Lecture 1: **Intermediate macroeconomics, autumn 2012**

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Literature: *Mankiw, Chapters 3 and 5.*

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Topics

1. **The relationship between saving, investment and the interest rate in a closed economy (the world economy)**
2. **The relationship between fiscal deficits and the interest rate**
3. **The relationship between saving, investment and the current account in an open economy**
4. **The relationship between the fiscal balance and the current account in an open economy**
5. **Trade imbalances in the euro area**
6. **The current account and the exchange rate**
7. **Sweden's crisis in the 1990s and the exchange rate depreciation**
8. **The need for real exchange rate depreciations in the euro area**

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A model of a closed economy

$Y = F(K, L)$	Production function
$K = \overline{K}$	Given capital stock
$L = \overline{L}$	Given labour force
$Y = C + I + G$	Goods market equilibrium
$C = C(Y - T)$	Consumption function
$I = I(r)$	Investment function
$G = \overline{G}$	Given government expenditure
$T = \overline{T}$	Given lump sum tax

Goods market equilibrium

$$\overline{Y} = C(\overline{Y} - \overline{T}) + I(r) + \overline{G}$$

$$\overline{G}\uparrow \Rightarrow r\uparrow \Rightarrow I\downarrow$$

Equilibrium in the market for credit ("loanable funds")

$$\overline{S} = \overline{Y} - C(\overline{Y} - \overline{T}) - \overline{G} = I(r)$$
Saving = Investment

$$\overline{S} = \left[\overline{Y} - \overline{T} - C(\overline{Y} - \overline{T}) \right] + \left[\overline{T} - \overline{G} \right] = I(r)$$
Private saving + Government saving = Investment

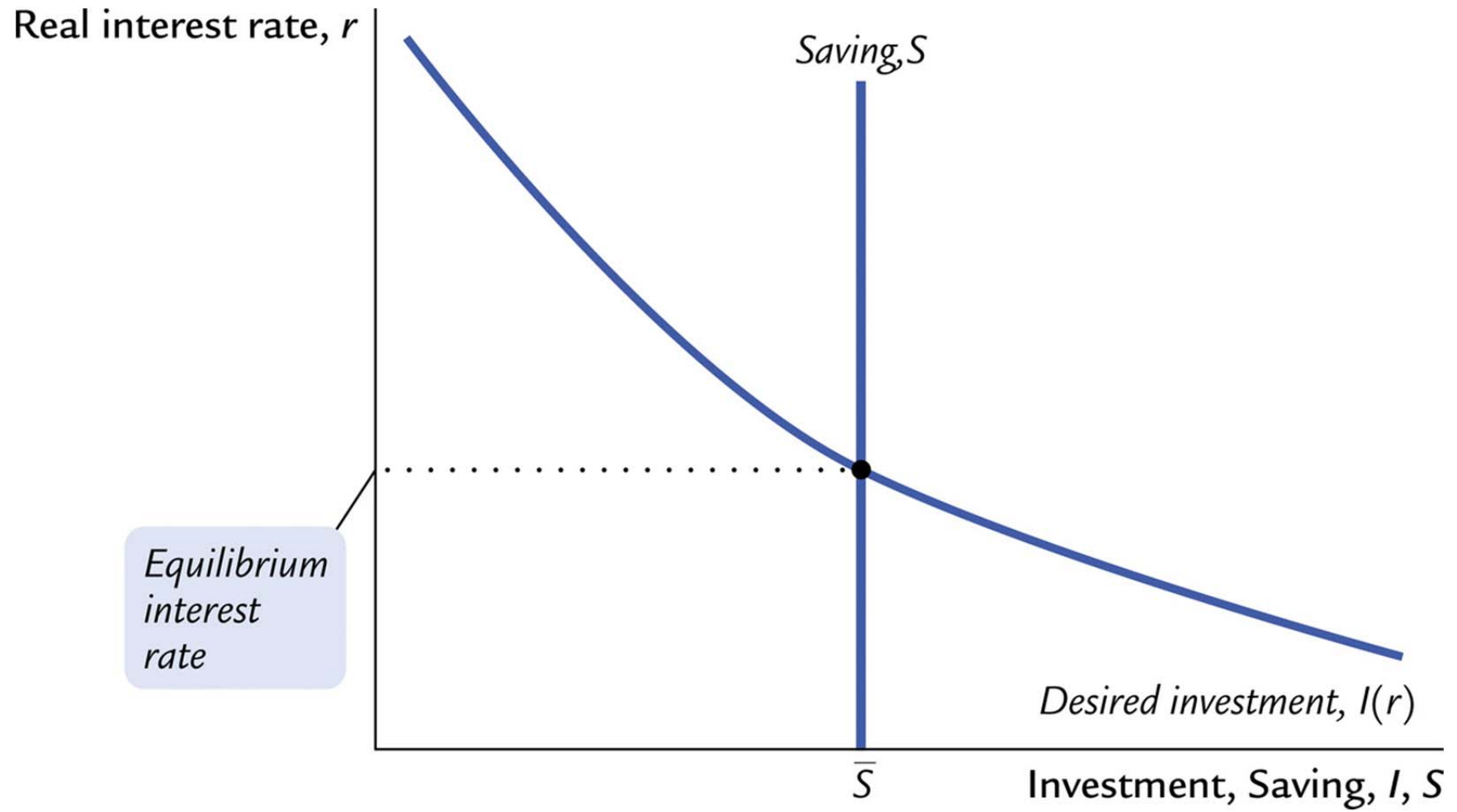$$\overline{G}\uparrow \Rightarrow r\uparrow \Rightarrow I\downarrow$$

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Figure 3-6: The consumption function

Consumption, C

Consumption
function

MPC

1

Disposable income, $Y - T$
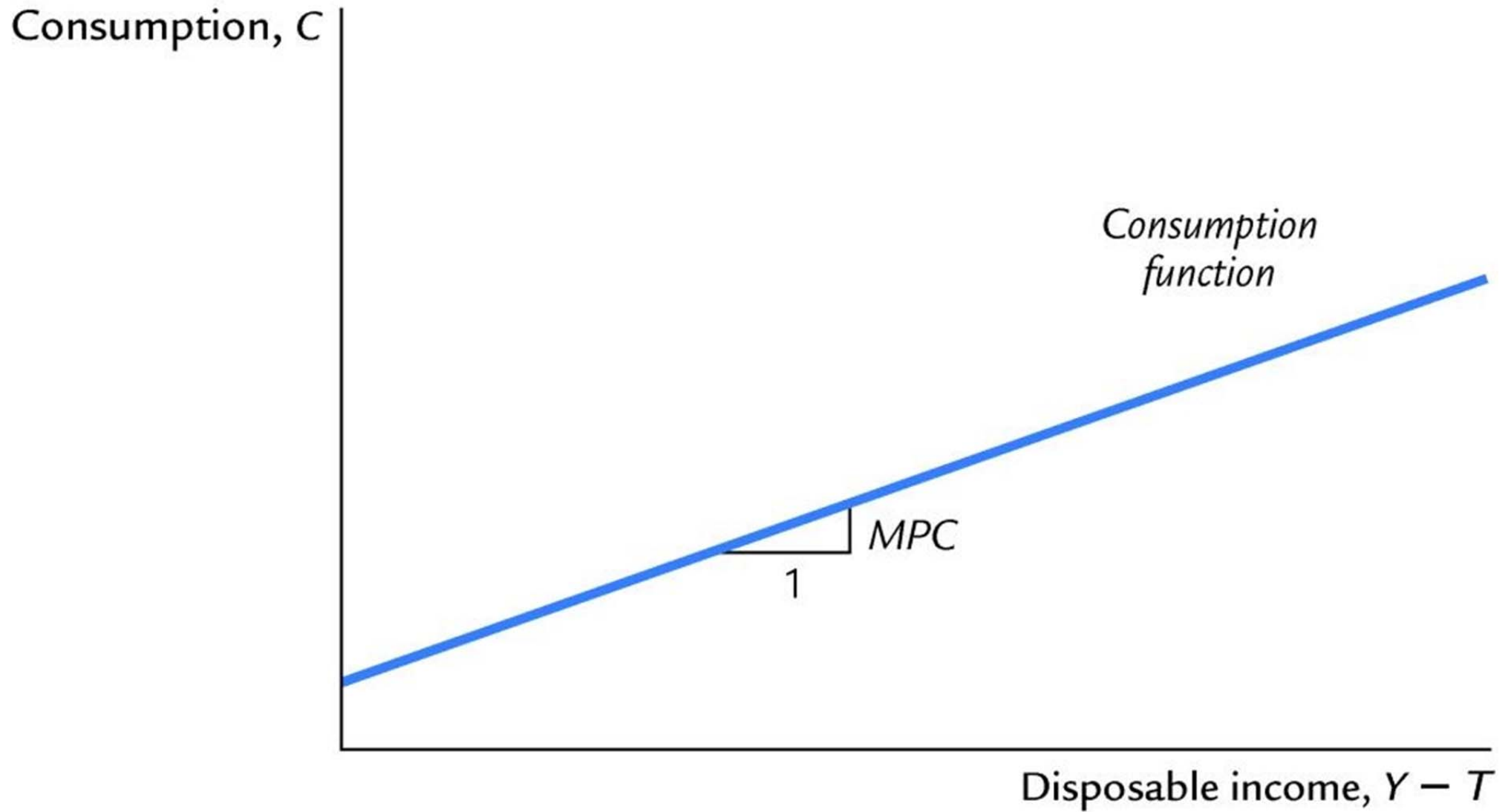
Figure 3-7: The investment function
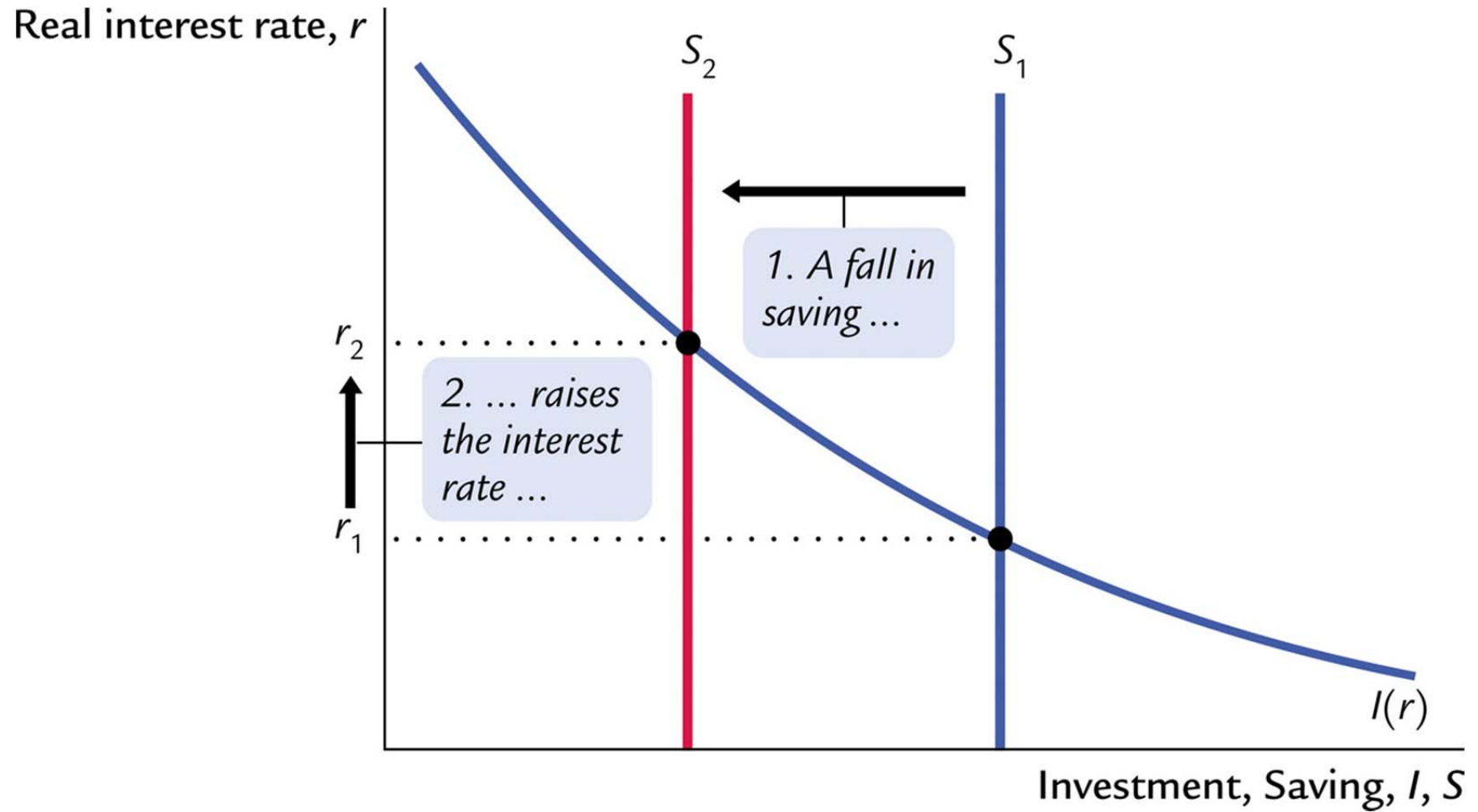

Real interest rate, r

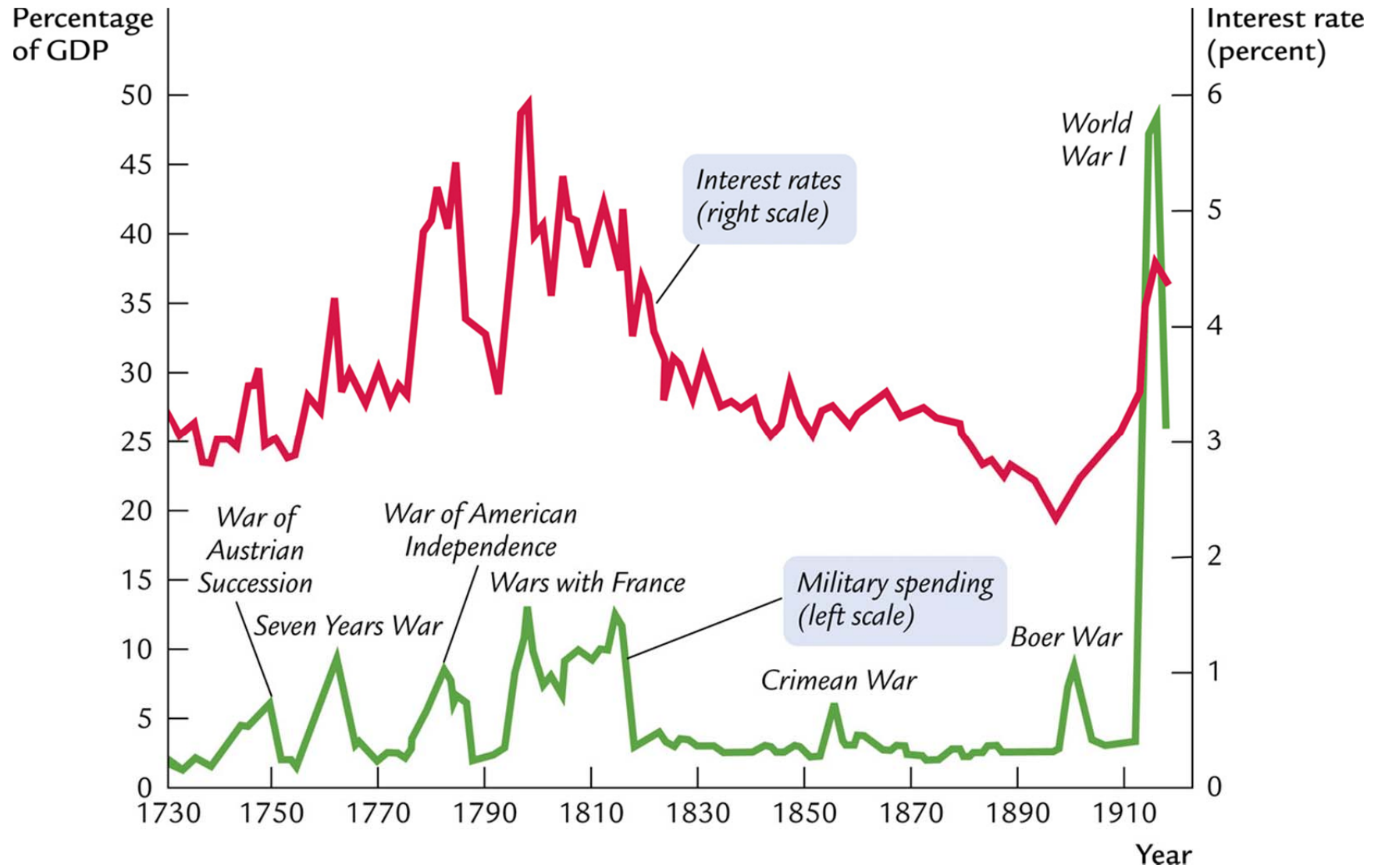Investment function, $I(r)$

Quantity of investment, I
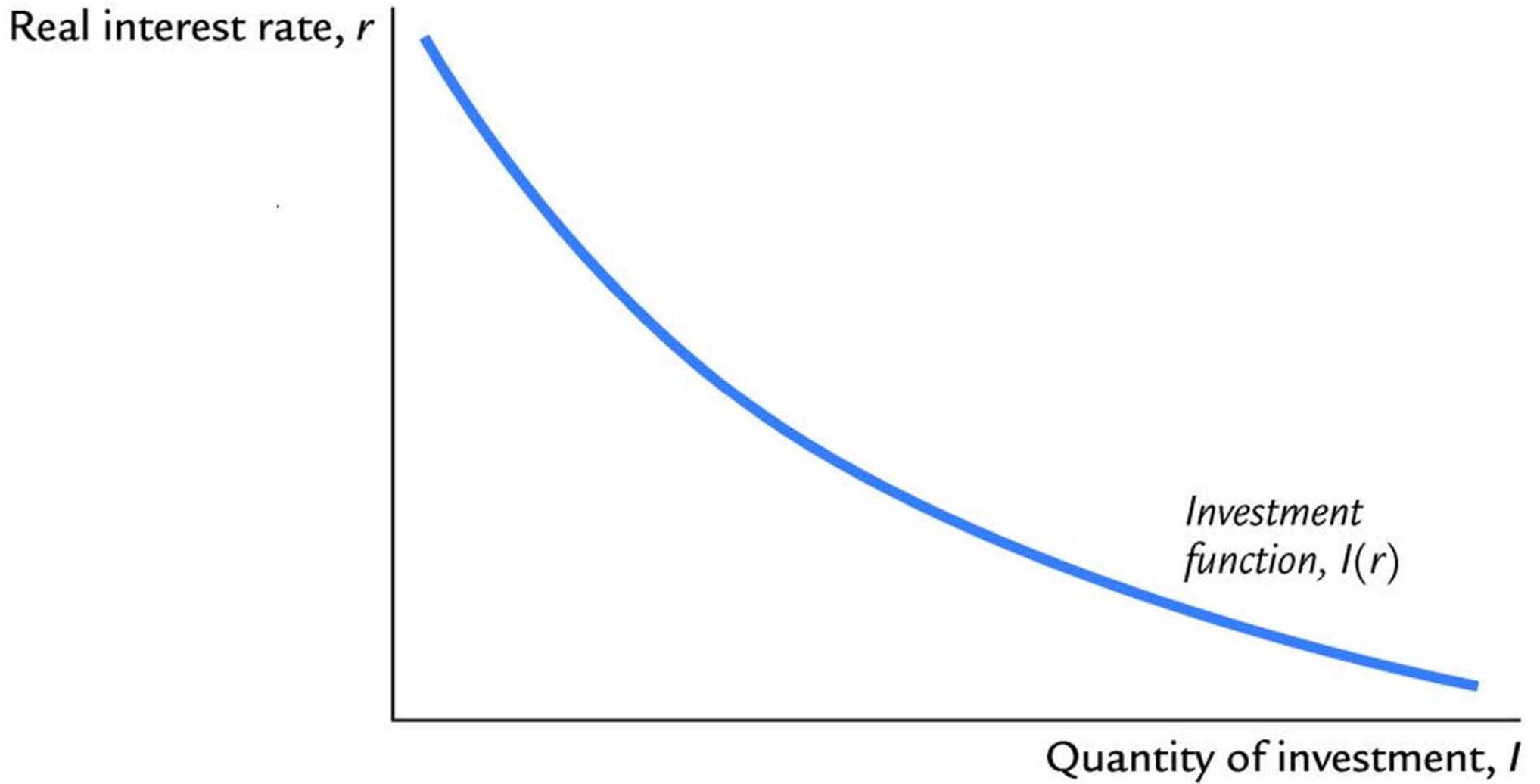
Figure 3-8: Saving, investment and the interest rate

Figure 3-9: A reduction in saving

Figure 3-10: Military spending and the interest rate in the United Kingdom
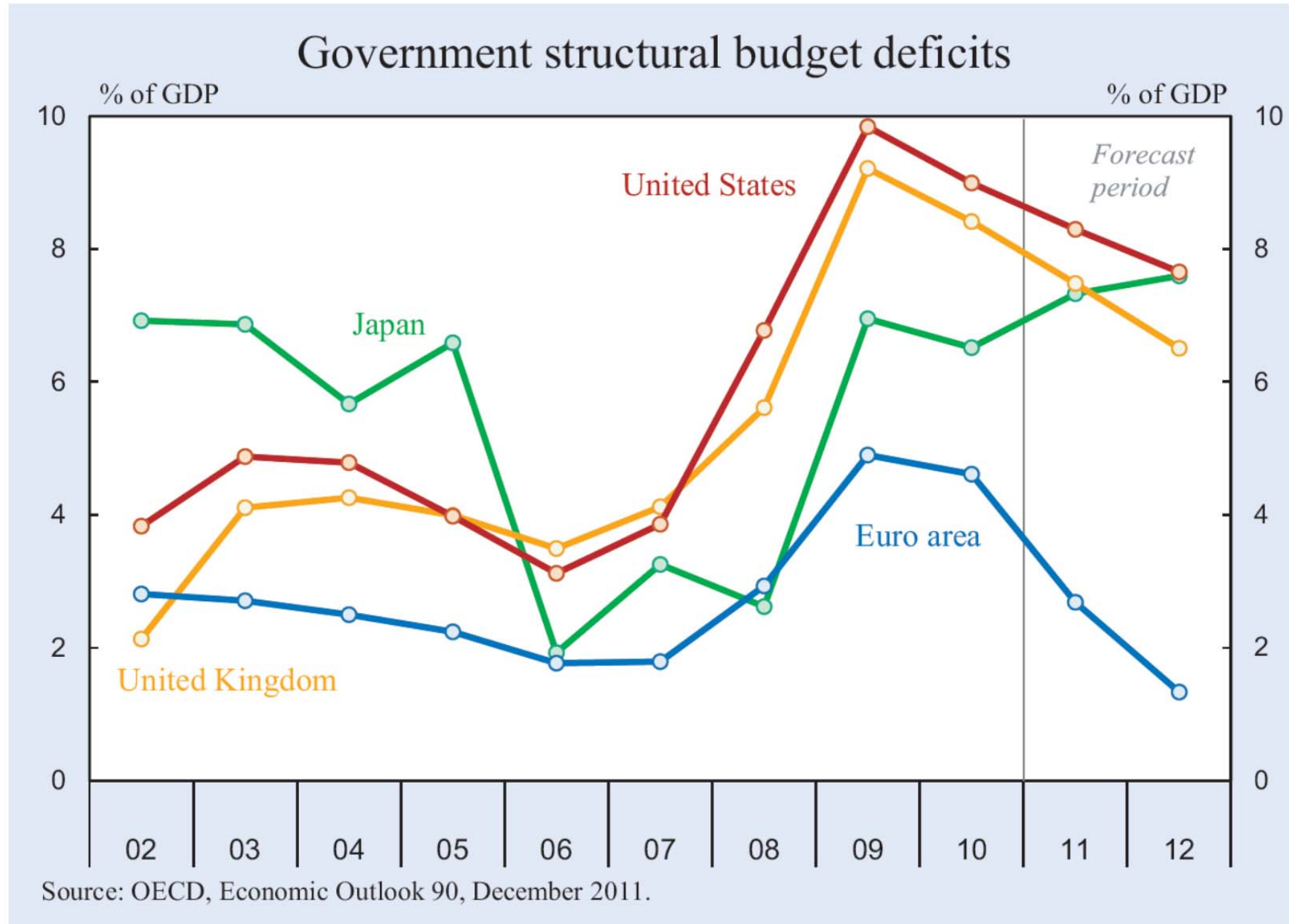
Current situation

- **Fiscal deficits in many countries**
  - **insufficient fiscal restraint in good times**
  - **fall in tax revenues in the financial crisis**
  - **support to the financial sector**
  - **fiscal stimulus programmes**

- **High interest rates in countries with solvency problems**

- **So far low interest rates in countries without credibility problems**

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General government net lending, per cent of GDP

	2011	2012
US	-9.6	-8.3
Japan	-8.2	-8.2
EU-15	-4.5	-3.6
UK	-8.3	-6.7

Source: European Commission

Figure 1.17

Government structural budget deficits

Source: OECD, Economic Outlook 90, December 2011.

Statsobligationsräntor i valda länder

Procent, dagsvärden, 5-dagars glidande medelvärde

Spanien
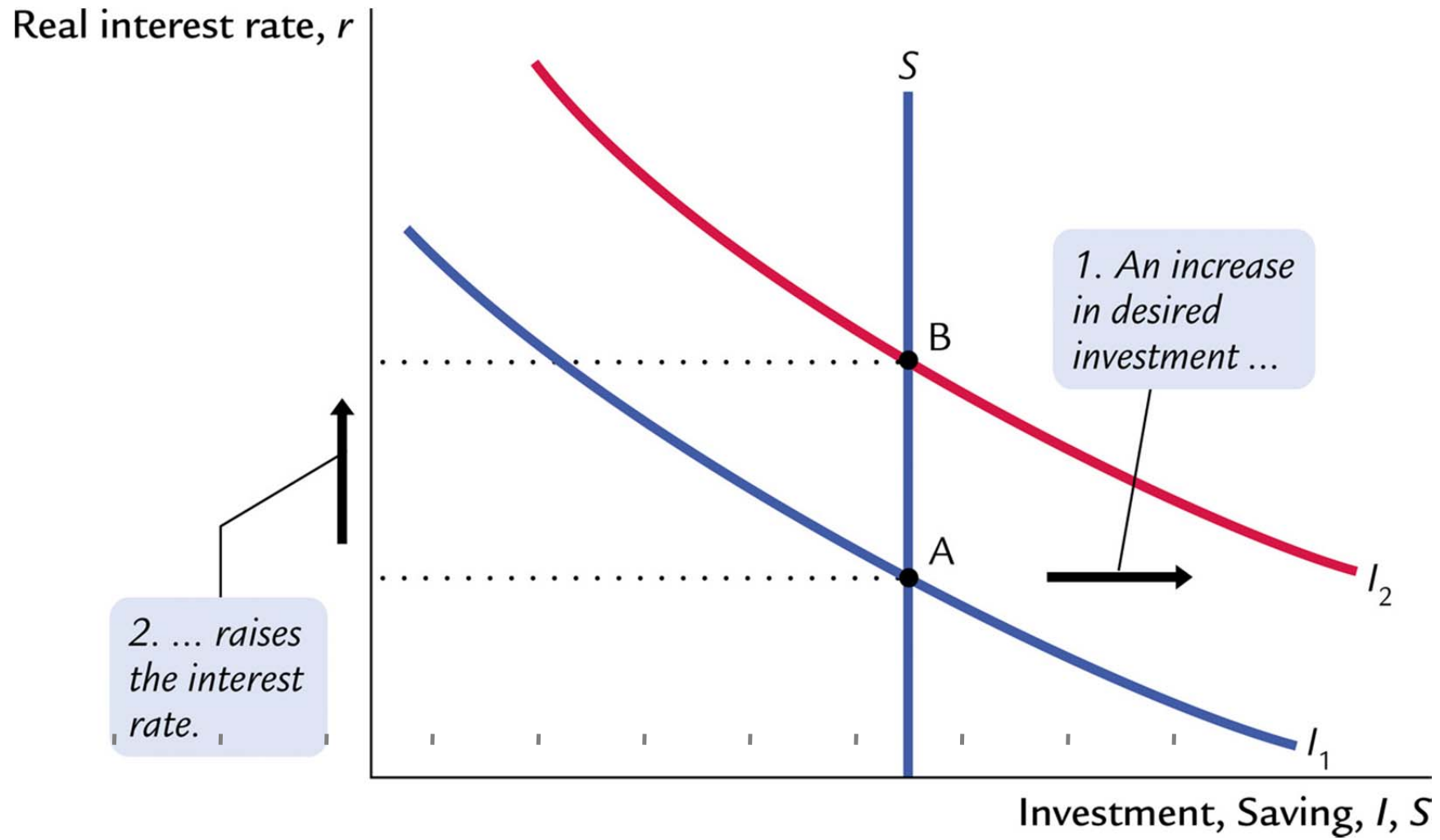Tyskland
Italien
Sverige
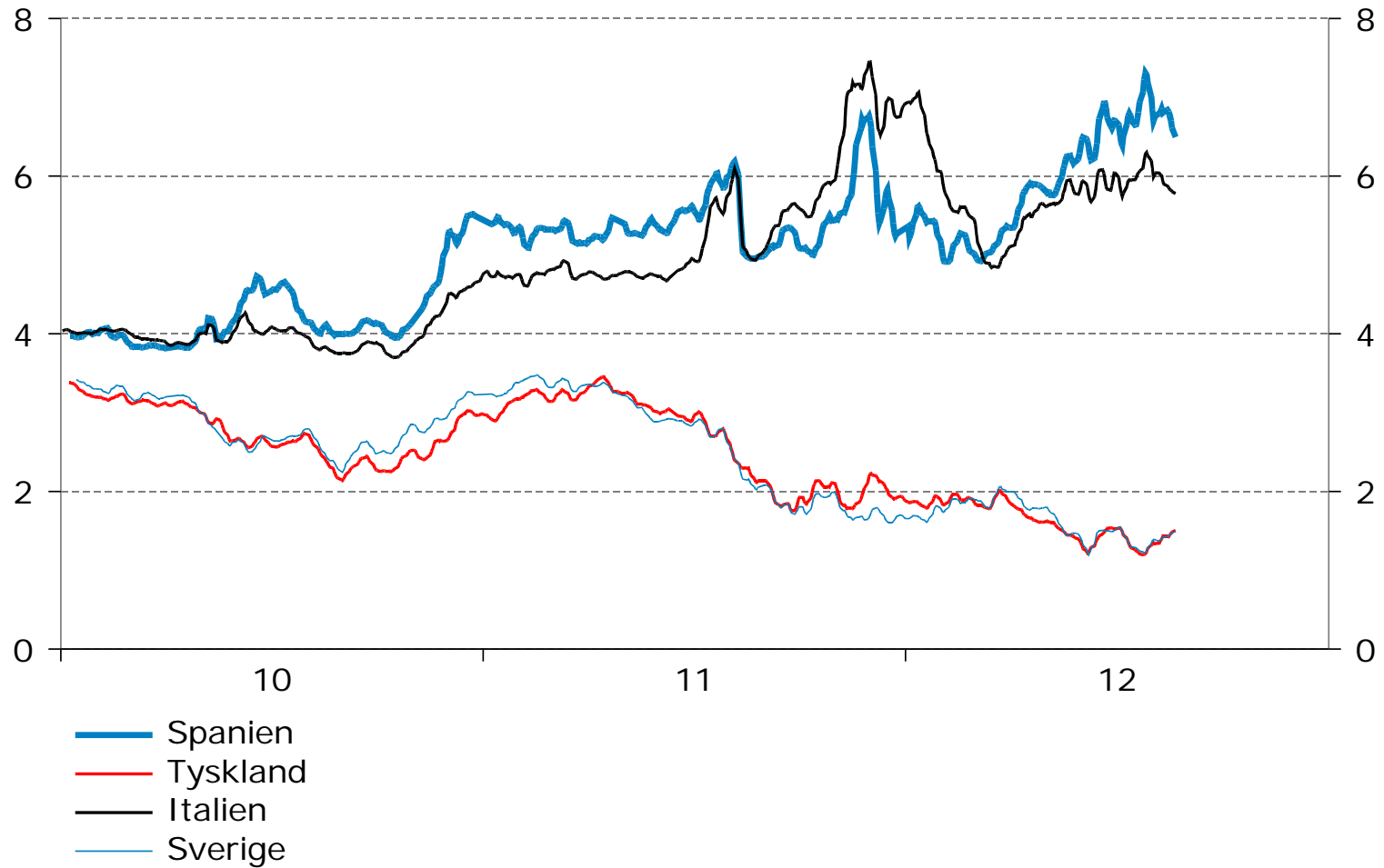
Realobligationsräntor

Procent, månadsvärden

Storbritannien
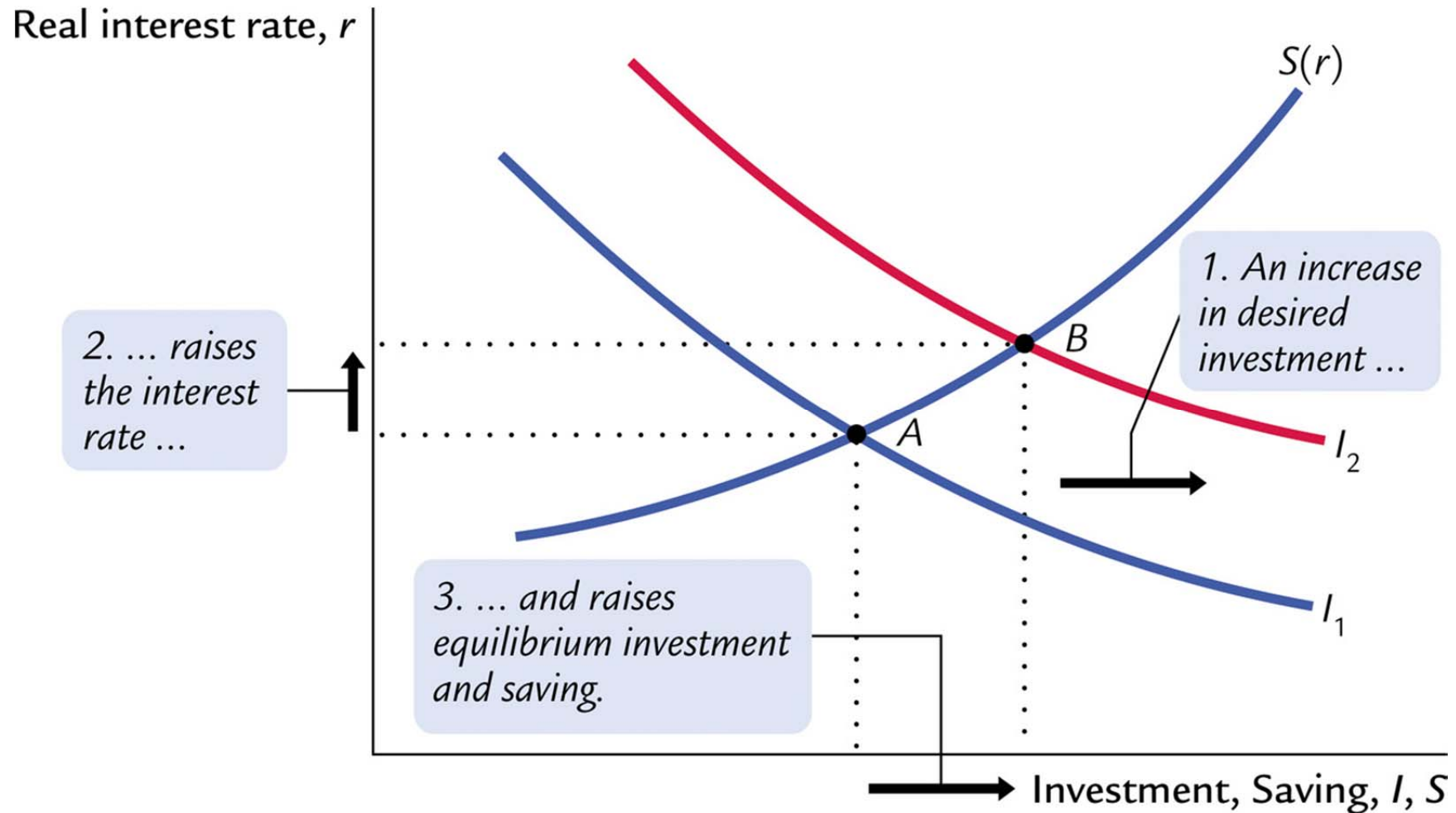USA
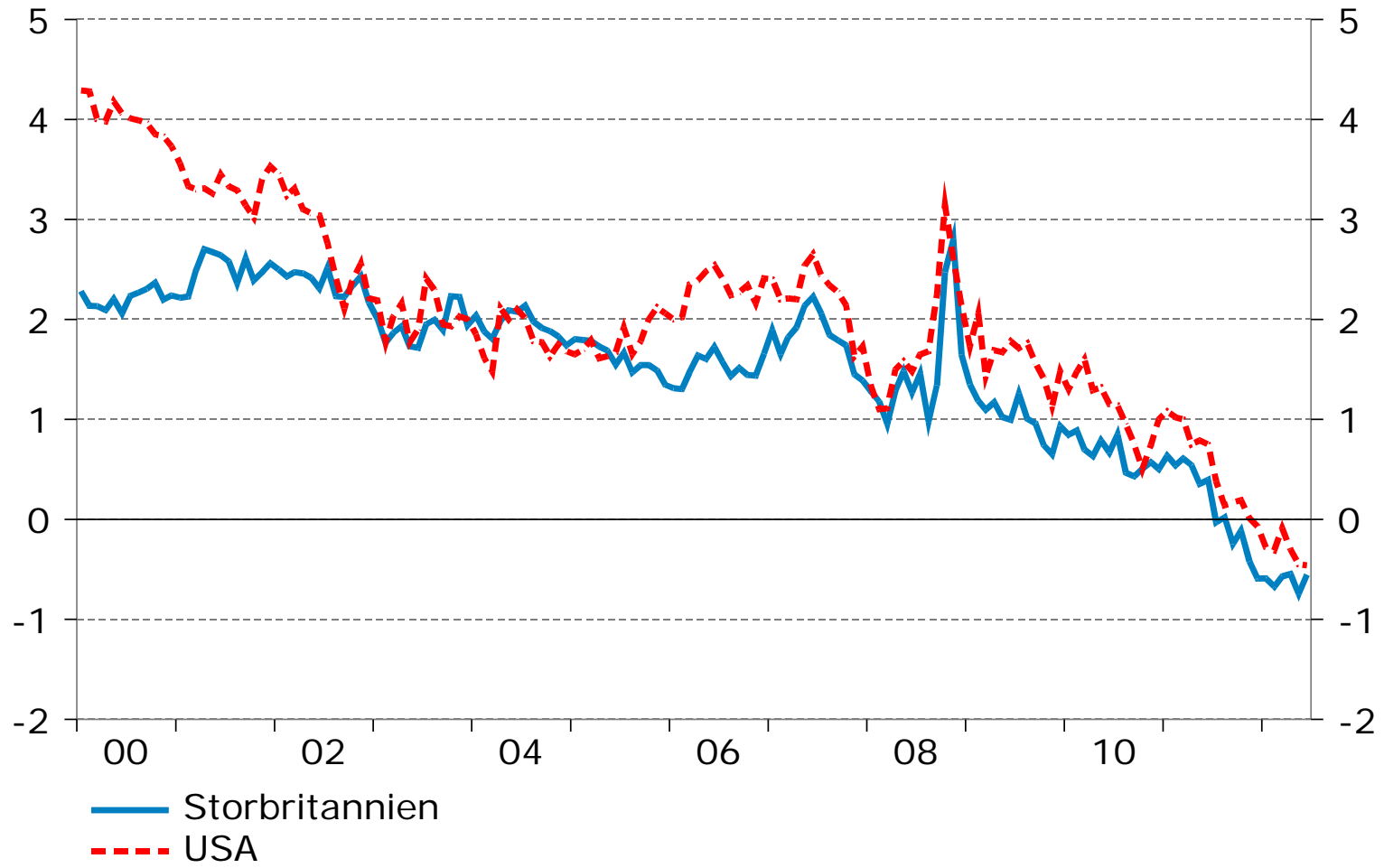
Figure 3-11: An Increase in the demand for investment
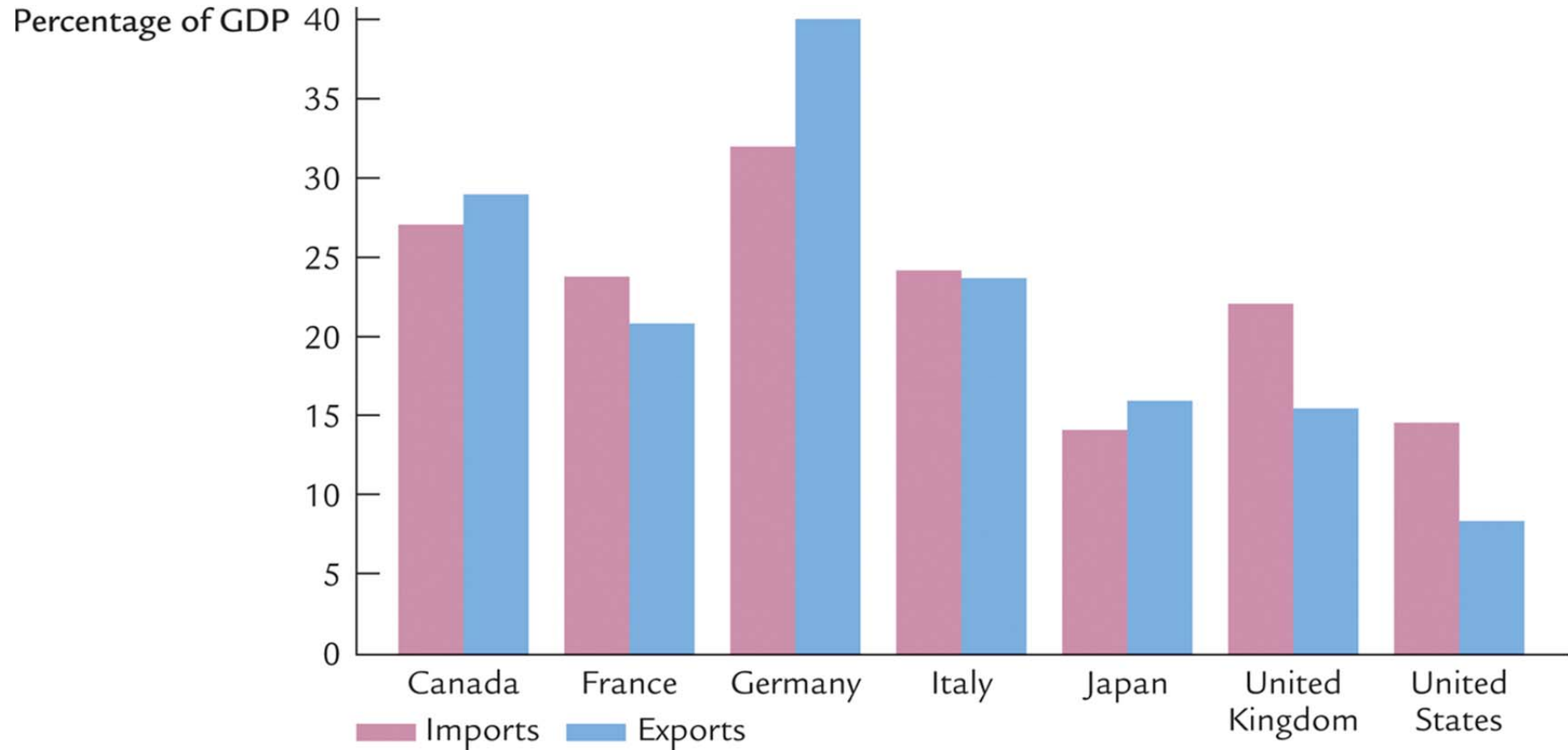
Figure 3-12: An increase in investment demand when saving depends on the interest rate

Real interest rate, r

$S(r)$

1. An increase in desired investment …

2. … raises the interest rate …

B

I_2

A

I_1

3. … and raises equilibrium investment and saving.

Investment, Saving, I, S

Figure 5.1 Imports and exports as a percentage of output: 2007

Equilibrium in the open economy

$$Y = C^d + I^d + G^d + EX$$

$$C = C^d + C^f \Rightarrow C^d = C - C^f$$

$$I = I^d + I^f \Rightarrow I^d = I - I^f$$

$$G = G^d + G^f \Rightarrow G^d = G - G^f$$

$$Y = (C - C_f) + (I - I^f) + (G - G^f) + EX$$

$$Y = C + I + G + EX - \underbrace{(C^f + I^f + G^f)}_{IM}$$

$$Y = C + I + G + \underbrace{EX - IM}_{NX}$$

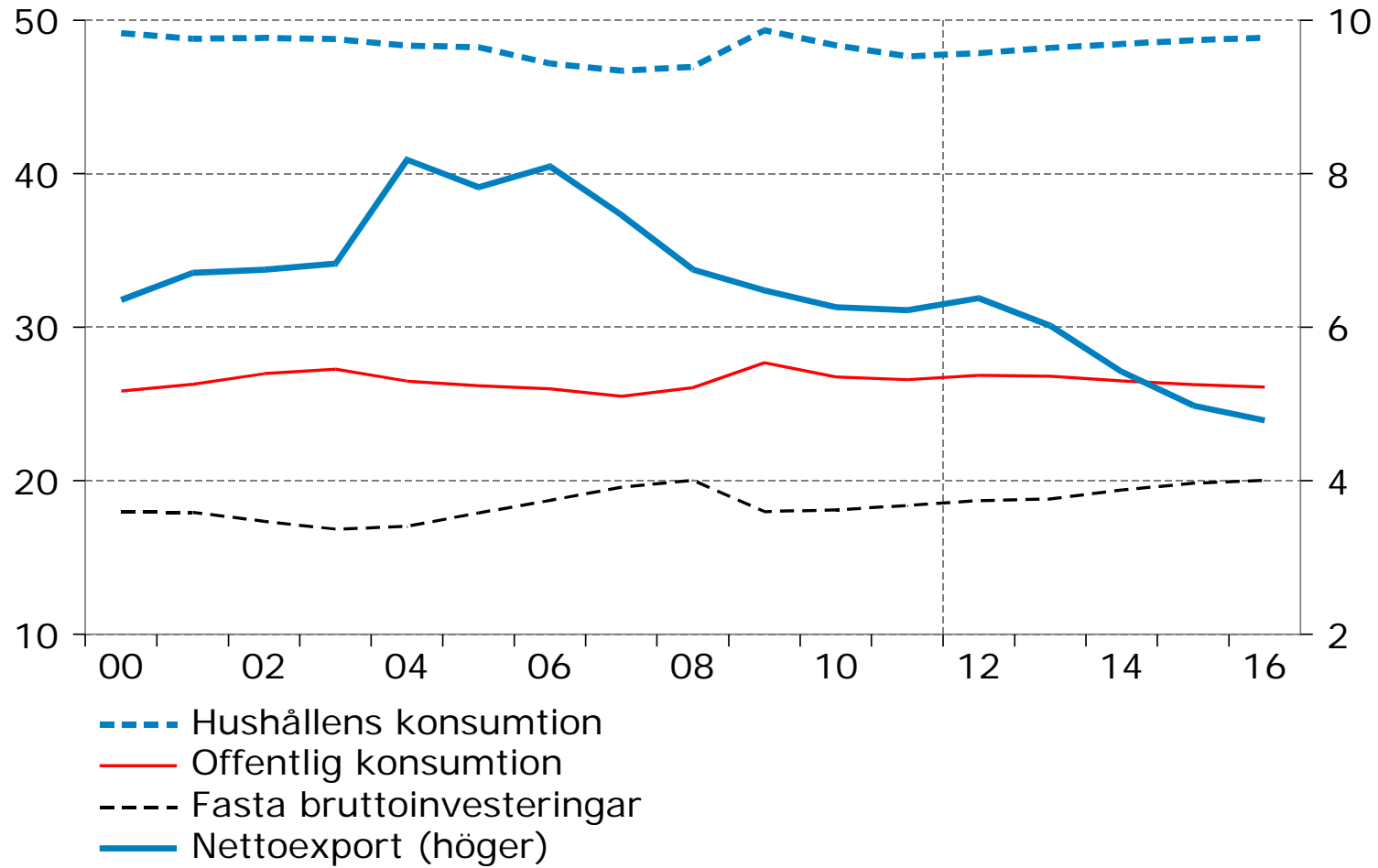$$Y = C + I + G + NX$$

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

Net Exports = Output – Domestic Spending

BNP-andelar

Procent av BNP, löpande priser

- - - - - Hushållens konsumtion
——— Offentlig konsumtion
- - - - Fasta bruttoinvesteringar
——— Nettoexport (höger)

Saving-investment balance in an open economy

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

Saving can be of two forms: physical accumulation of real capital (I) or accumulation of financial claims on the rest of the world resulting from net exports (NX).

$S - I = NX$

- **Net exports are the difference between saving and investment.**
- **Net exports = trade balance**
- **Saving minus investment = net capital outflow (net foreign investment)**

A model of a small open economy

$$r = r^*$$

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

$$C = C(Y - \overline{T})$$

$$I = I(r)$$

$$NX = (Y - C - \overline{G}) - I = S - I$$

Reduced form

$$NX = \left[\overline{Y} - C(\overline{Y} - \overline{T}) - \overline{G}\right] - I(r^*)$$
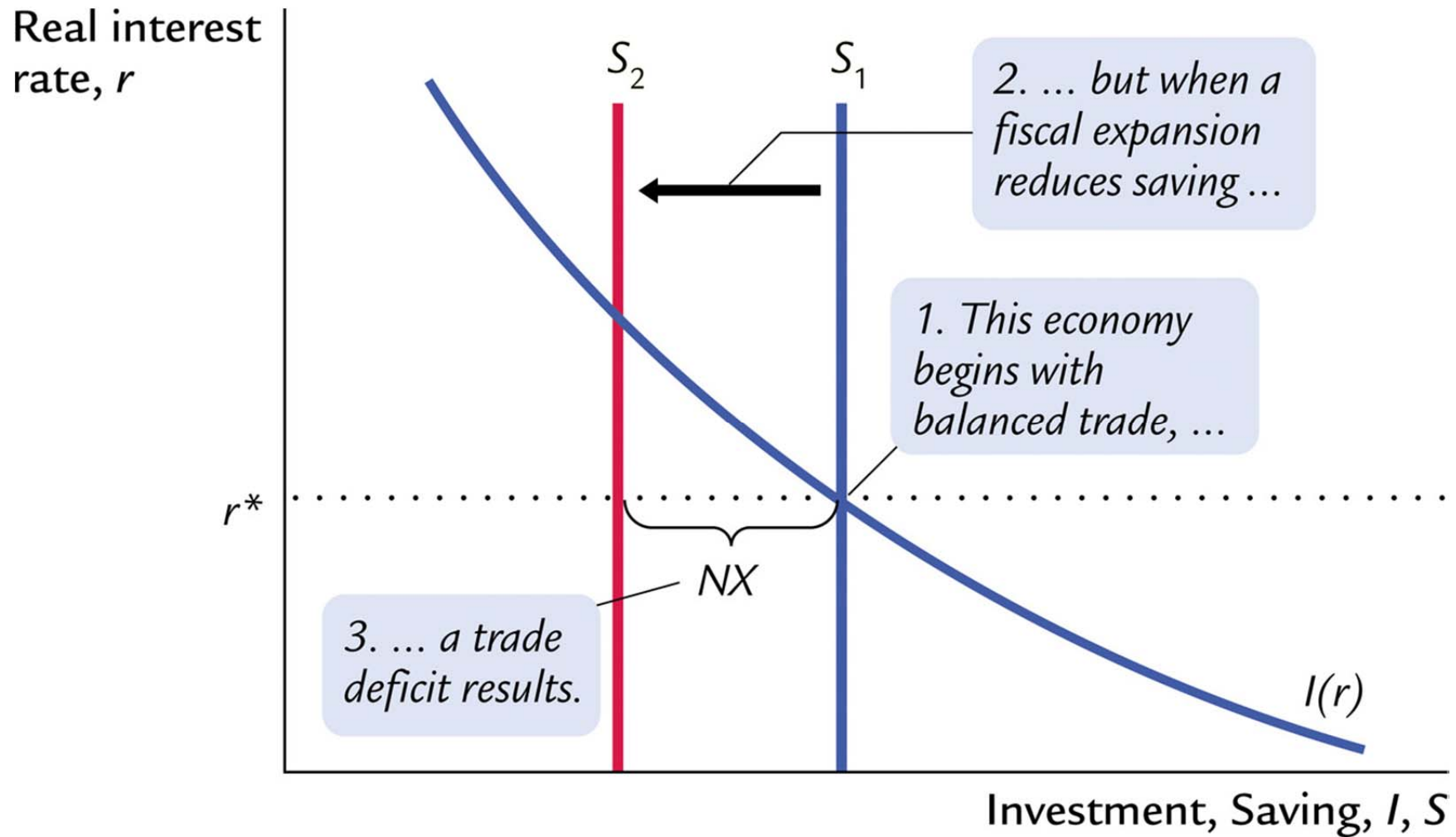
$$NX = \overline{S} - I(r^*)$$

Net export equals the difference between saving and investment at the given world market real rate of interest

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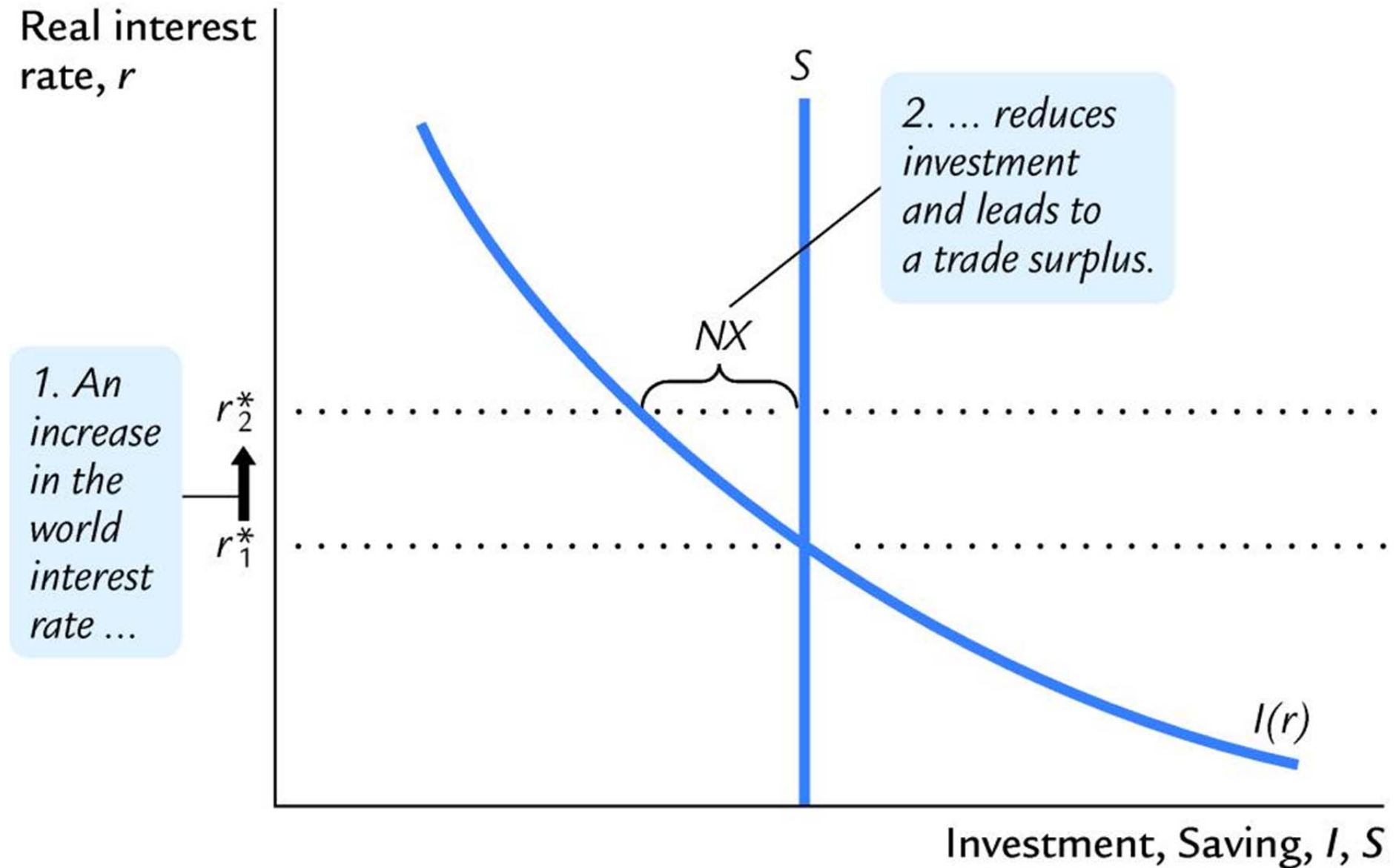
Figure 5-2: Saving and investment in a small open economy
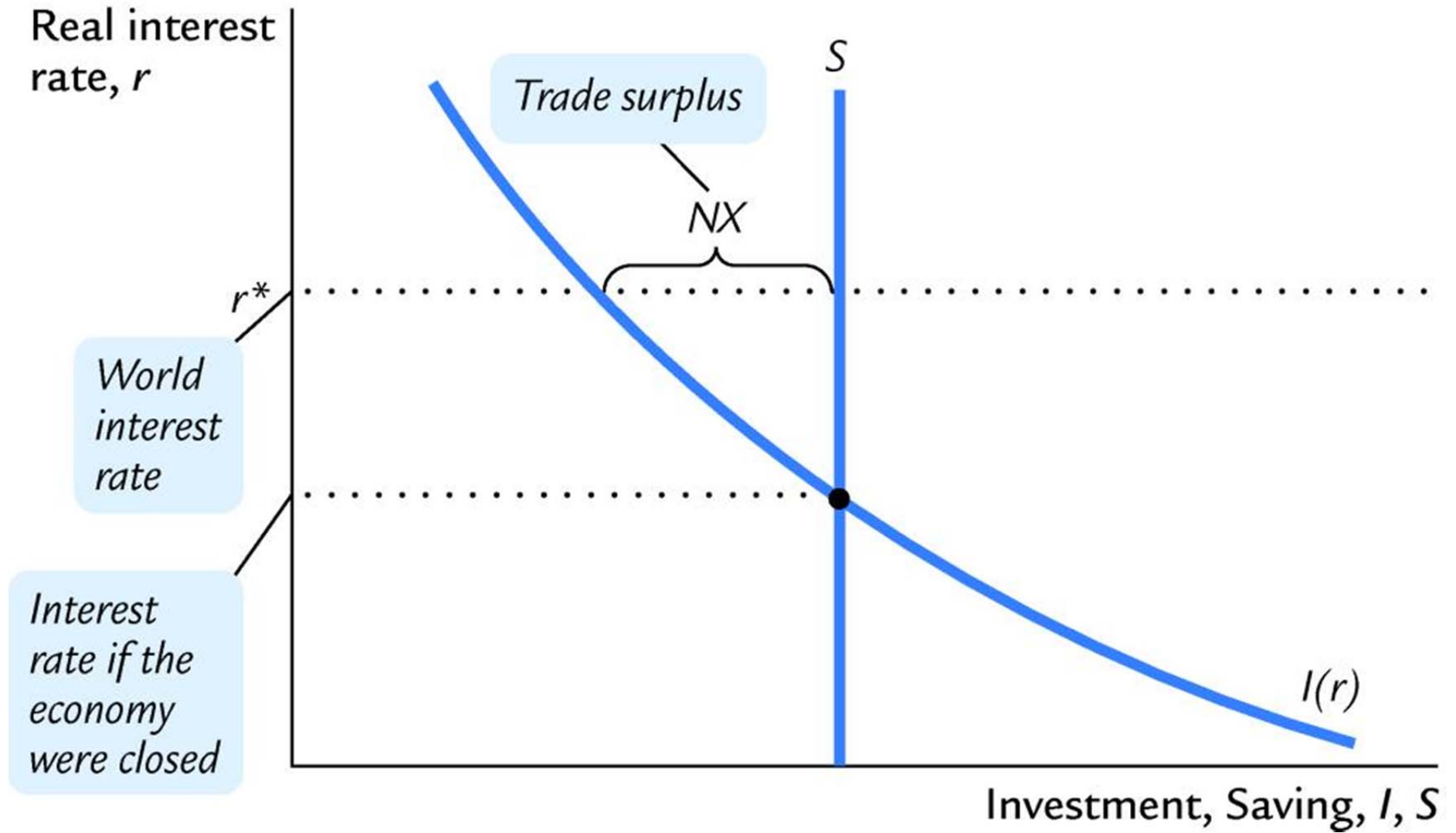
Figure 5-3: A fiscal expansion at home in a small open economy

Figure 5.4: A fiscal expansion abroad in a small open economy

Real interest rate, r

S

2. ... reduces investment and leads to a trade surplus.

NX

1. An increase in the world interest rate ...

r_2^*

r_1^*

$I(r)$

Investment, Saving, I, S

Figure 5-5: A shift in the investment schedule in a small open economy

Real interest rate, r

S

1. An increase in investment demand …

2. … leads to a trade deficit.

NX

r^*

$I(r)_2$

$I(r)_1$

Investment, Saving, I, S
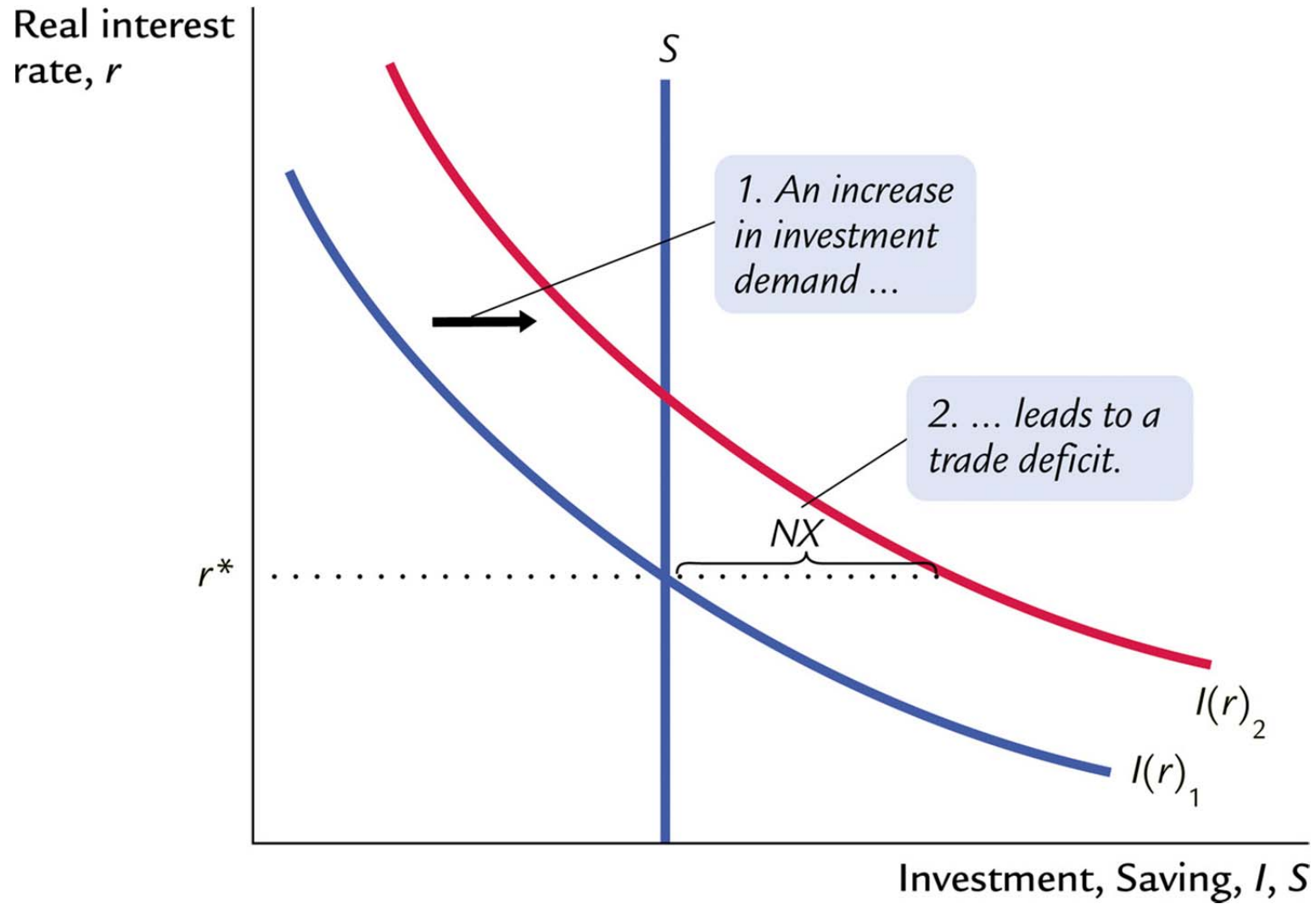
Current account balance = Net exports + net return on foreign assets

CA = NX + r · NFA
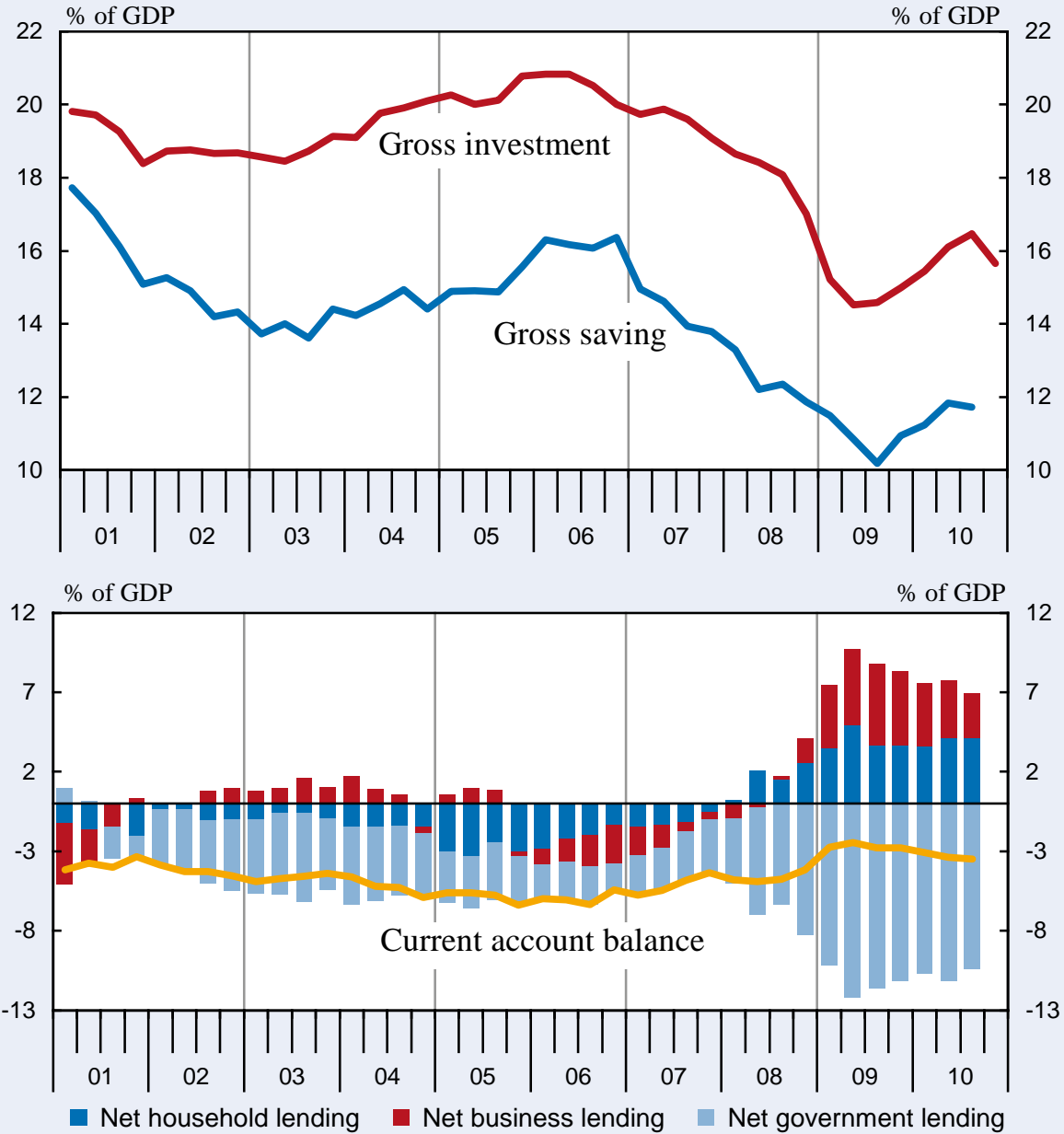
CA = current account balance

NX = net exports

r = interest rate

NFA = Net foreign assets = Foreign assets - Foreign debt

Mankiw simplifies the analysis by neglecting the net return on foreign assets.

US current account

Source: Bureau of Economic Analysis; Datastream, last accessed on 19 January 2011.
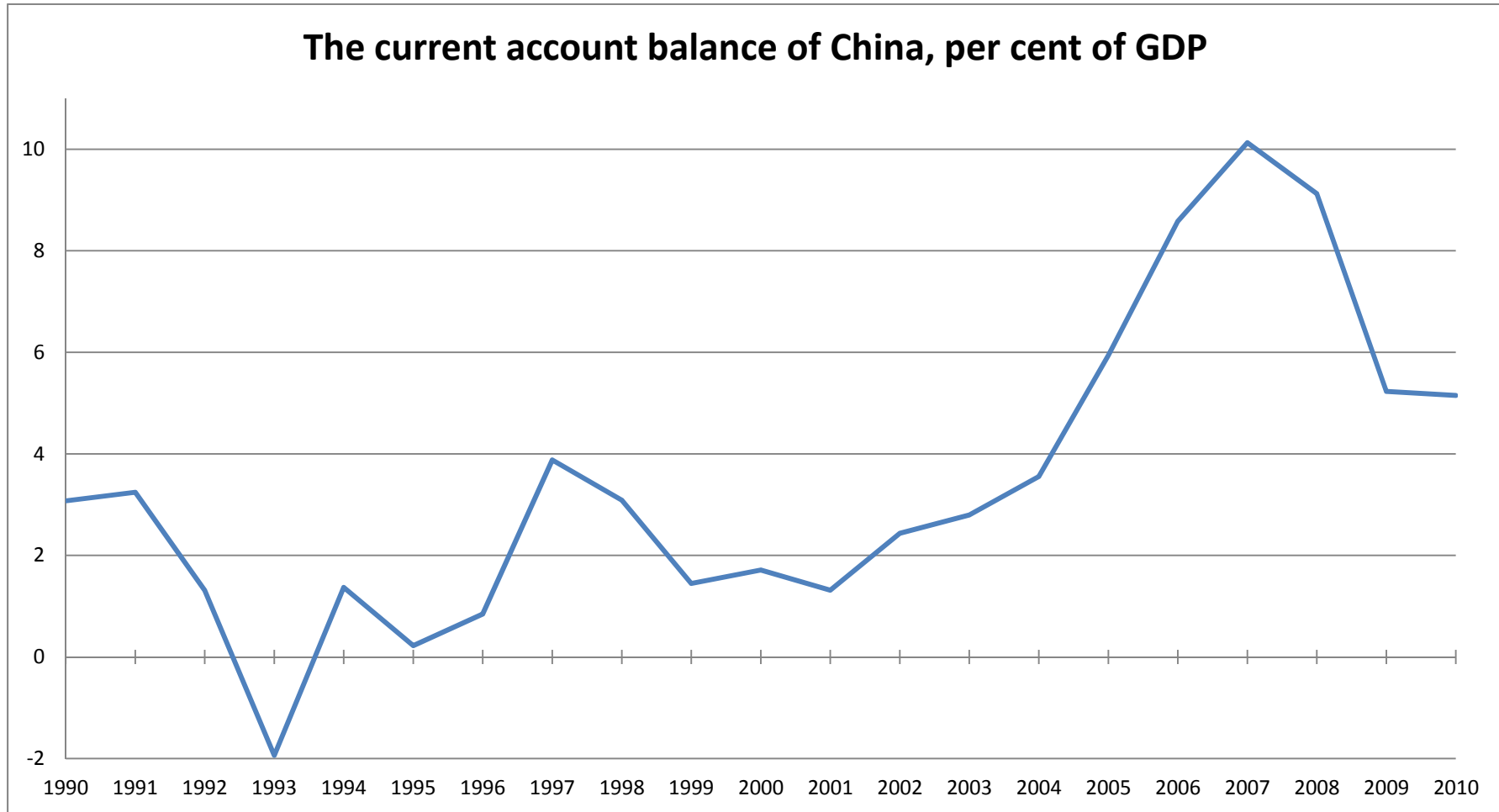
The current account balance of China, per cent of GDP

Figure 1. Global Current Account, 2001–11

All Countries: Actual Unadjusted
Current Account, 2001–11
(Percent of world GDP)
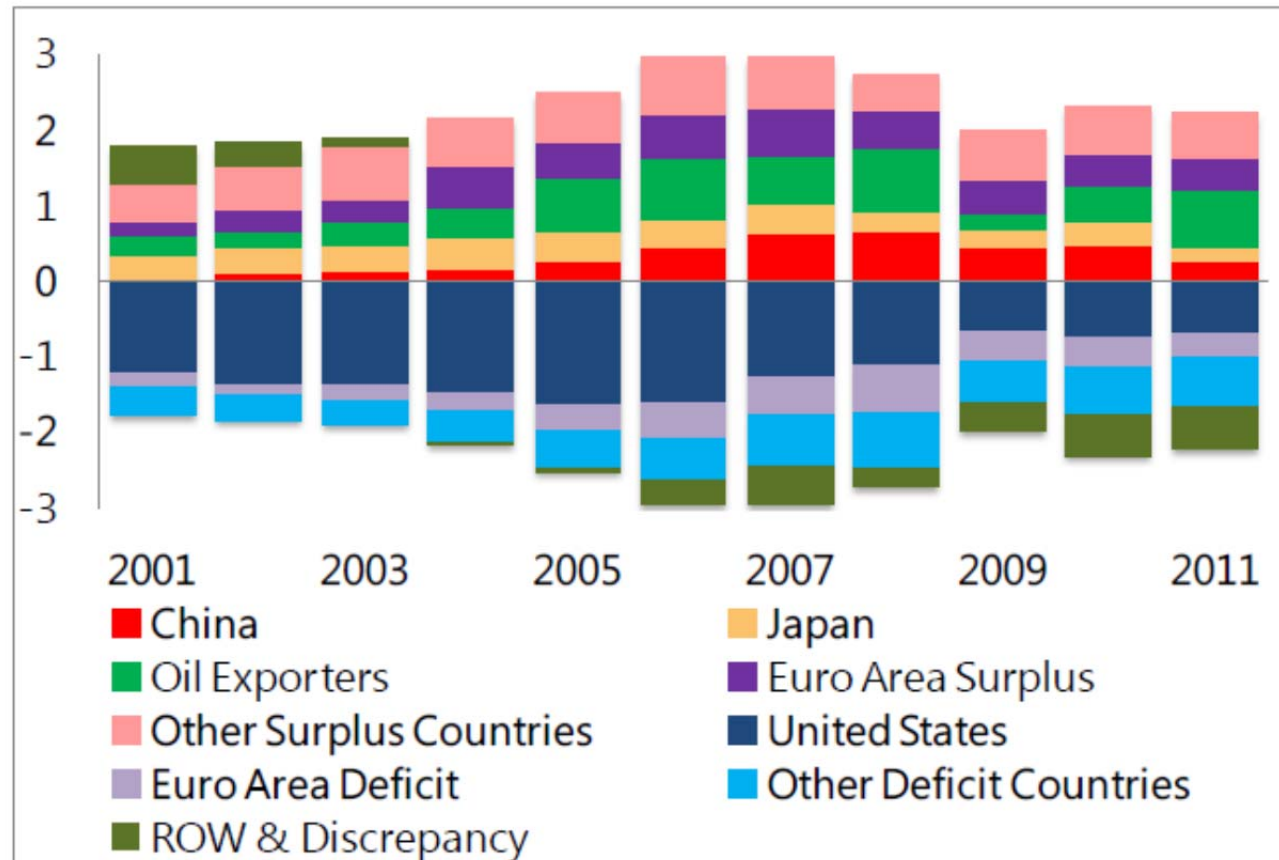
Source: IMF, World Economic Outlook Database

External balances from a savings and investment perspective
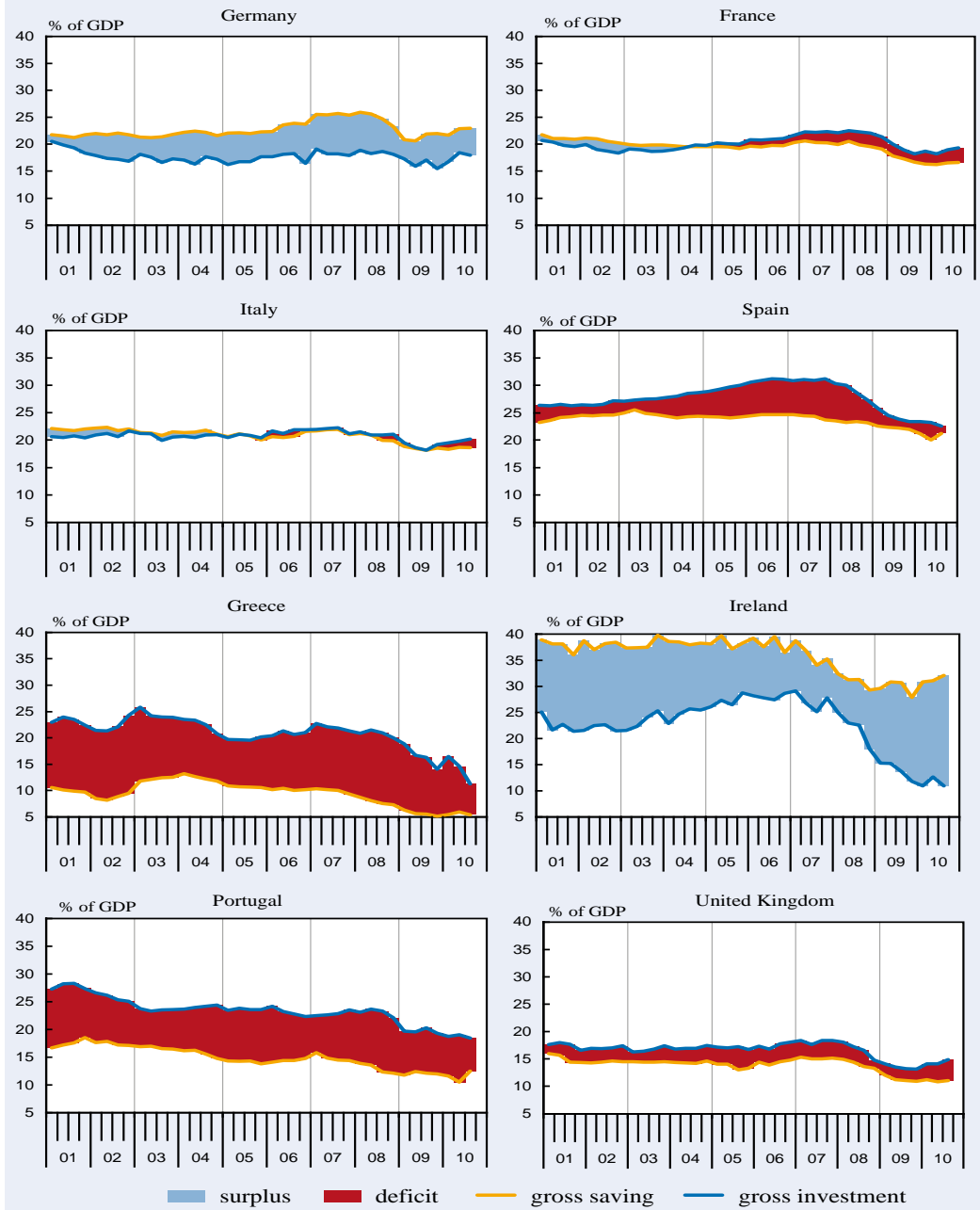
Source: Eurostat, last accessed on 19 January 2011.

Current account balances 2005-2010

% of GDP

Country	Value
Luxembourg	8.4
Netherlands	6.4
Germany	6.1
Austria	3.2
Finland	3.0
Belgium	0.6
France	-1.2
Italy	-2.0
Slovenia	-3.1
Ireland	-3.5
Slovakia	-5.3
Malta	-6.7
Estonia	-7.4
Spain	-7.6
Cyprus	-10.3
Portugal	-10.8
Greece	-11.7
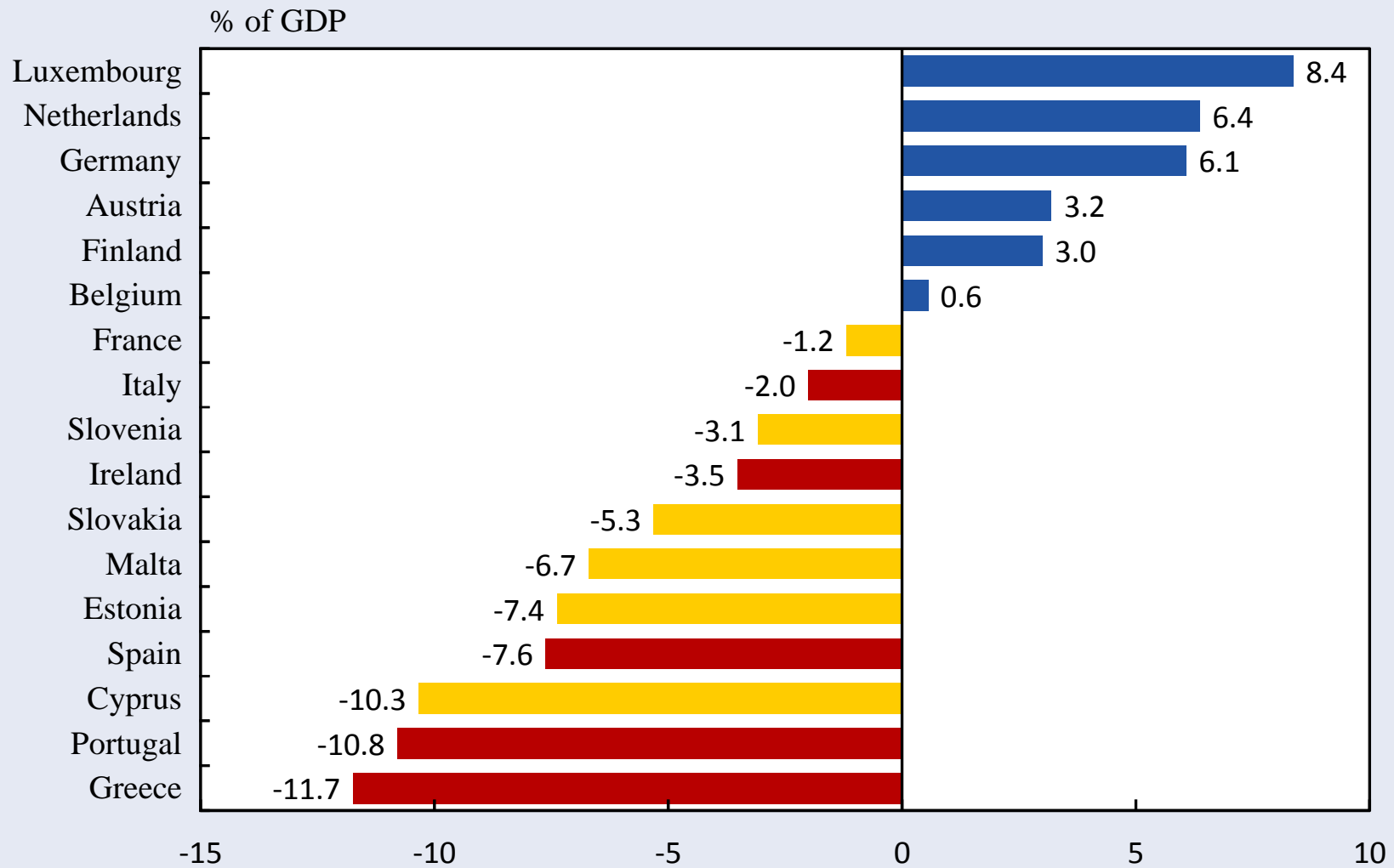
Source: Eurostat, Ifo Institute calculations.

| Current account (per cent of GDP)			
	2010	**2011**	**2012**
Greece	-12,3	-11,3	-7,8
Ireland	0,5	0,0	1,6
Portugal	-9,7	-6,5	-3,6
Spain	-4,5	-2,0	-1,0
Italy	-3,5	-1,3	-3,0
Cyprus	-8,7	-7,7	-7,2
Germany	5,8	5,3	4,7
Euro area	1,4	-0,4	-0,6
Sweden	6,8	6,4	5,8

<u>Qualifications regarding interest rates</u>

- **The interest rate *r* in Mankiw should be interpreted as a long-term bond interest rate (say on 10-year bonds)**

- **In Mankiw there is only <u>one</u> world real interest rate which applies to all countries**

- **This is a reasonable assumption when debts of various countries are regarded as perfect substitutes for each other**

- **It is not a reasonable assumption when financial markets, as they do now, doubt the solvency (the ability to service the debt) of some countries**

- **In such a situation investors demand a risk premium when lending to countries that are regarded as risky**
  - **currently large interest rate differentials on government bonds in the eurozone with higher interest rates for countries with large government debt**
  - **these interest rate differentials spill over to private sector debt**

Public finances 2011		
	Government net lending (per cent of GDP)	**General government consolidated gross debt (per cent of GDP)**
Greece	-9,1	165,3
Ireland	-13,1	108,2
Italy	-3,9	120,1
Portugal	-4,2	107,8
Spain	-8,5	69,6
Cyprus	-6,3	71,6
Belgium	-3,7	98,0
France	-5,2	85,8
Germany	-1,0	81,2
Sweden	0,3	38,4

Interest rates, ten-year government bonds
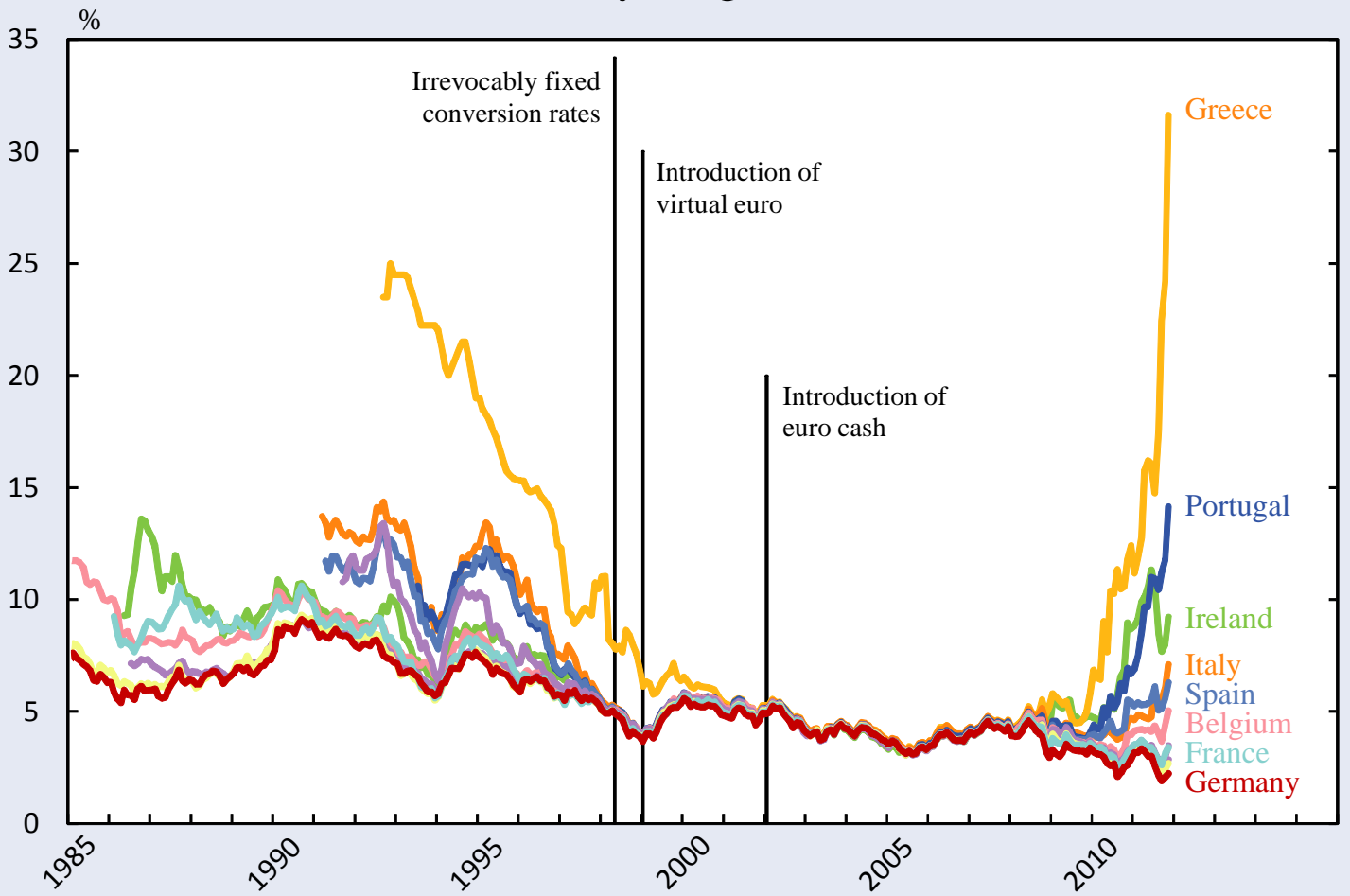
Source: Thomson Reuters Datastream.

The real exchange rate

Real exchange rate = the relative price between domestic and foreign goods

p = Swedish product price in SEK

p^* = foreign product price (in \$)

e = nominal exchange rate (units of foreign currency per unit of domestic currency, \$/SEK)

ε = real exchange rate

Real exchange rate = nominal exchange rate (\$/SEK) x Swedish product price (SEK) / foreign product price (\$)

$\varepsilon = e \times (p/p^*)$

$$\frac{\Delta \varepsilon}{\varepsilon} \approx \frac{\Delta e}{e} + \frac{\Delta p}{p} - \frac{\Delta p^*}{p}$$

Percentage change in real exchange rate ≈ percentage change in nominal exchange rate + percentage change in Swedish product price – percentage change in foreign product price
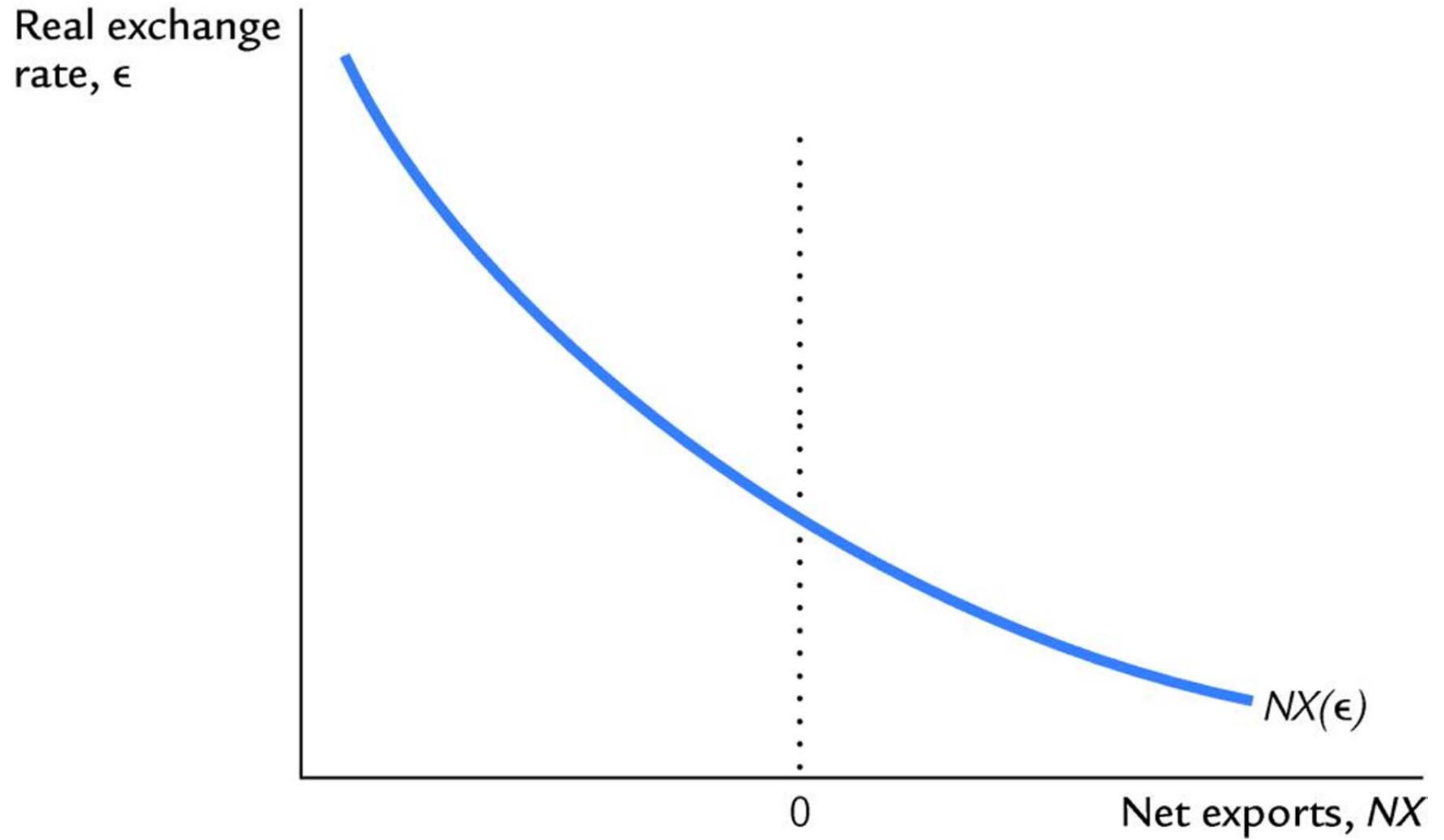

$\varepsilon \uparrow \Leftrightarrow$ real appreciation (the relative price of domestic goods increases)

$\varepsilon \downarrow \Leftrightarrow$ real depreciation (the relative price of domestic goods falls)
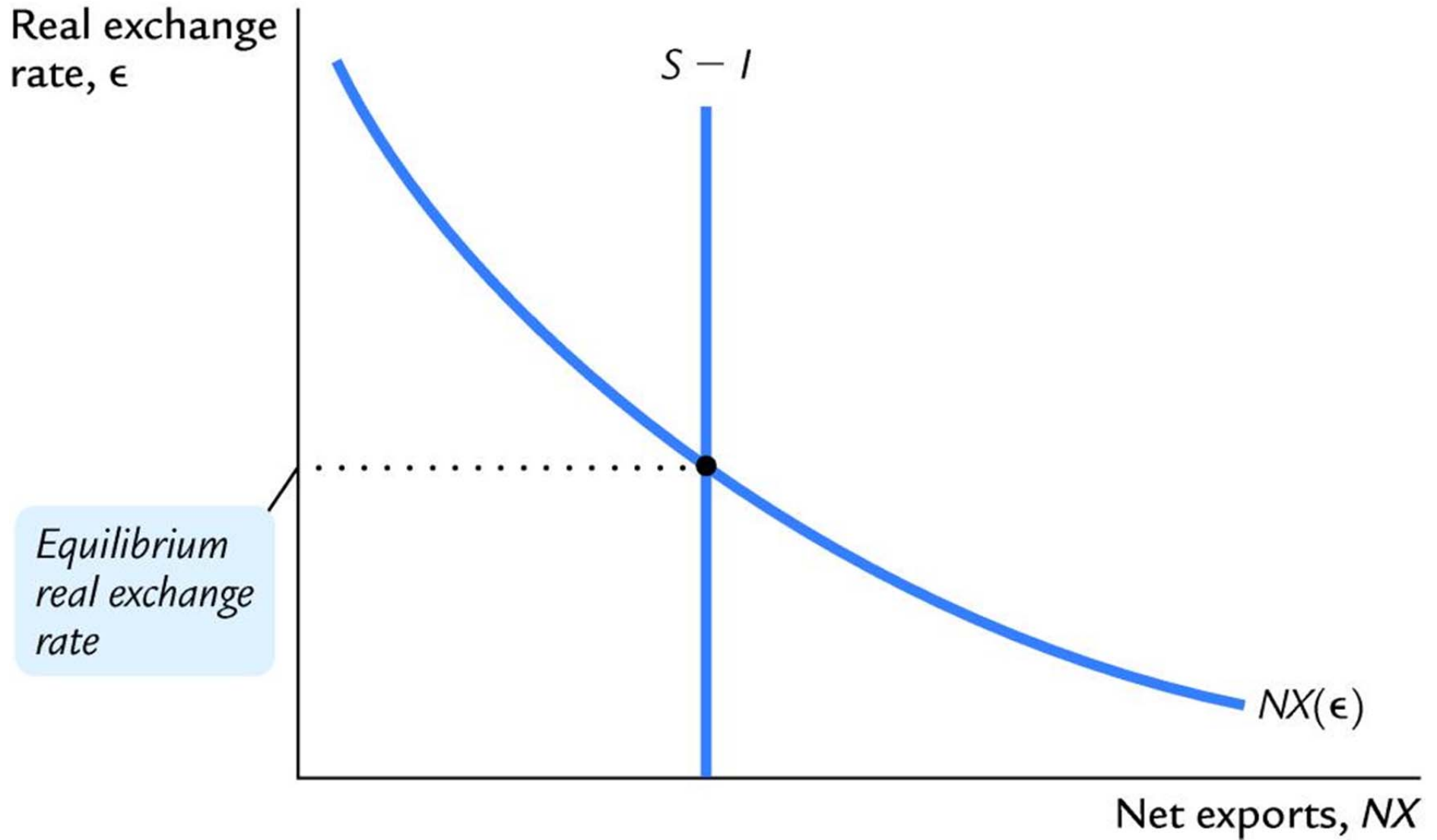

$NX = NX(\varepsilon)$ $\qquad\qquad \varepsilon \uparrow \Rightarrow NX \downarrow$

Net export is negatively related to the real exchange rate (the relative price of domestic goods)
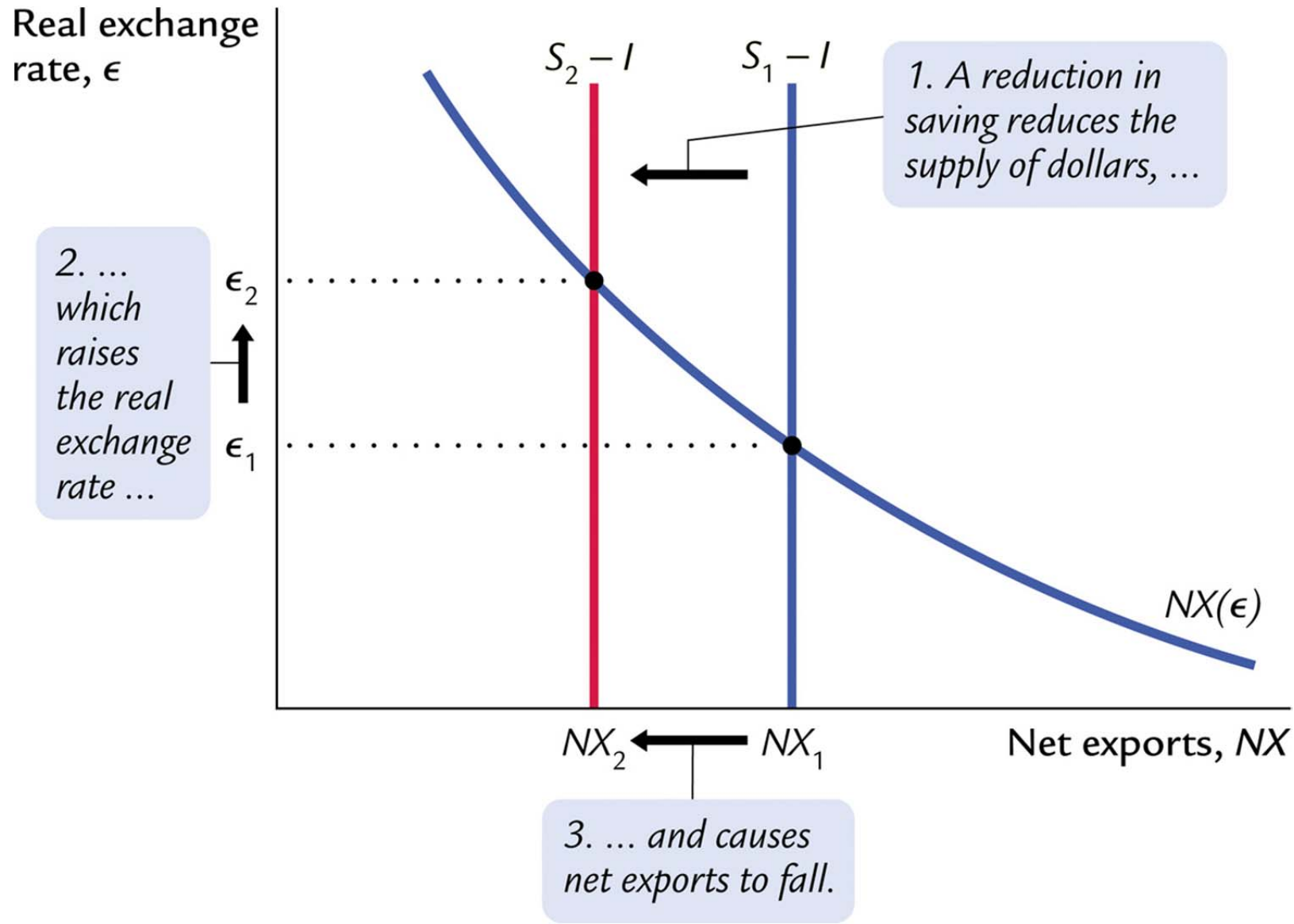
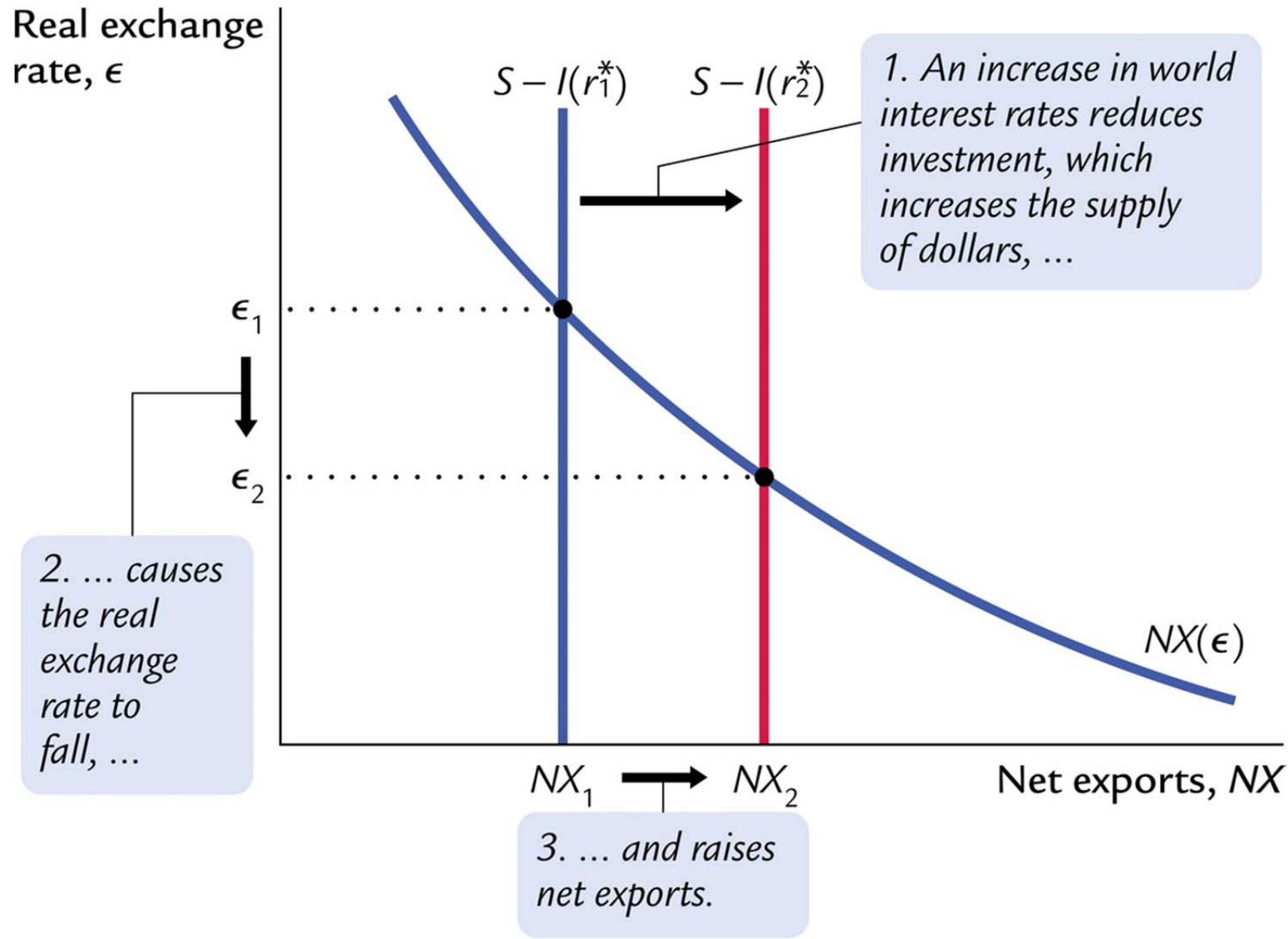**Figure 5-7: Net exports and the real exchange rate**

Figure 5-8: How the real exchange rate is determined

Figure 5-9:The impact of expansionary fiscal policy at home on the real exchange rate

Figure 5-10: The impact of expansionary fiscal policy abroad on the real exchange rate

Real exchange rate, ϵ

$S - I(r_1^*)$ $S - I(r_2^*)$

1. An increase in world interest rates reduces investment, which increases the supply of dollars, ...

ϵ_1

ϵ_2

$NX(\epsilon)$

2. ... causes the real exchange rate to fall, ...

NX_1 NX_2

Net exports, NX

3. ... and raises net exports.

Figure 5-11: The impact of an increase in investment demand on the real exchange rate

Real exchange rate, ϵ

$S - I_2$ $S - I_1$

1. An increase in investment reduces the supply of dollars, ...

2. ... which raises the exchange rate ...

ϵ_2

ϵ_1

$NX(\epsilon)$

NX_2 NX_1 Net exports, NX

3. ... and reduces net exports.
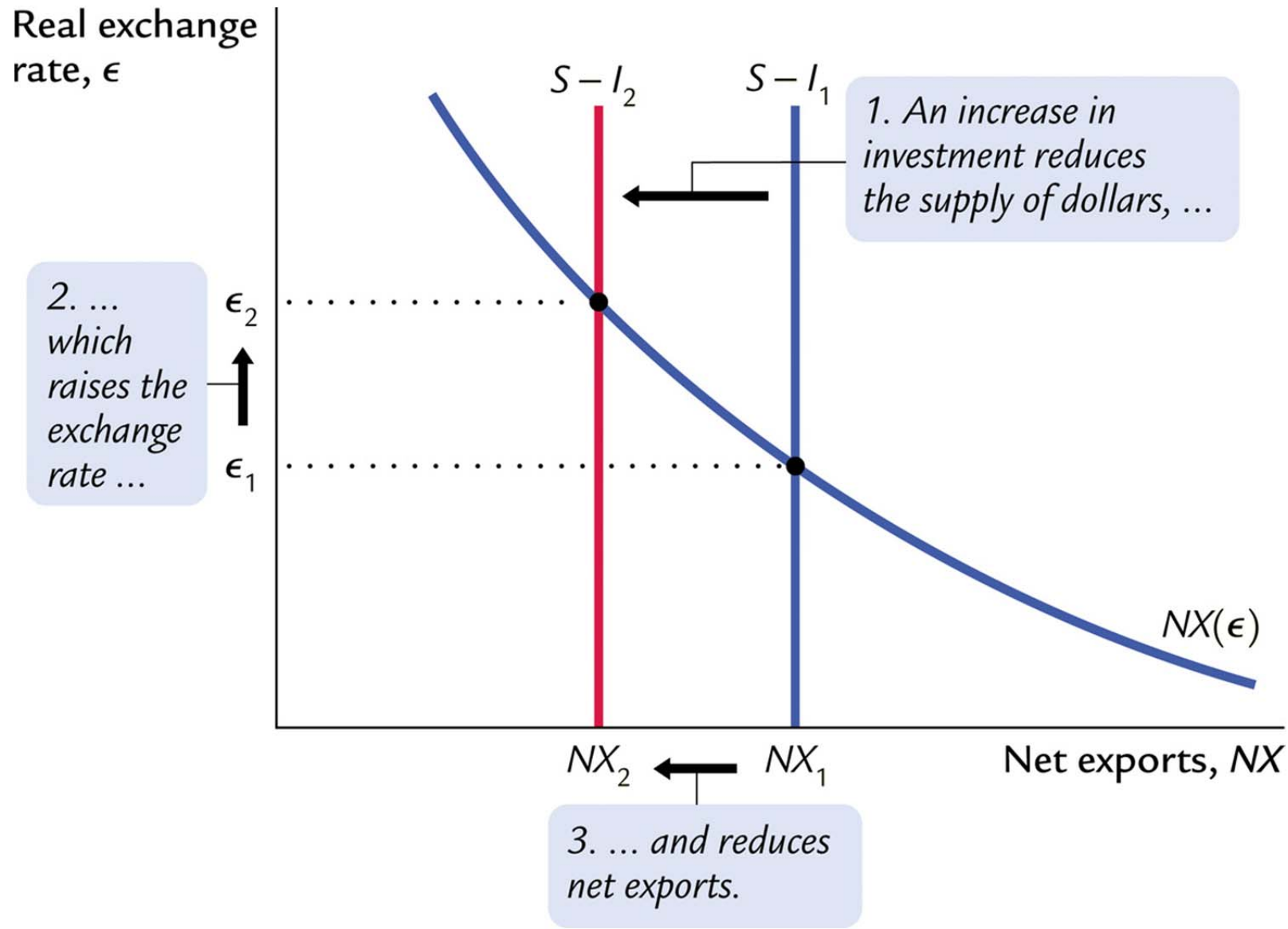
Elimination of current account deficits

- **This requires a real exchange rate depreciation**

- **Sweden had large current account deficits in the late 1980s before the 1990s crisis**

- **These deficits were eliminated through a large nominal - and real - exchange rate depreciation in 1992 when the fixed exchange rate was abandoned and the krona was allowed to float**

- **Large increases in net exports in subsequent years**

- **Greece, Portugal, Ireland, Spain and Italy all have had current account deficits after large real exchange rate appreciations**

- **But real exchange rate depreciations are difficult to achieve within the eurozone where there are no longer any nominal exchange rates between countries**

- **Instead lower inflation (price and wage cuts) are required in crisis countries and higher inflation in Germany and other surplus countries**

Nominal exchange rate and relative unit labour costs vis-à-vis EU-15 for Sweden
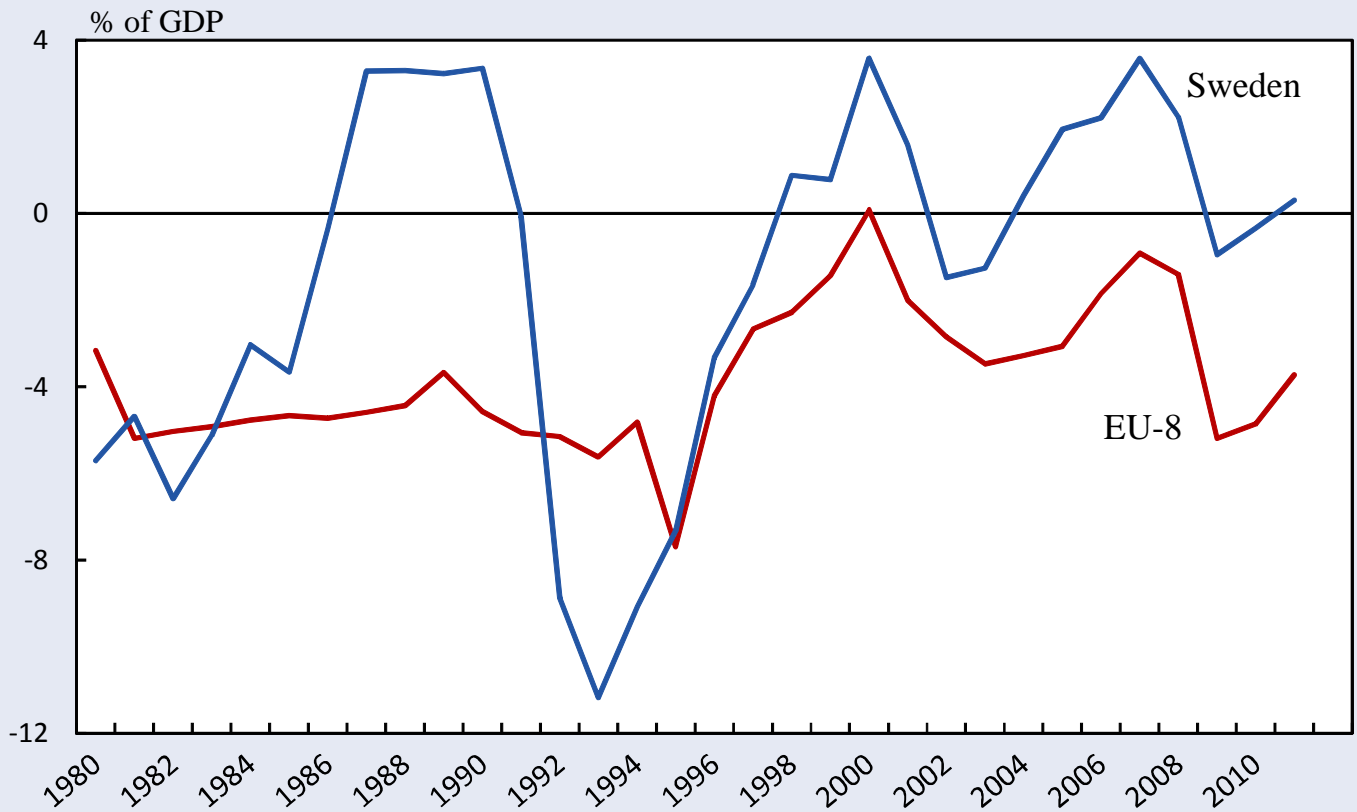
Index: 1985=100
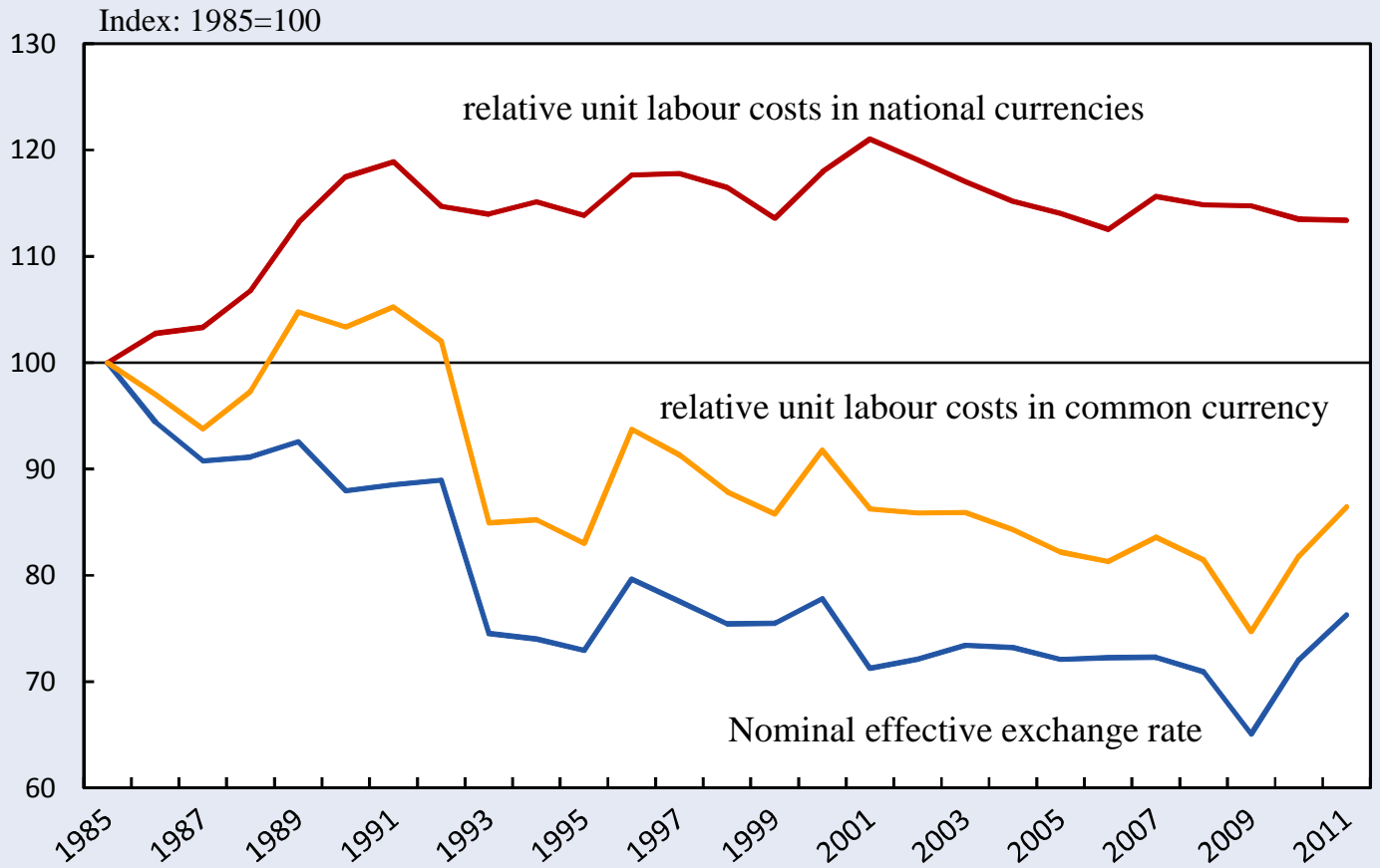
Sources: Ameco and own calculations.

Fiscal consolidation, GDP growth and change in net exports in Sweden, 1993-2000
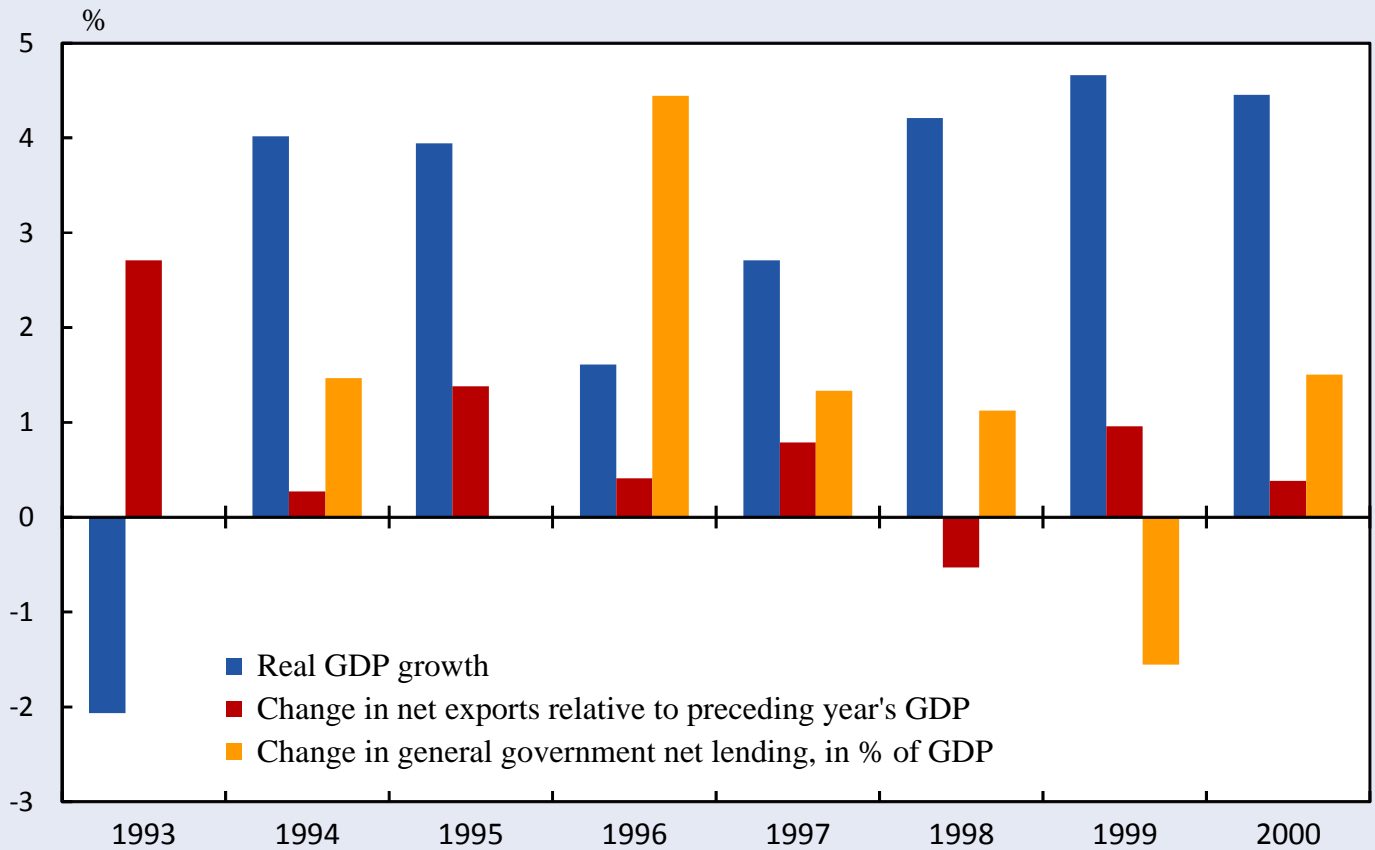
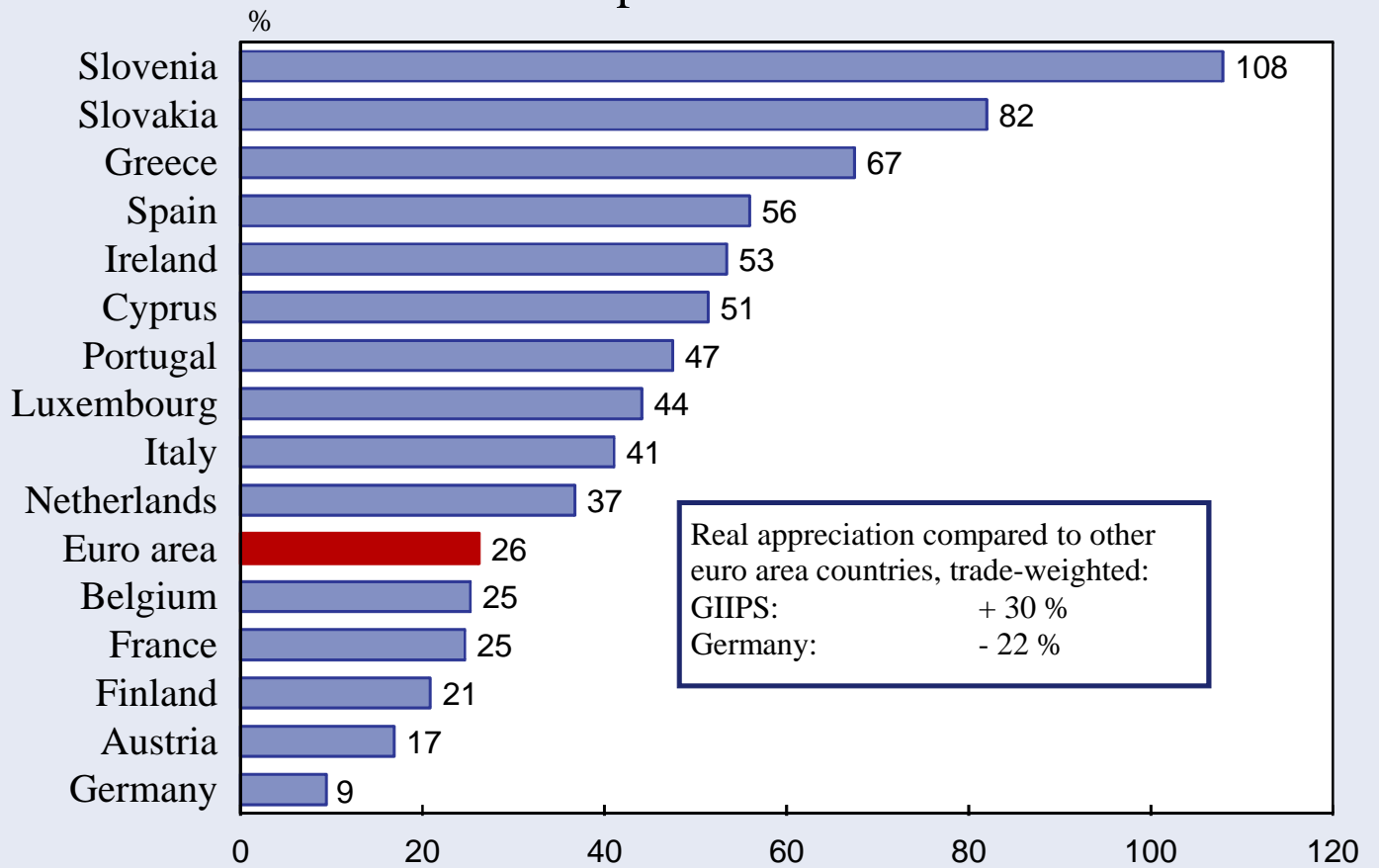Sources: Ameco and own calculations.

General government net lending in Sweden and the euro area

% of GDP

Sweden

EU-8

Note: EU-8 is a weighted average for Austria, Belgium, Finland, France, (West) Germany, Italy, the Netherlands and Portugal.
Sources: OECD Economic Outlook No. 89 (Sweden); and Ameco and own calculations (EU-8).

Price developments 1995-2008

%

Country	Value
Slovenia	108
Slovakia	82
Greece	67
Spain	56
Ireland	53
Cyprus	51
Portugal	47
Luxembourg	44
Italy	41
Netherlands	37
Euro area	26
Belgium	25
France	25
Finland	21
Austria	17
Germany	9

Real appreciation compared to other euro area countries, trade-weighted:
GIIPS: + 30 %
Germany: - 22 %

0   20   40   60   80   100   120

Note: Price change and exchange rate realignments (before May 1998).
Source: Eurostat, Database, *Economy and Finance, National accounts,GDP and main components - Price indices*;
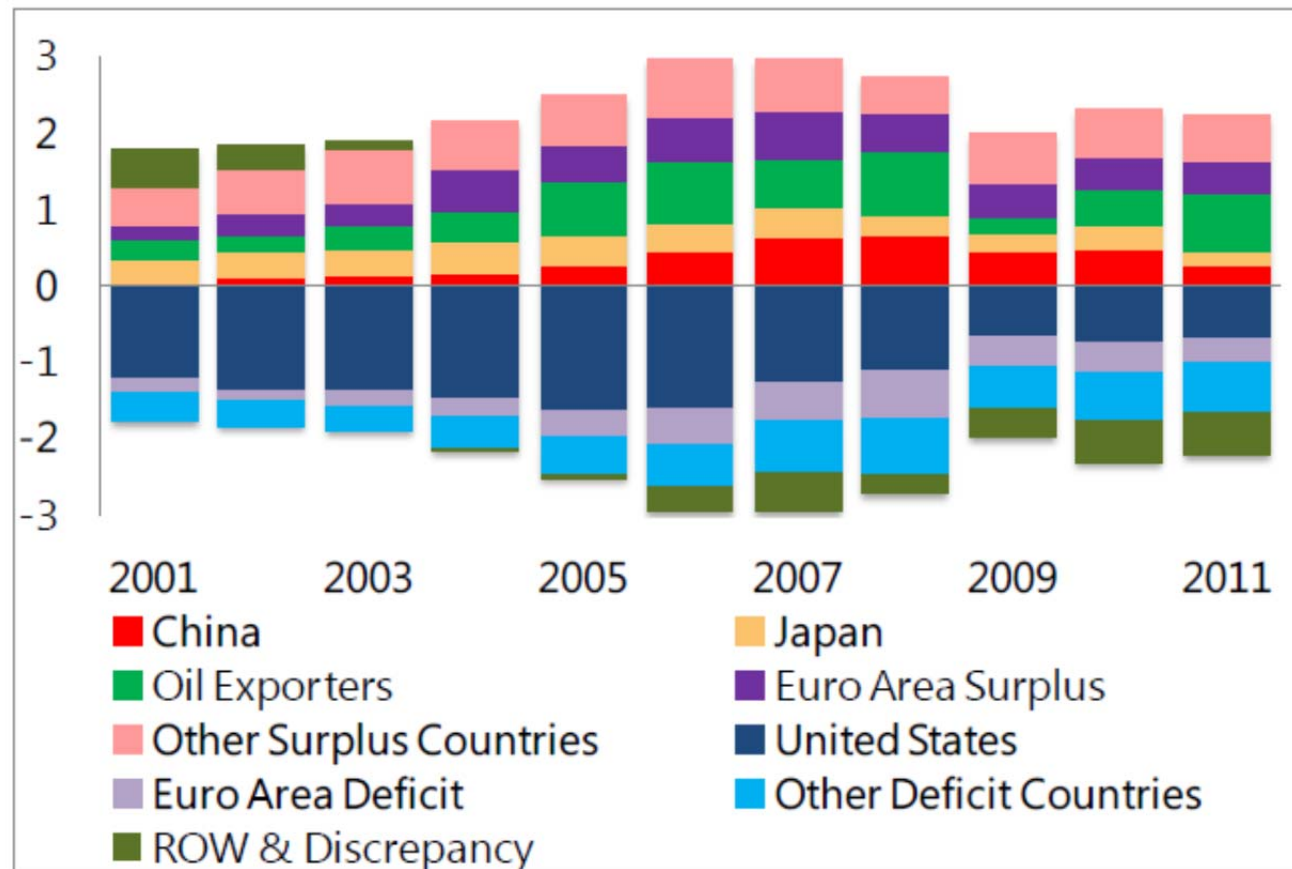Ifo Institute calculations.

What explains past global imbalances?

1. Low US savings (governments and households)
2. "Saving glut" in the rest of the world (China and other Asian Countries
3. Strategy for "export-led growth" in China and other Asian countries
   - fixed exchange rate
   - desire to build up foreign exchange reserves (precautionary motive)

Elimination of US current account deficit requires large US real exchange rate depreciation

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Figure 1. Global Current Account, 2001–11

All Countries: Actual Unadjusted Current Account, 2001–11
(Percent of world GDP)

Legend:
- China
- Japan
- Oil Exporters
- Euro Area Surplus
- Other Surplus Countries
- United States
- Euro Area Deficit
- Other Deficit Countries
- ROW & Discrepancy

Source: IMF, World Economic Outlook Database

Figure 2. Real Effective Exchange Rates:
(Jan 2007 – Jun 2012, regional REERs weighted by market GDP)

Advanced Economies

Emerging Asia & Oil Exporters

Other Emerging Markets
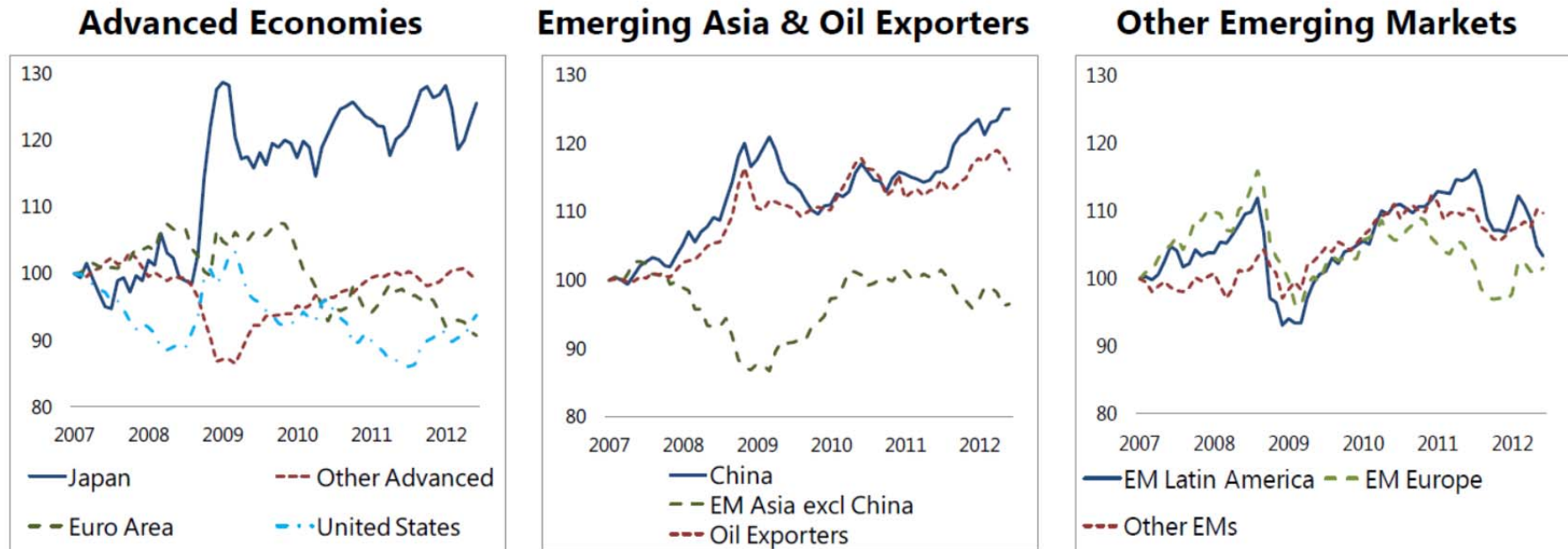
Source: IMF Information Notice System and IMF Staff Estimates

Figure 3. Patterns of Current Account Balances and Capital Flows, 2005–11
(Percent of each country's or region's GDP)

Current Account
Capital Account
Change in Reserves
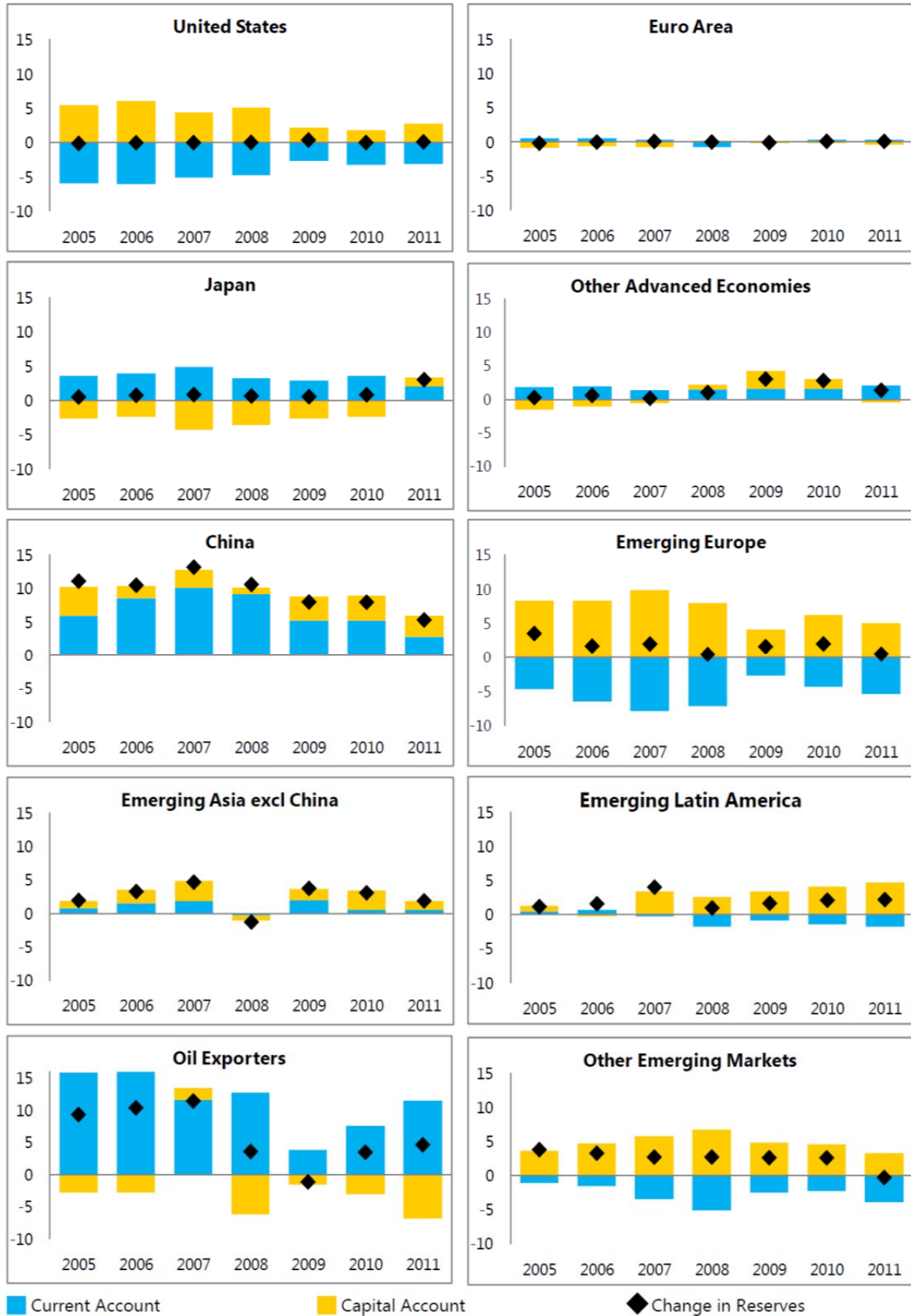
Source: IMF World Economic Outlook Database
For country groupings see Appendix VI.