Lecture 1: **Intermediate macroeconomics, autumn 2014**

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Literature: ***Mankiw, chapters 3 and 6.***

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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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Terminology

- $T - G =$ Government saving = The government's budget balance or the fiscal balance
- If $T - G > 0$, then there is a government budget surplus or fiscal surplus
- If $T - G < 0$, then there is a government budget deficit or fiscal deficit
- Sometimes the term government net lending is used to denote the fiscal balance
- Positive government net lending means a fiscal surplus
- Negative government net lending means a fiscal deficit

Figure 3-6: The consumption function

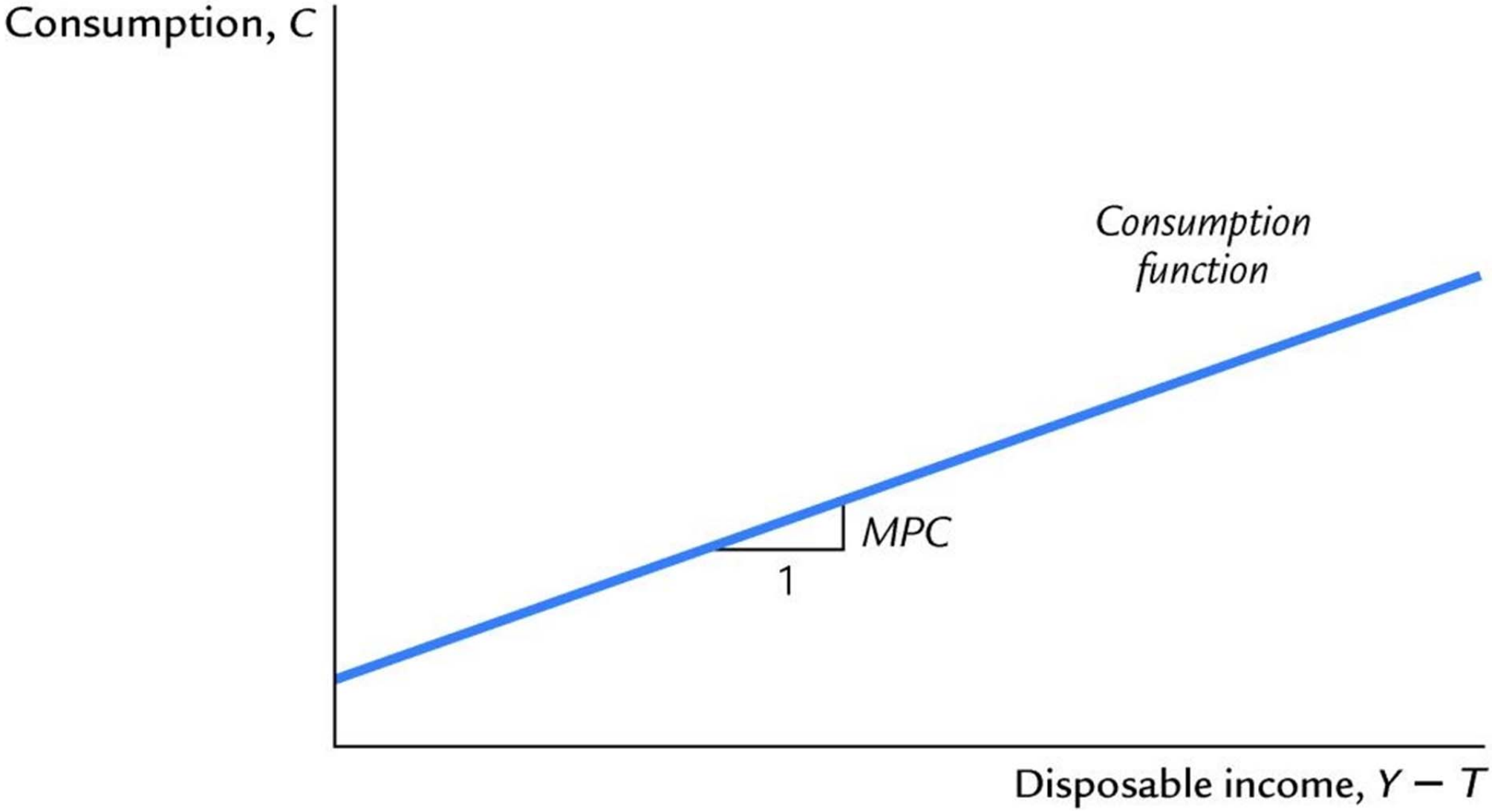


Figure 3-7: The investment function

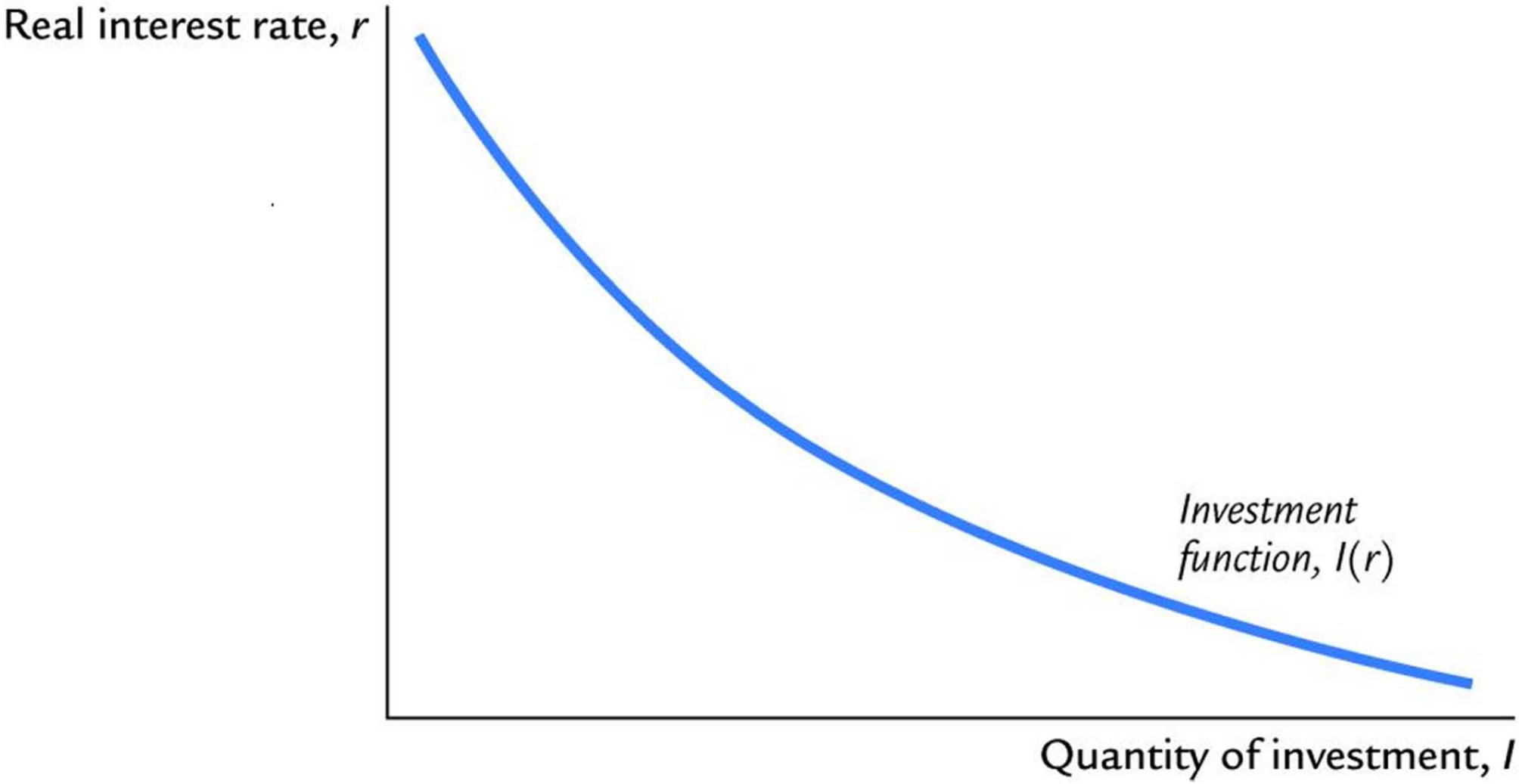


Figure 3-8: Saving, investment and the interest rate

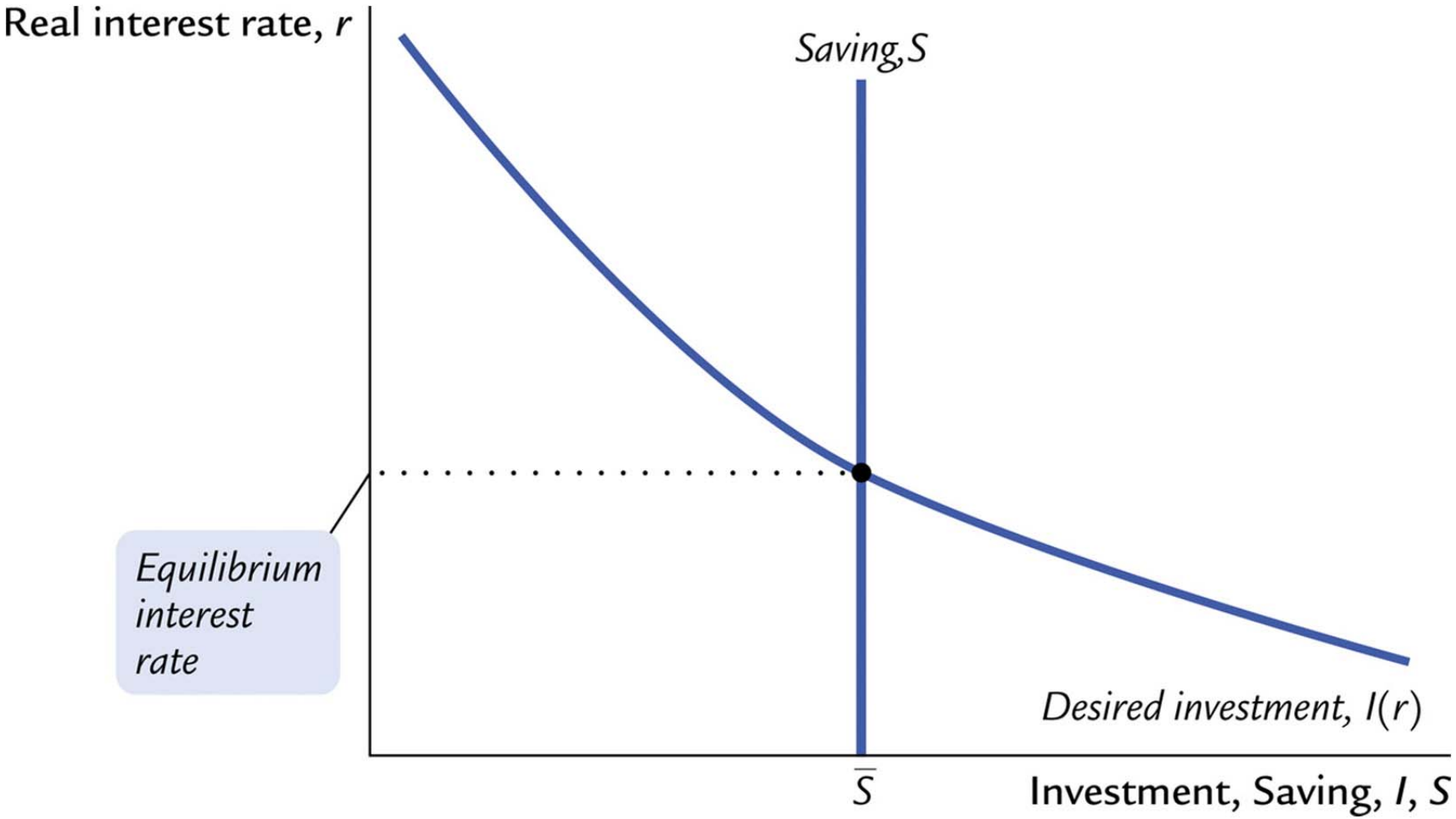


Figure 3-9: A reduction in saving

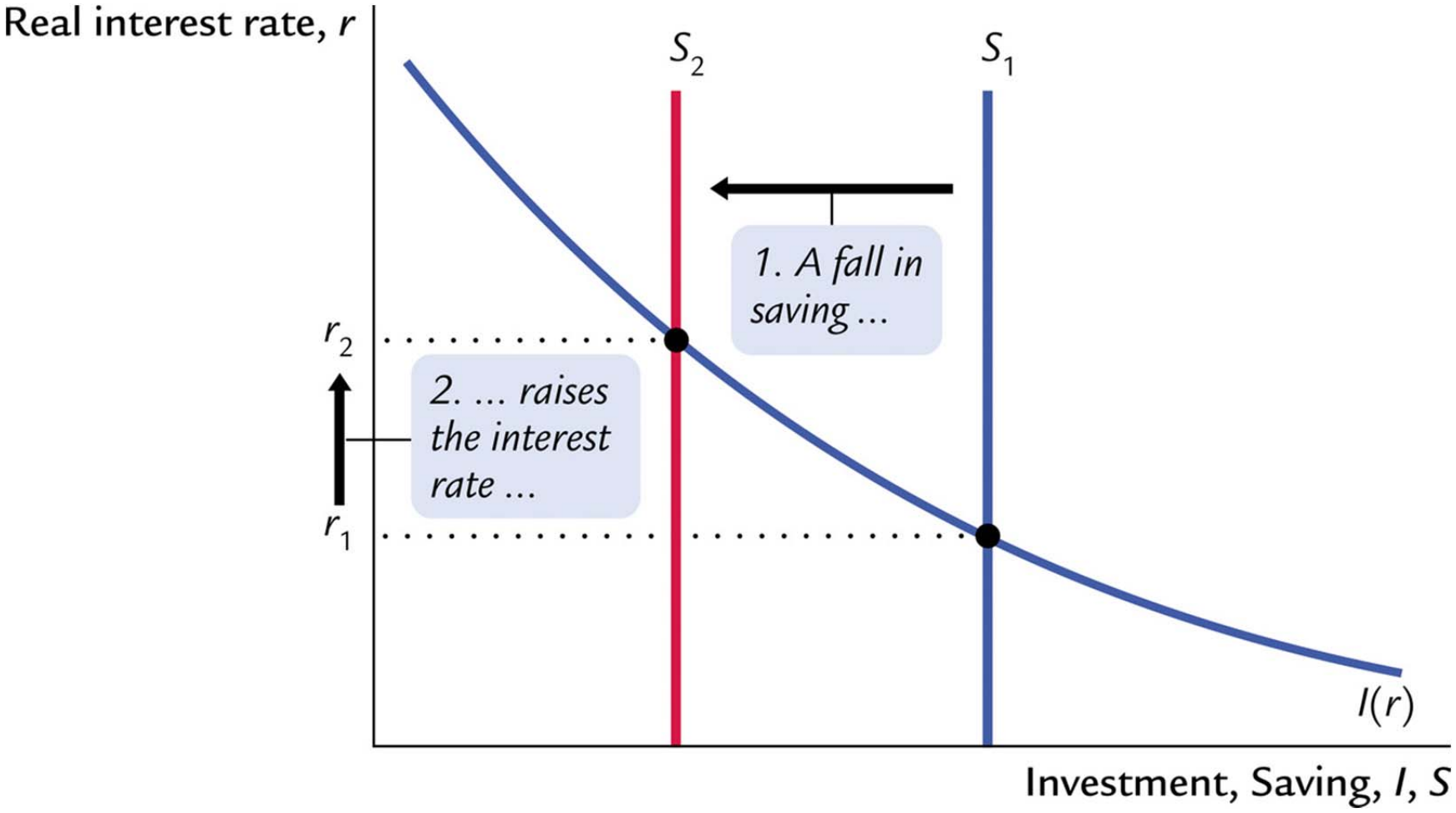
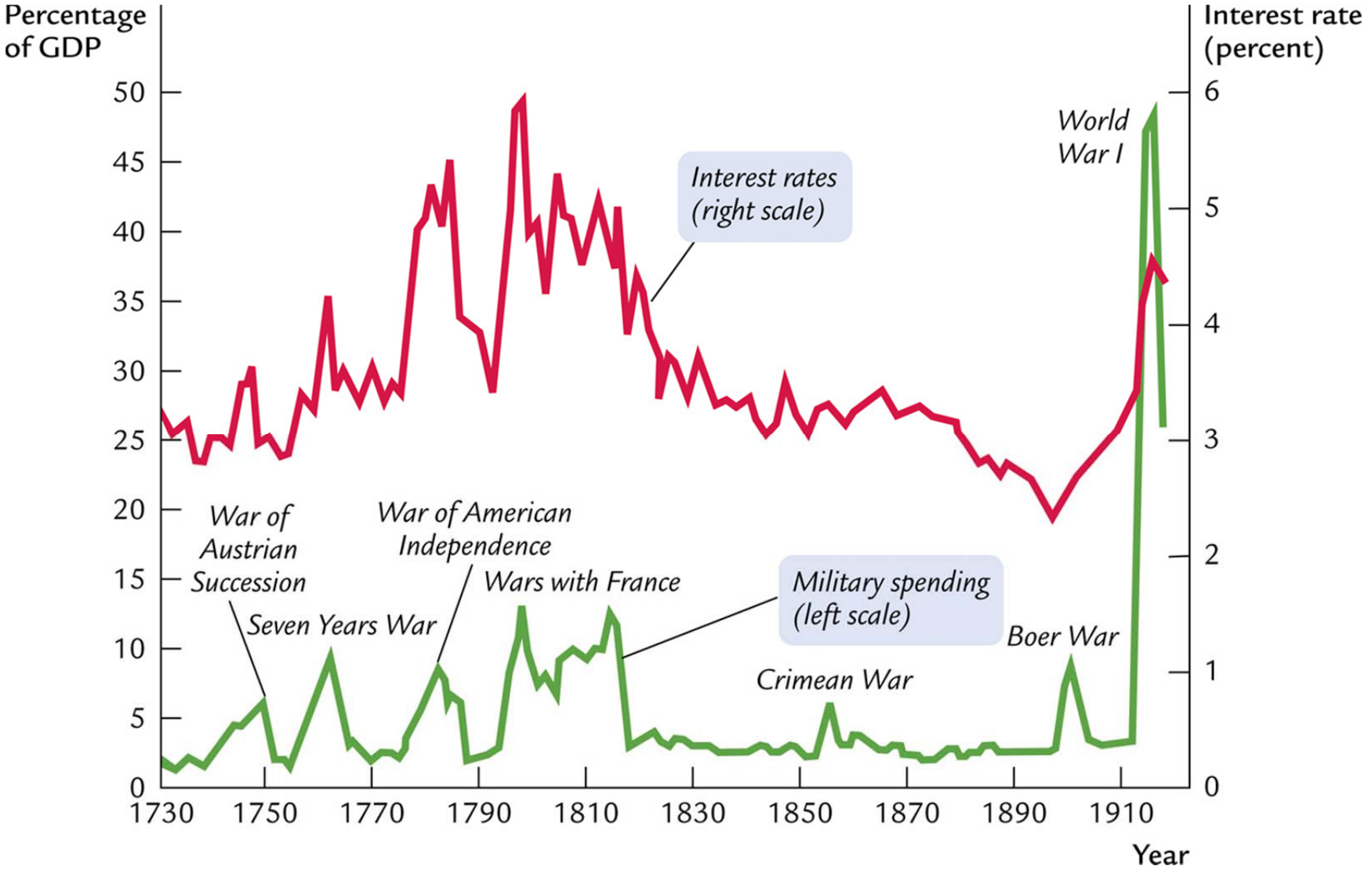


Figure 3-10: Military spending and the interest rate in the United Kingdom



Different interest rates in the real world

- **Only one interest rate in the model**

- **Many interest rates in the real world**

- **terms**
- **credit risk**
- **tax treatment**

- **The interest rate in the model is best interpreted as the interest rate on long-term bonds**

Recent and 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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Table 1.2 EEAG report 2014

Table 1.2

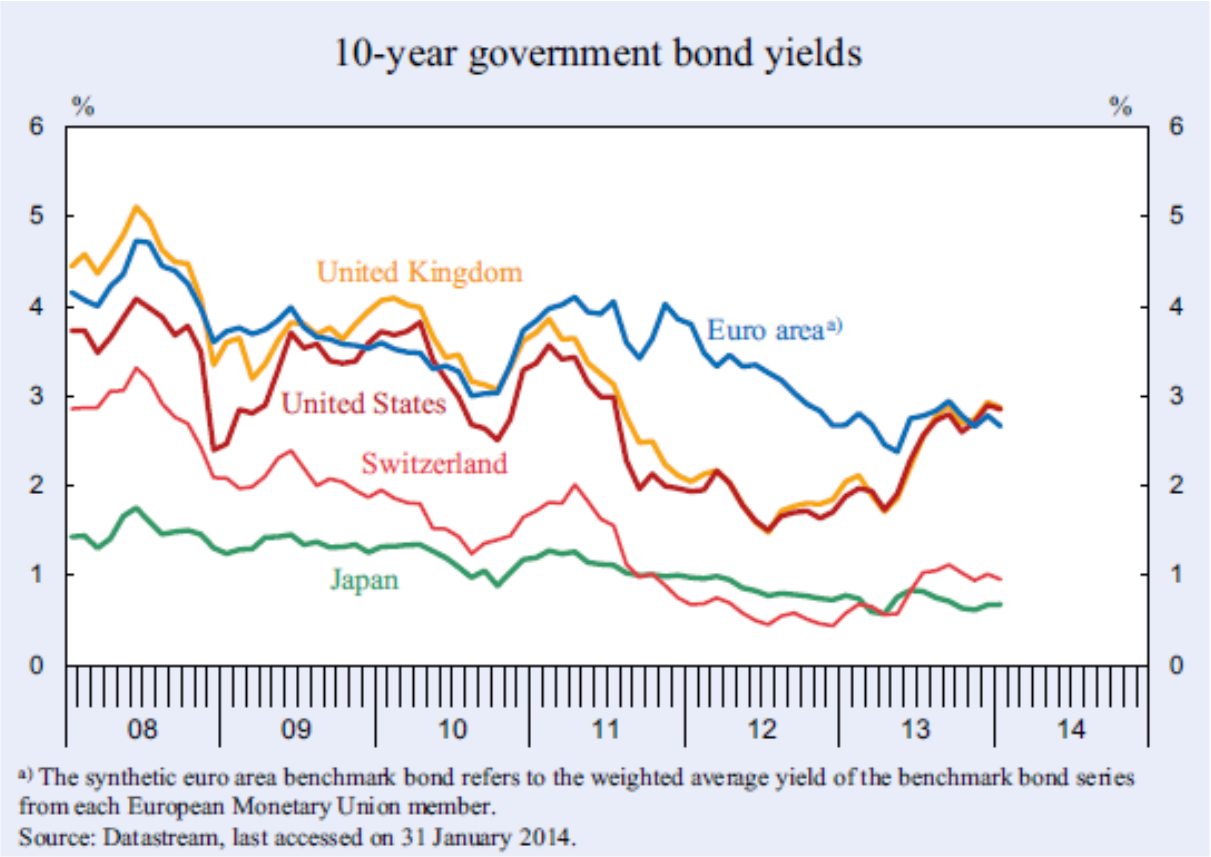
Public finances

	Gross debt[a]				Fiscal balance[a]			
	1999–2007	2008/2009	2010– 012	2013	1999–2007	2008/2009	2010–2012	2013
Germany	63.8	70.7	81.1	79.6	– 2.2	– 1.6	– 1.6	0.0
France	61.8	73.7	86.1	93.5	– 2.7	– 5.5	– 5.7	– 4.2
Italy	106.5	111.3	122.3	133.0	– 2.9	– 4.0	– 3.6	– 2.8
Spain	49.4	47.1	72.7	94.8	0.2	– 7.8	– 9.9	– 6.8
Netherlands	51.7	59.6	66.8	74.8	– 0.5	– 2.5	– 4.4	– 3.3
Belgium	98.6	92.5	97.8	100.4	– 0.4	– 3.3	– 3.9	– 2.9
Austria	64.7	66.5	73.0	74.8	– 1.8	– 2.6	– 3.2	– 2.5
Greece	103.3	121.3	158.5	176.2	– 5.3	– 12.8	– 9.8	– 13.6
Finland	42.1	38.7	50.5	58.4	3.9	0.8	– 2.0	– 2.6
Portugal	59.9	77.7	108.8	127.8	– 4.1	– 6.9	– 6.9	– 5.9
Ireland	31.9	54.3	104.2	124.4	1.6	– 10.5	– 17.3	– 7.2
Slovakia	40.9	31.7	45.6	54.3	– 5.3	– 5.1	– 5.8	– 3.0
Slovenia	26.2	28.6	46.7	63.2	– 2.3	– 4.1	– 5.3	– 5.8
Luxembourg	6.4	15.0	20.0	24.5	2.4	1.3	– 0.4	– 0.9
Latvia	12.7	28.4	42.3	42.5	– 1.6	– 7.0	– 4.3	– 1.4
Cyprus	64.3	53.7	73.1	116.0	– 2.7	– 2.6	– 6.0	– 8.3
Estonia	5.0	5.8	7.5	10.0	0.7	– 2.5	0.4	– 0.4
Malta	61.4	63.7	69.2	72.6	– 5.1	– 4.2	– 3.2	– 3.4
Euro area	**69.0**	**75.0**	**88.7**	**95.5**	**– 1.9**	**– 4.2**	**– 4.7**	**– 3.1**
United Kingdom	40.6	59.5	83.8	94.3	– 1.5	– 8.2	– 7.9	– 6.4
Sweden	51.5	40.7	38.8	41.3	1.3	0.6	– 0.1	– 1.1
Denmark	44.3	37.0	44.8	44.3	2.4	0.3	– 3.0	– 1.9
Poland	43.2	49.0	55.6	58.2	– 4.1	– 5.6	– 5.6	– 4.8
Czech Republic	25.2	31.6	42.0	49.0	– 3.9	– 4.0	– 4.1	– 2.9
Romania	19.5	18.5	34.4	38.5	– 2.6	– 7.4	– 5.1	– 2.5
Hungary	59.8	76.4	81.4	80.7	– 6.4	– 4.1	– 0.8	– 3.1
Croatia			50.7	59.6			– 6.4	– 5.4
Bulgaria	46.2	14.2	17.0	19.4	0.6	– 1.3	– 2.0	– 2.0
Lithuania	20.5	22.4	38.9	39.9	– 1.8	– 6.4	– 5.4	– 3.0
European Union[b]	**61.8**	**68.3**	**83.1**	**89.8**	**– 1.7**	**– 4.6**	**– 5.0**	**– 3.5**
United States	59.7	79.8	99.1	106.0	– 2.1	– 9.7	– 9.6	– 5.8
Japan	166.1	201.0	228.1	243.5	– 6.0	– 7.3	– 9.8	– 9.5
Switzerland	63.3	50.1	49.1	48.2	0.2	1.2	0.2	0.2

[a] As a percentage of gross domestic product. For the European countries, definitions according to the Maastricht Treaty. For the United States, Japan and Switzerland, definitions are according to the IMF. – [b] Before 2009 the European Union does not include information on Croatia.

Sources: European Commission, Autumn 2013; IMF World Economic Outlook, October 2013.

Figure 1.21 EEAG report 2014



a) The synthetic euro area benchmark bond refers to the weighted average yield of the benchmark bond series from each European Monetary Union member.
Source: Datastream, last accessed on 31 January 2014.

Obligationsräntorna i euroområdets krisländer är nu (nästan) nere på nivåer som rådde före finanskrisen

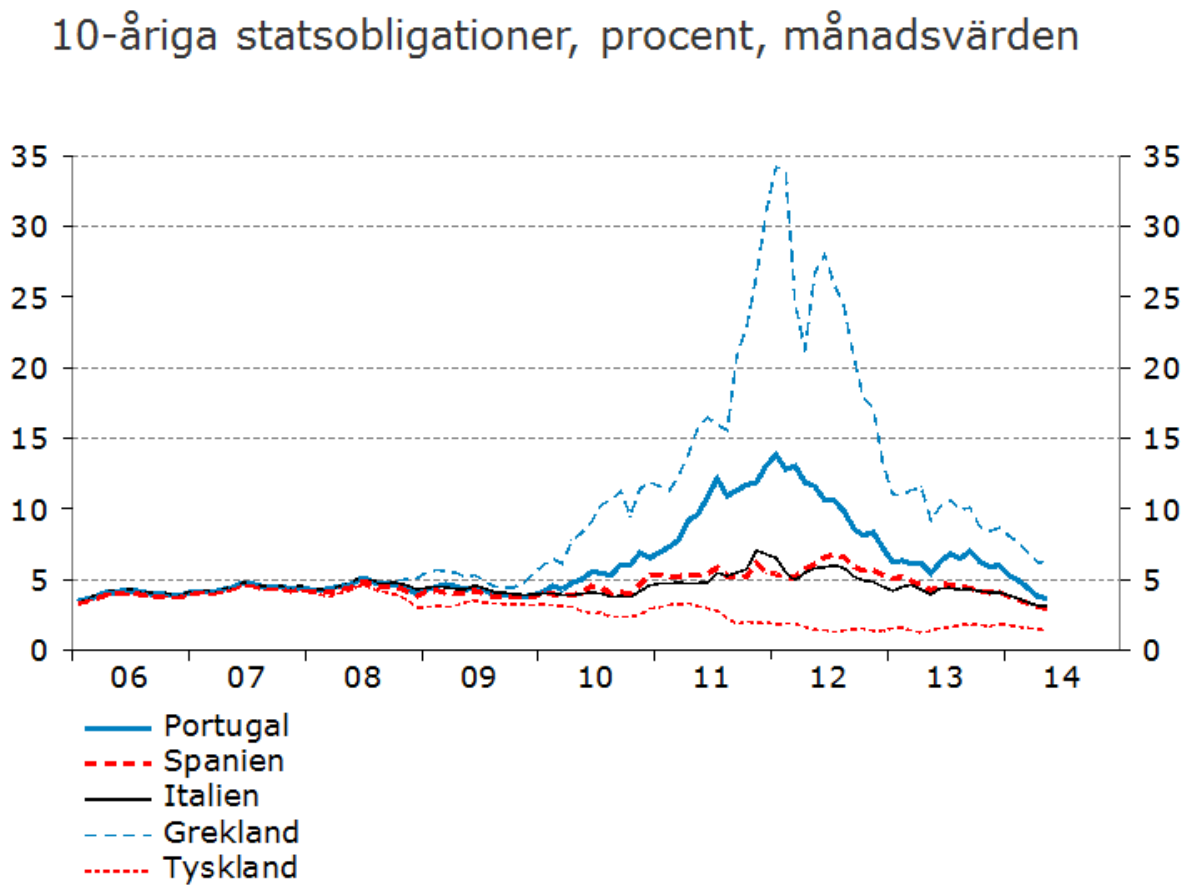


Figure 3-11: An Increase in the demand for investment

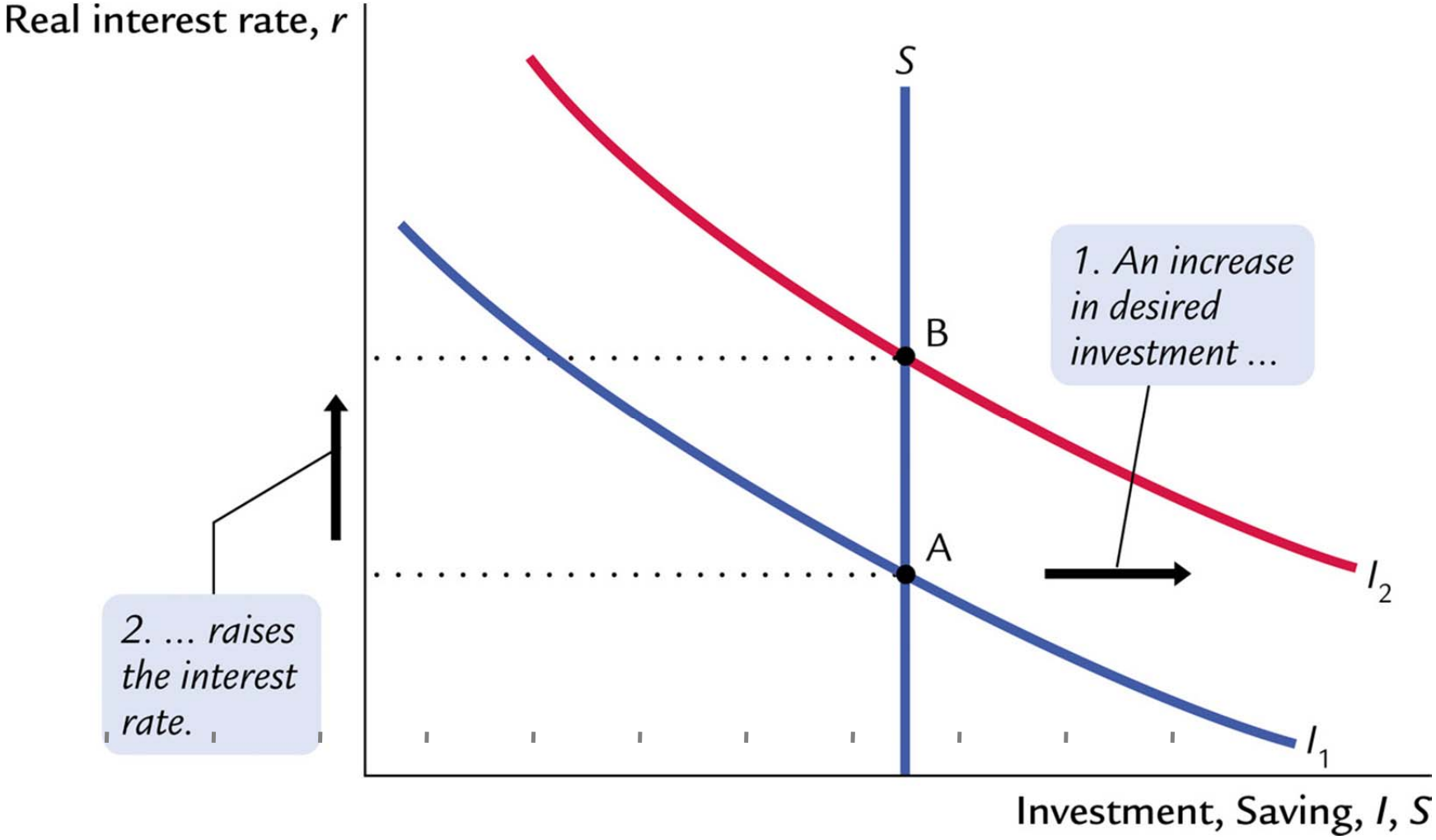


Figure 3-12: An increase in investment demand when saving depends on the interest rate

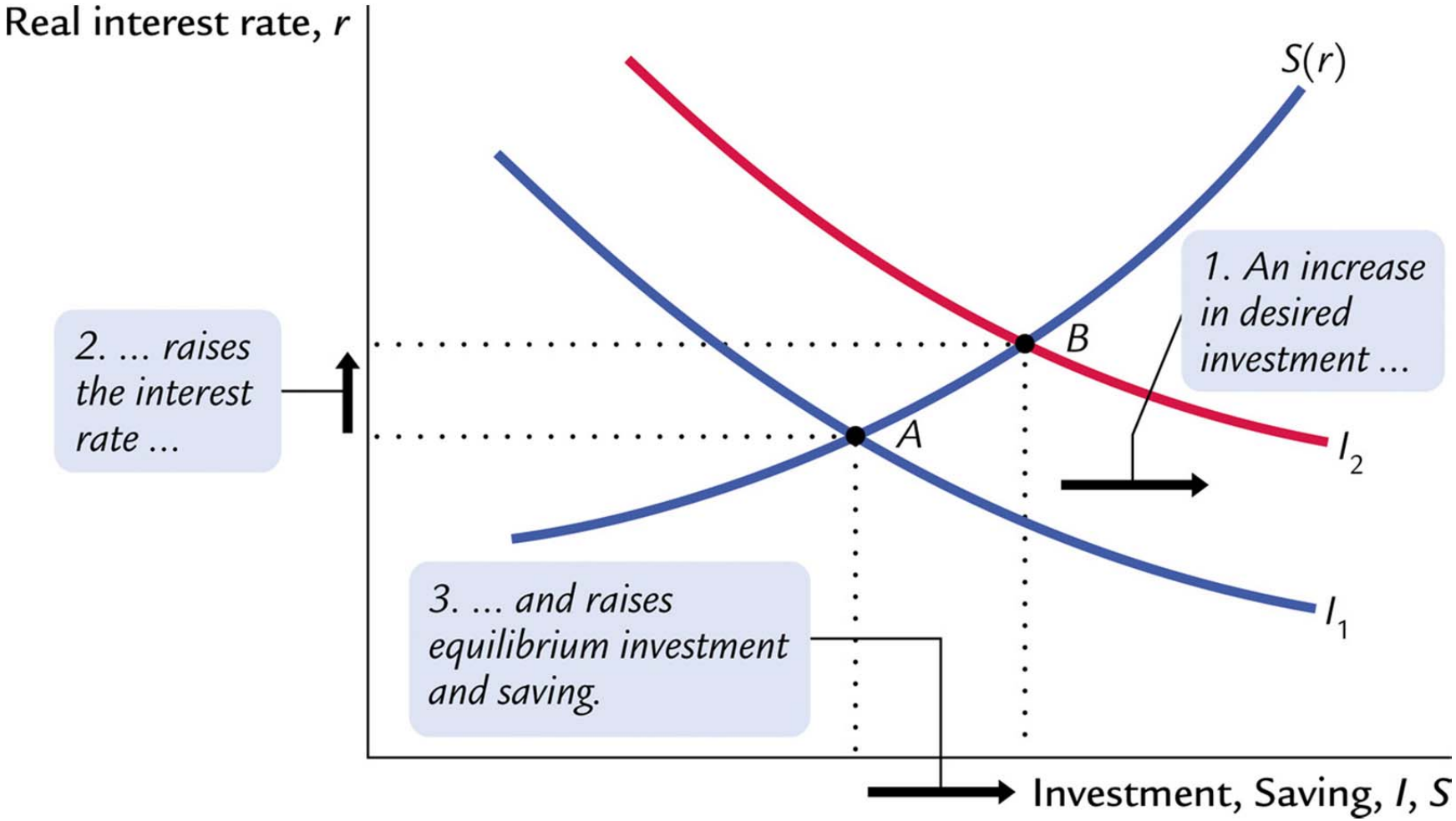
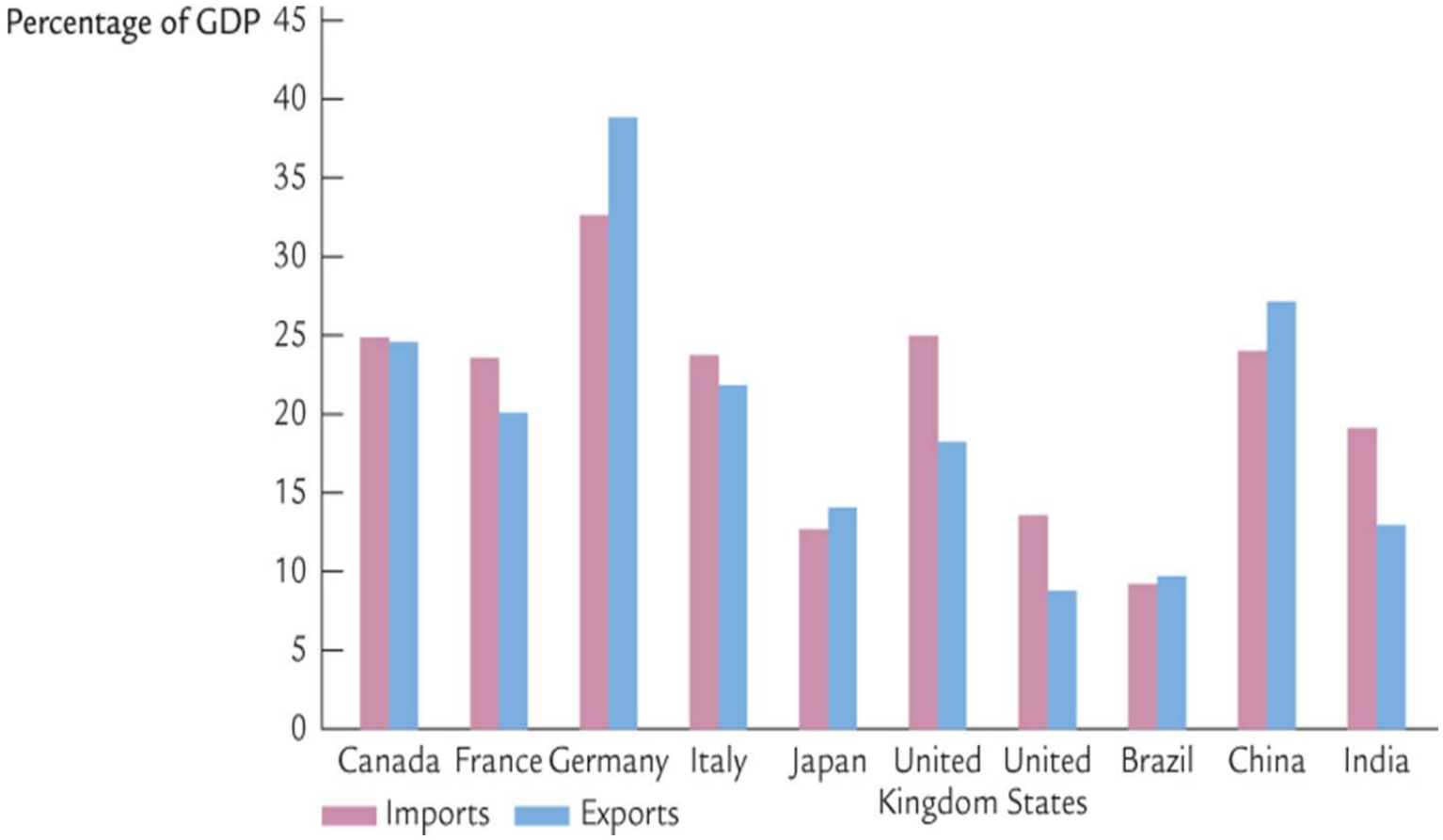


Figure 6-1: Imports and exports as a percentage of output: 2010



Equilibrium in the open economy

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

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

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

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

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

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

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

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

Equilibrium in the open economy, cont.

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

Net Exports = Output – Domestic Spending

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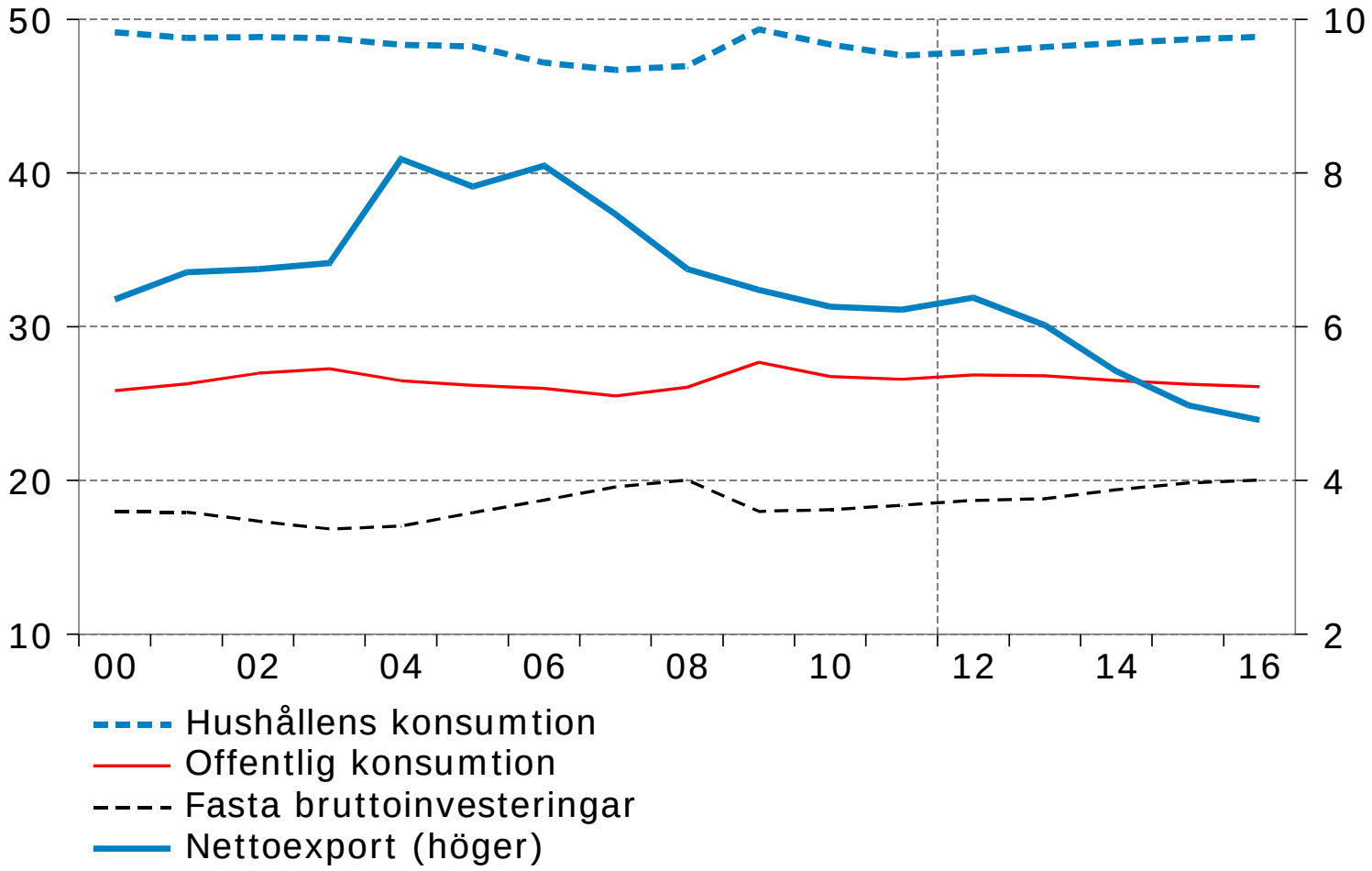
BNP-andelar

Procent av BNP, löpande priser



Saving-investment balance in an open economy

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

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) = Net exports = Trade balance**

- **Net capital outflow can take many forms**
  - **lending to foreign banks**
  - **purchases of foreign bonds**
  - **purchases of foreign assets (equity, real estate)**

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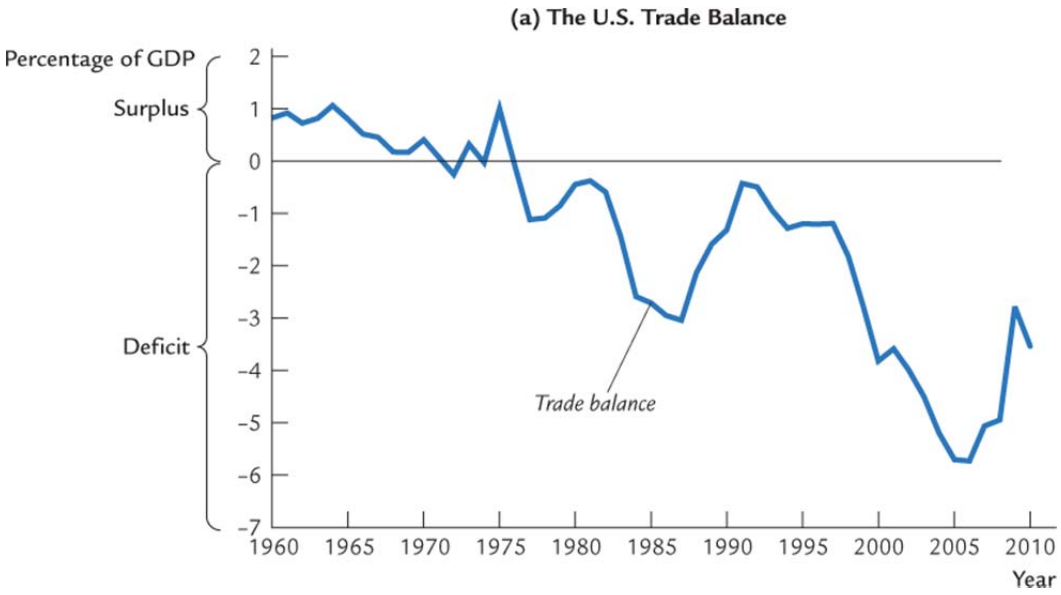
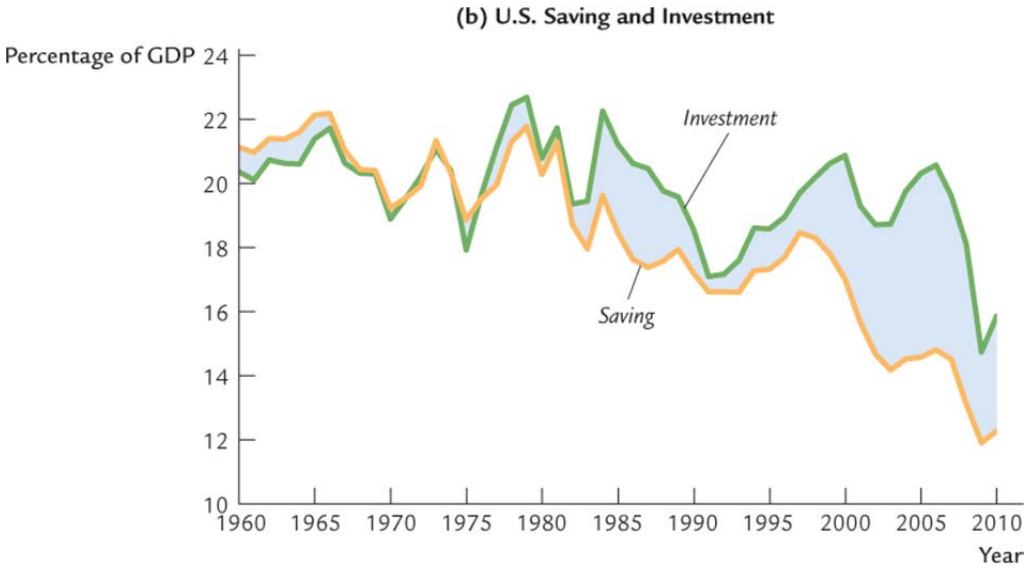
Figure 6-6: The trade balance, saving, and investment: The U.S. Experience





A model of a small open economy

$$r = r^*$$

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

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

$$I = I(r)$$

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

Reduced form

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

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

Net export equals the difference between saving and investment

at the given world market real rate of interest

Figure 6-2: Saving and investment in a small open economy

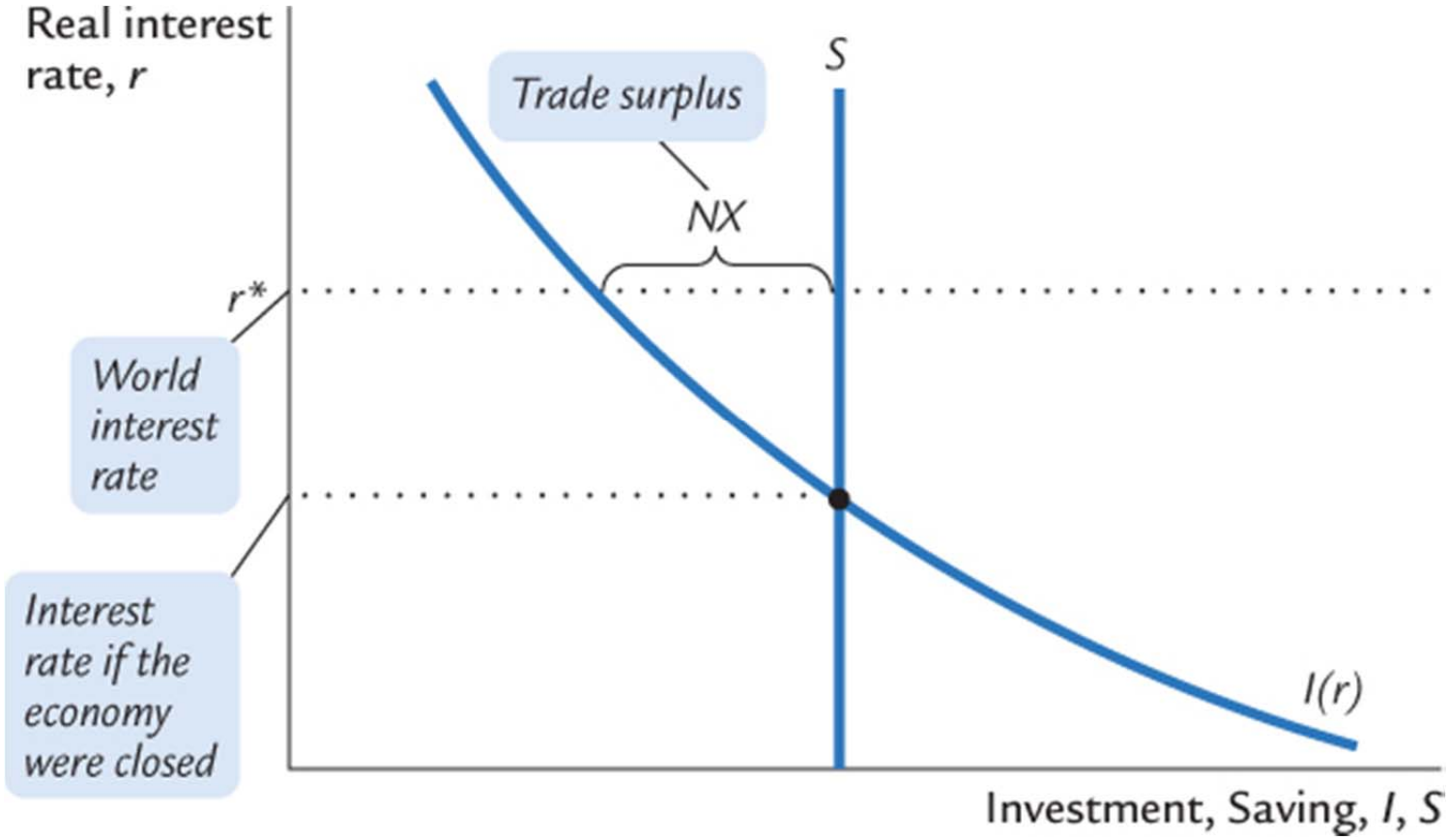


Figure 6-3: A fiscal expansion at home in a small open economy

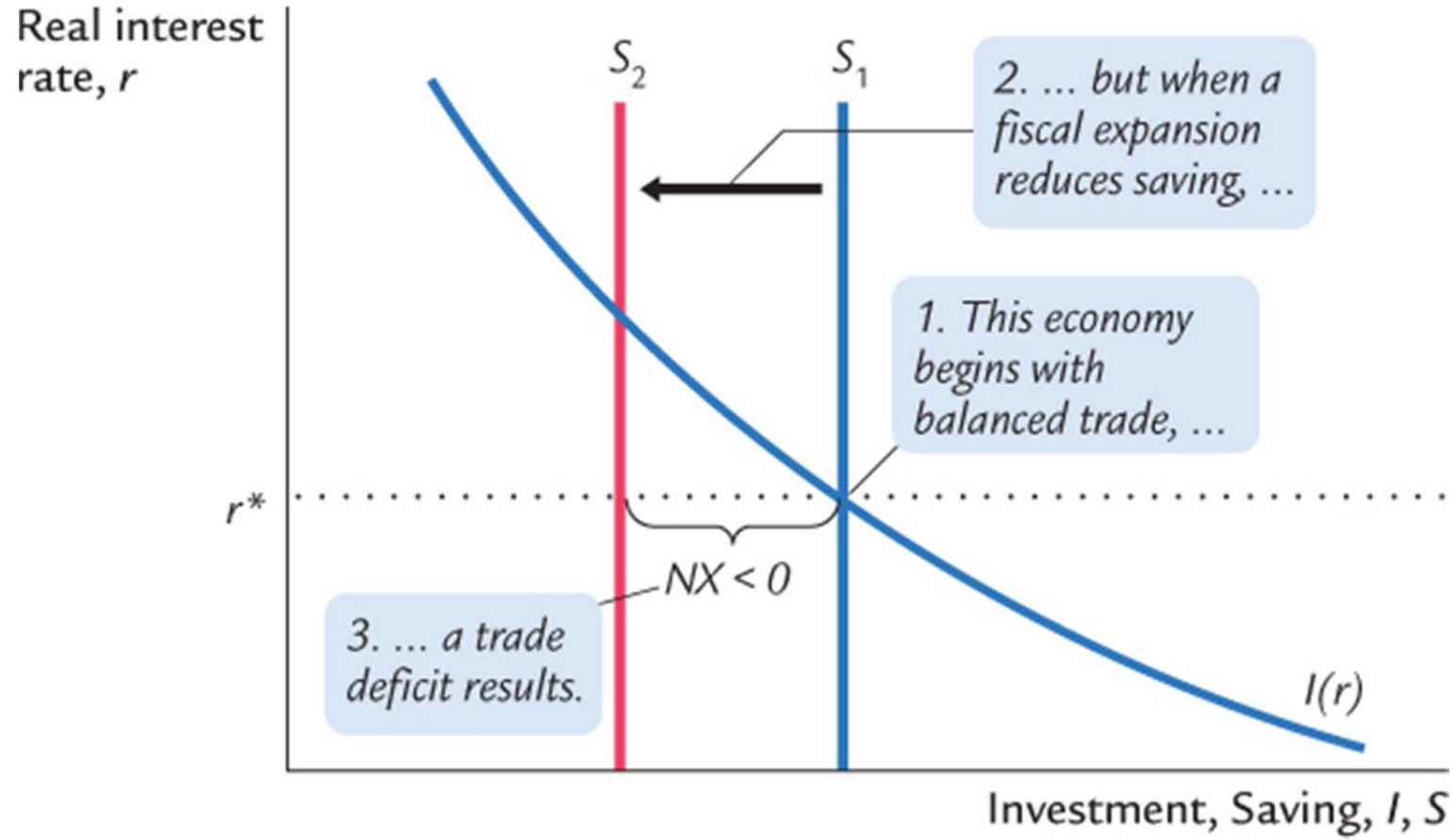


Figure 6-4: A fiscal expansion abroad in a small open economy

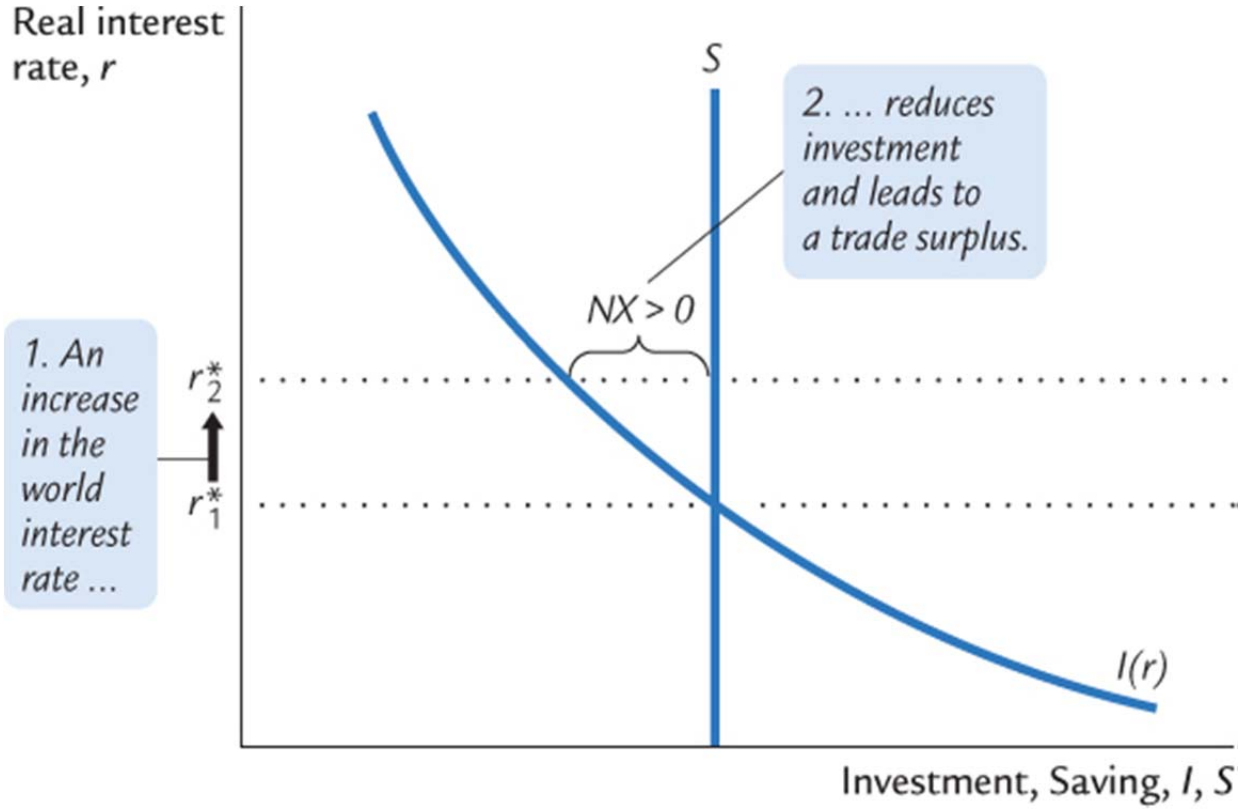
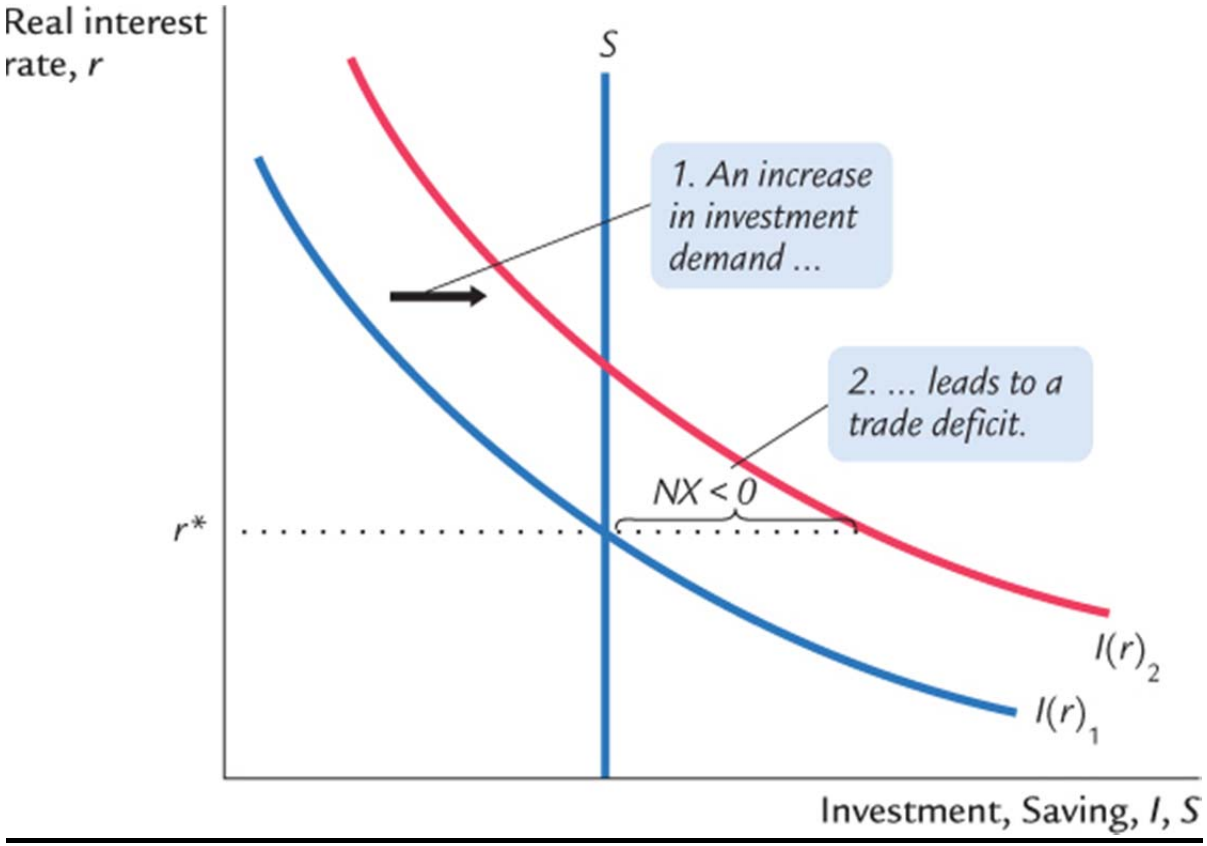


Figure 6-5: A shift in the investment schedule in a small open economy



Current account balance = Net exports + Net return on foreign assets $CA = NX + r \cdot NFA$

CA = current account balance

NX = net exports

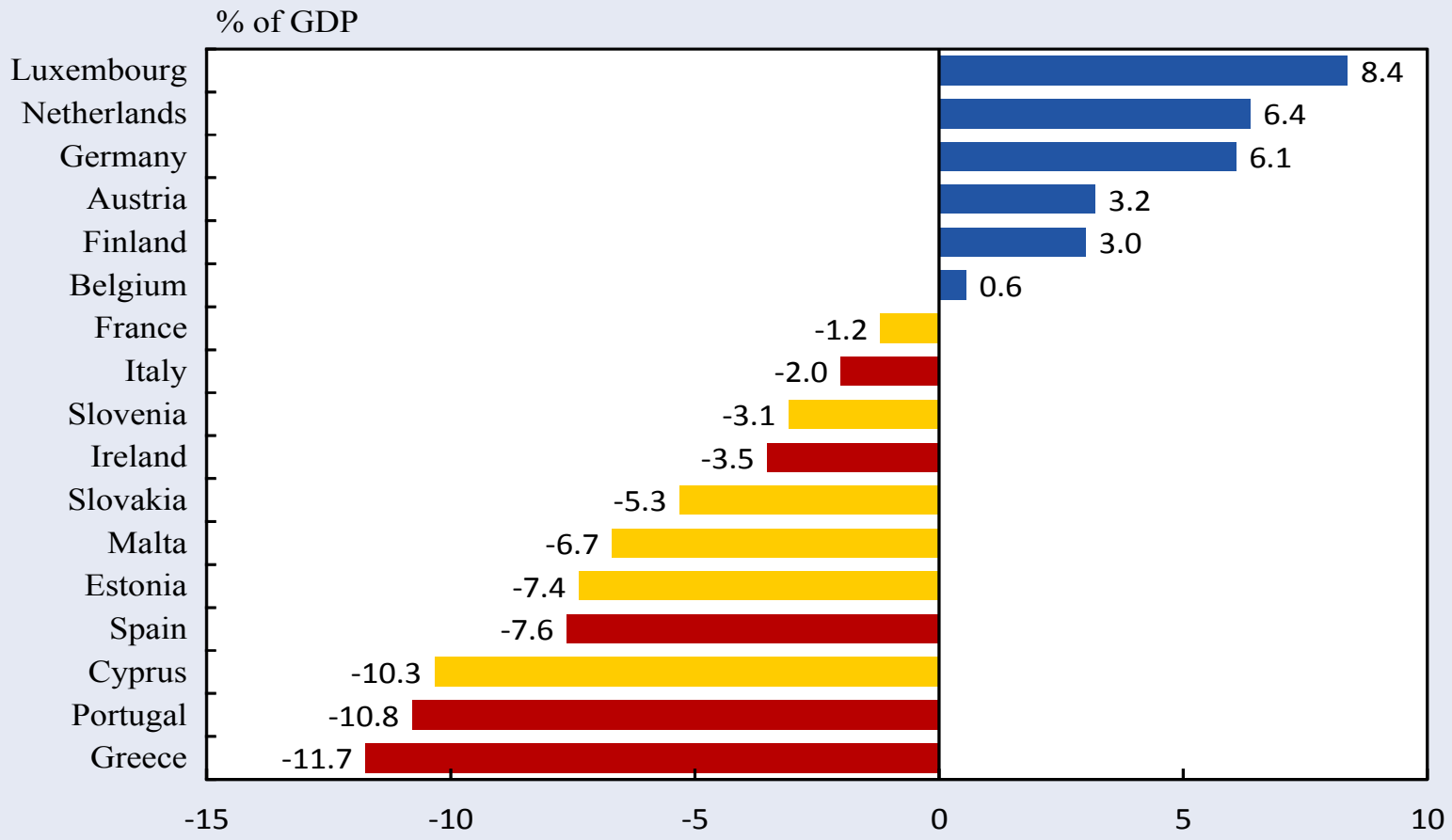
r = interest rate

NFA = net foreign assets = foreign assets - foreign debt

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

In most advanced economies NFA ≈ 0.
Germany is an exception; NFA ≈ 50 per cent of national income (GDP − depreciation of capital). In Great Britain (with colonial empire) before World War I, NFA was twice the size of national income.
Hence NFA added approximately $2 \times 0.05 = 10$ per cent to national income.
In France (also with colonial empire) before World War I, NFA was about the size of national income.
Hence NFA added approximately 5 per cent to national income.

Current account balances 2005-2010



Source: Eurostat, Ifo Institute calculations.

The real exchange rate

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

p = **price of domestic (Swedish) output in domestic currency (SEK)**

p^* = **price of foreign (US) output in foreign currency**

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

ε = **real exchange rate**

The price of output in a country is called the GDP deflator

Real exchange rate = nominal exchange rate ($/SEK) × Swedish output price (SEK) / foreign output price ($)

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

Relative rates of change

- **Percentage change of a ratio ≈ Percentage change of numerator - Percentage change of denominator (if small changes)**

  - If $z = \frac{x}{y}$ **, then** $\frac{\Delta z}{z} \approx \frac{\Delta x}{x} - \frac{\Delta y}{y}$

- **Percentage change of a product ≈ Percentage change of factor 1 + Percentage change of factor 2 (if small changes)**

  - If $z = xy$**, then** $\frac{\Delta z}{z} \approx \frac{\Delta x}{x} + \frac{\Delta y}{y}$

  Hence if $\varepsilon = \frac{ep}{p}$ **then:**

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

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

The real exchange rate, cont.

$\varepsilon\uparrow \Leftrightarrow$ 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)

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Figure 6-7: Net exports and the real exchange rate

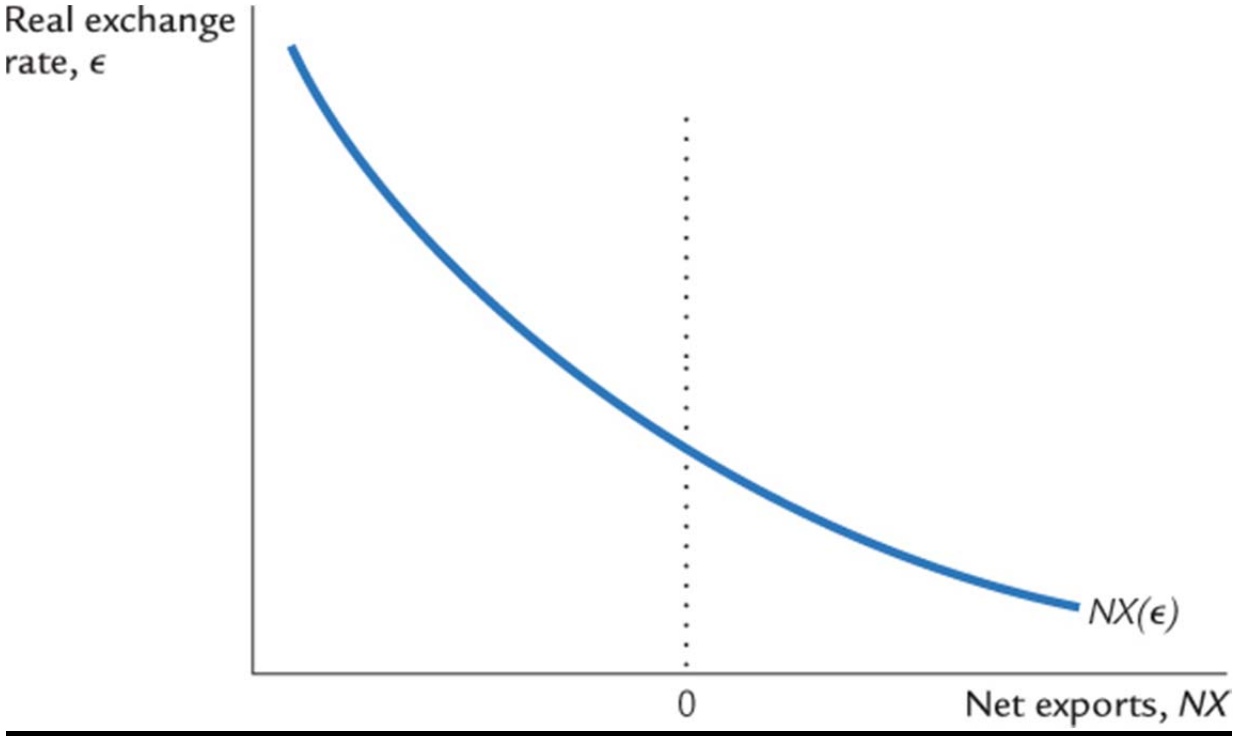


Figure 6-8: How the real exchange rate is determined

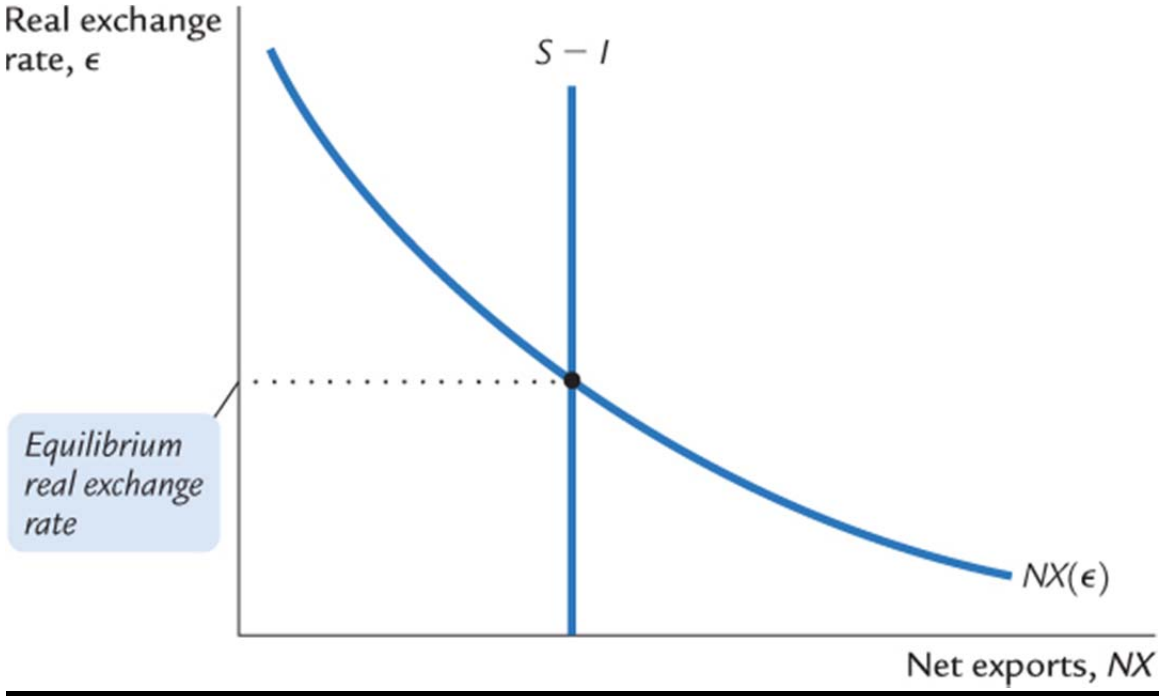


Figure 6-9: The impact of expansionary fiscal policy at home on the real exchange rate

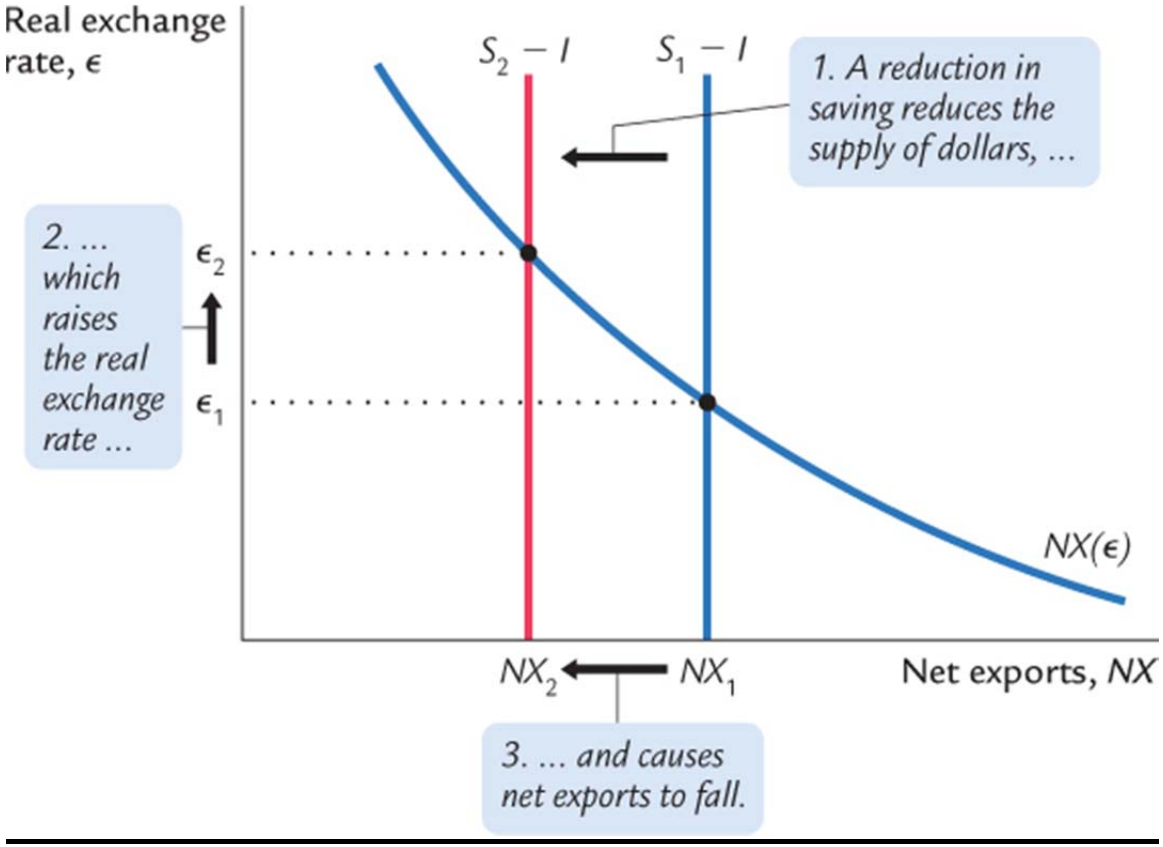


Figure 6-10: The impact of expansionary fiscal policy abroad on the real exchange rate

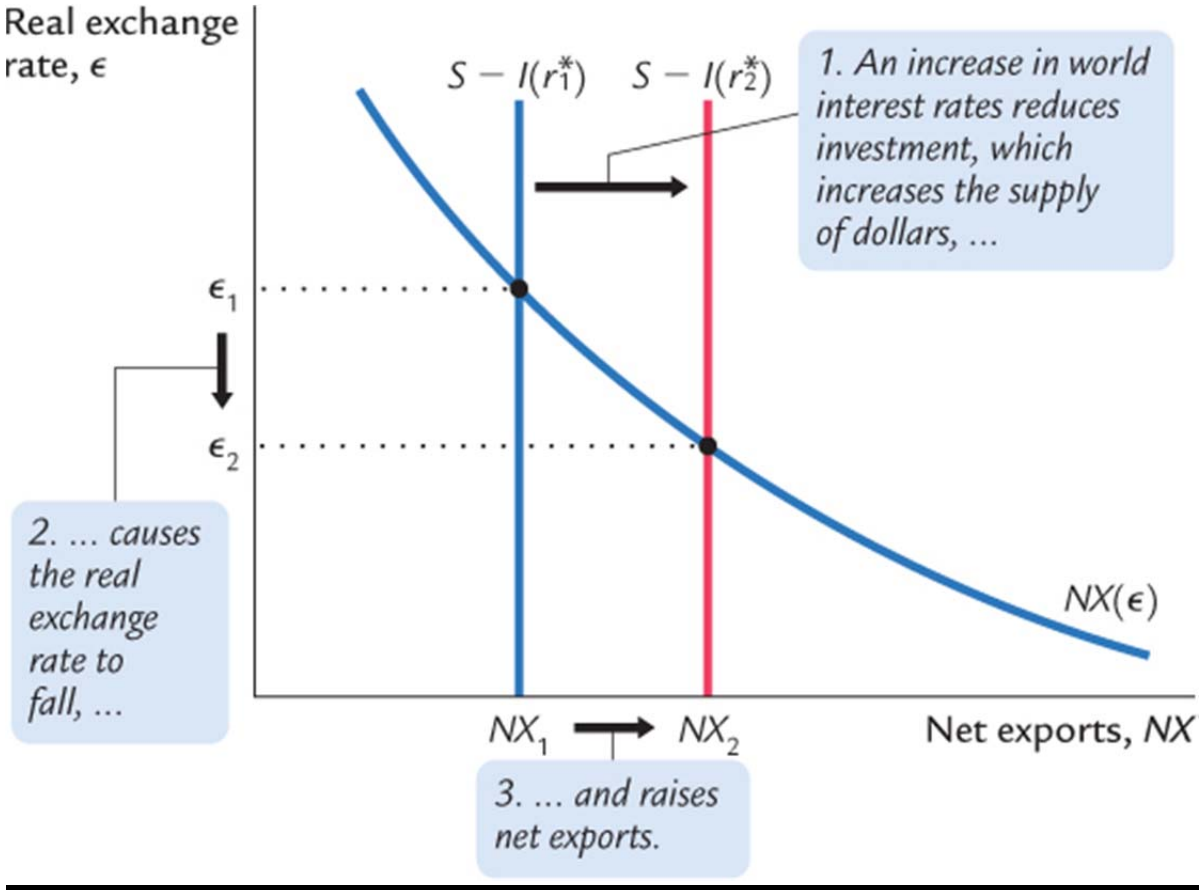
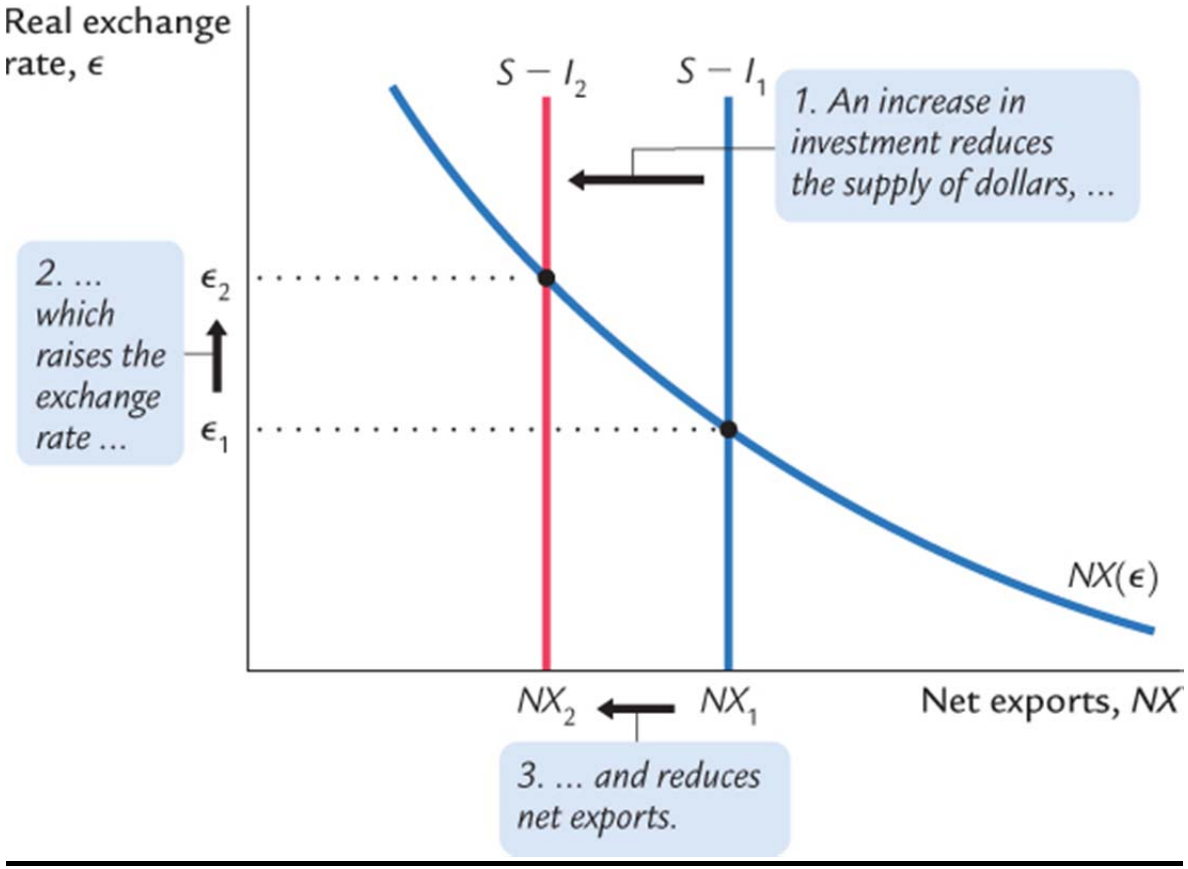


Figure 6-11 The impact of an increase in investment demand on the real exchange rate



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**
- **At the same time large fiscal deficits were turned into surpluses**
- **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**

Measures of the real exchange rate

ULC = unit labour cost = the labour cost of producing one unit of output $ULC = \frac{WL}{Y}$

$W =$ wage

$L =$ employment

$Y =$ output

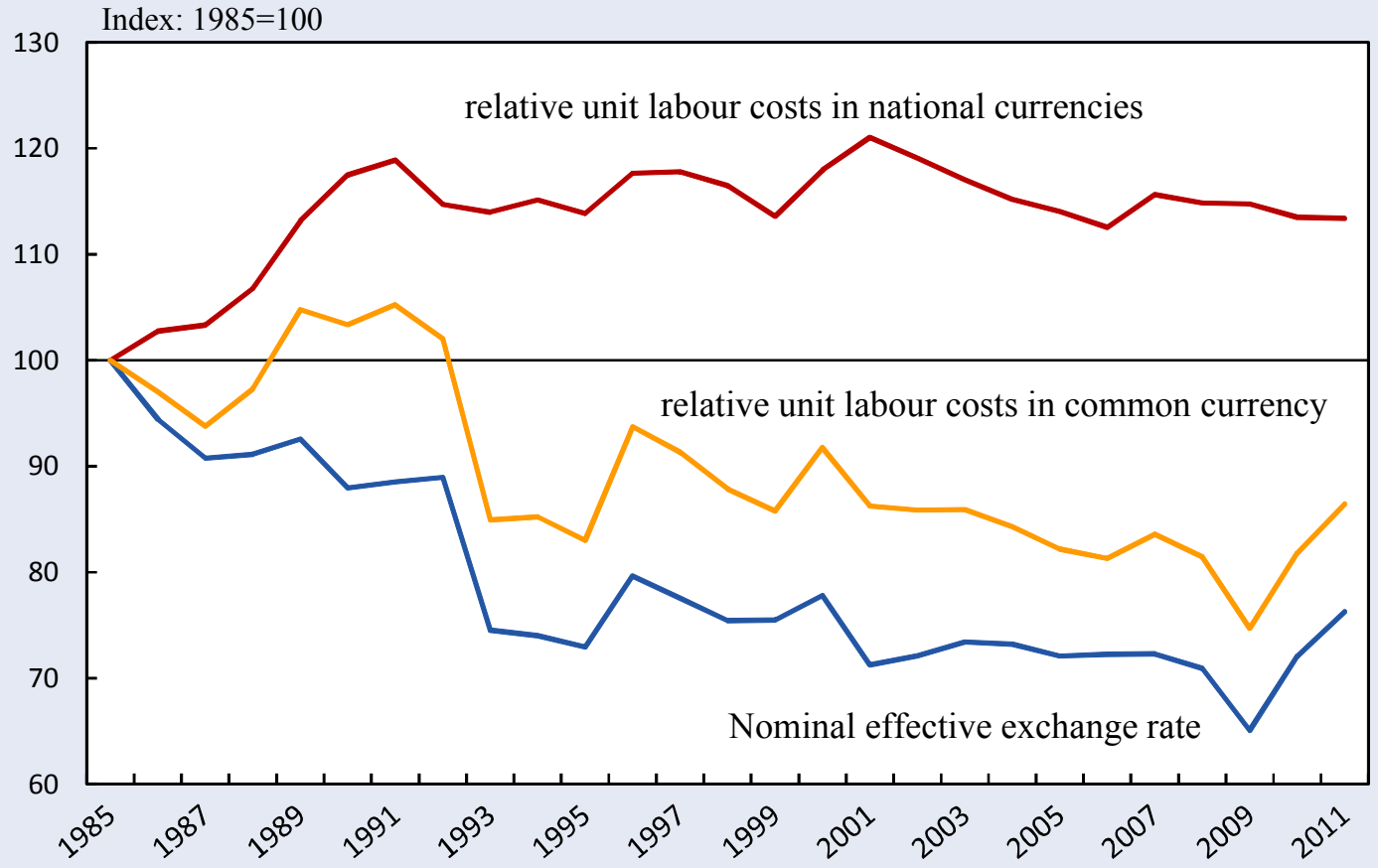
Instead of $\varepsilon = e \cdot \frac{p}{p^*}$ one often uses relative unit labour costs, $RULC$, as a measure of the real exchange rate: $RULC = e \cdot \frac{ULC}{ULC^*}$

e = the nominal exchange rate

ULC = domestic unit labour cost

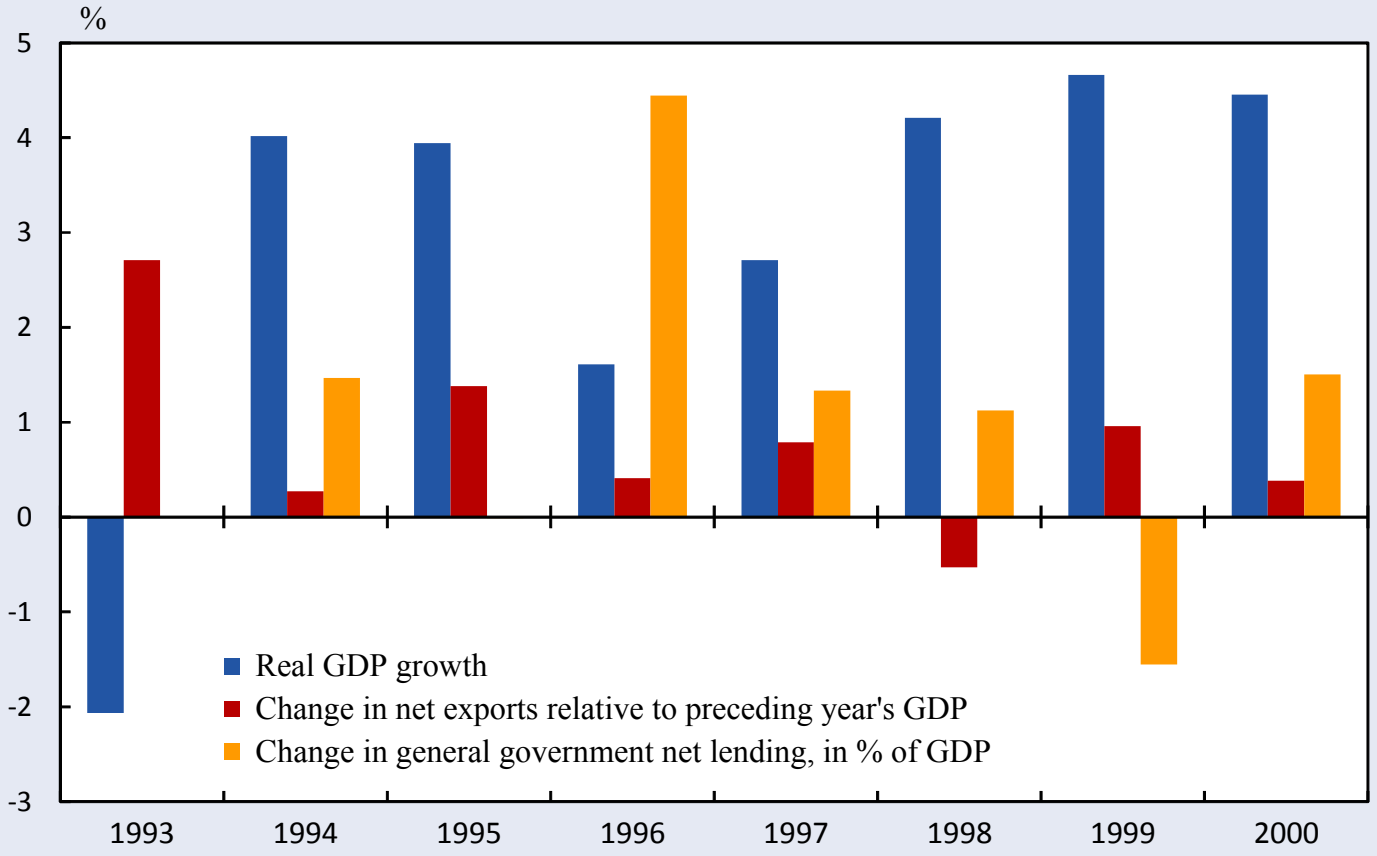
ULC^* = foreign unit labour cost

Nominal exchange rate and relative unit labour costs vis-à-vis EU-15 for Sweden



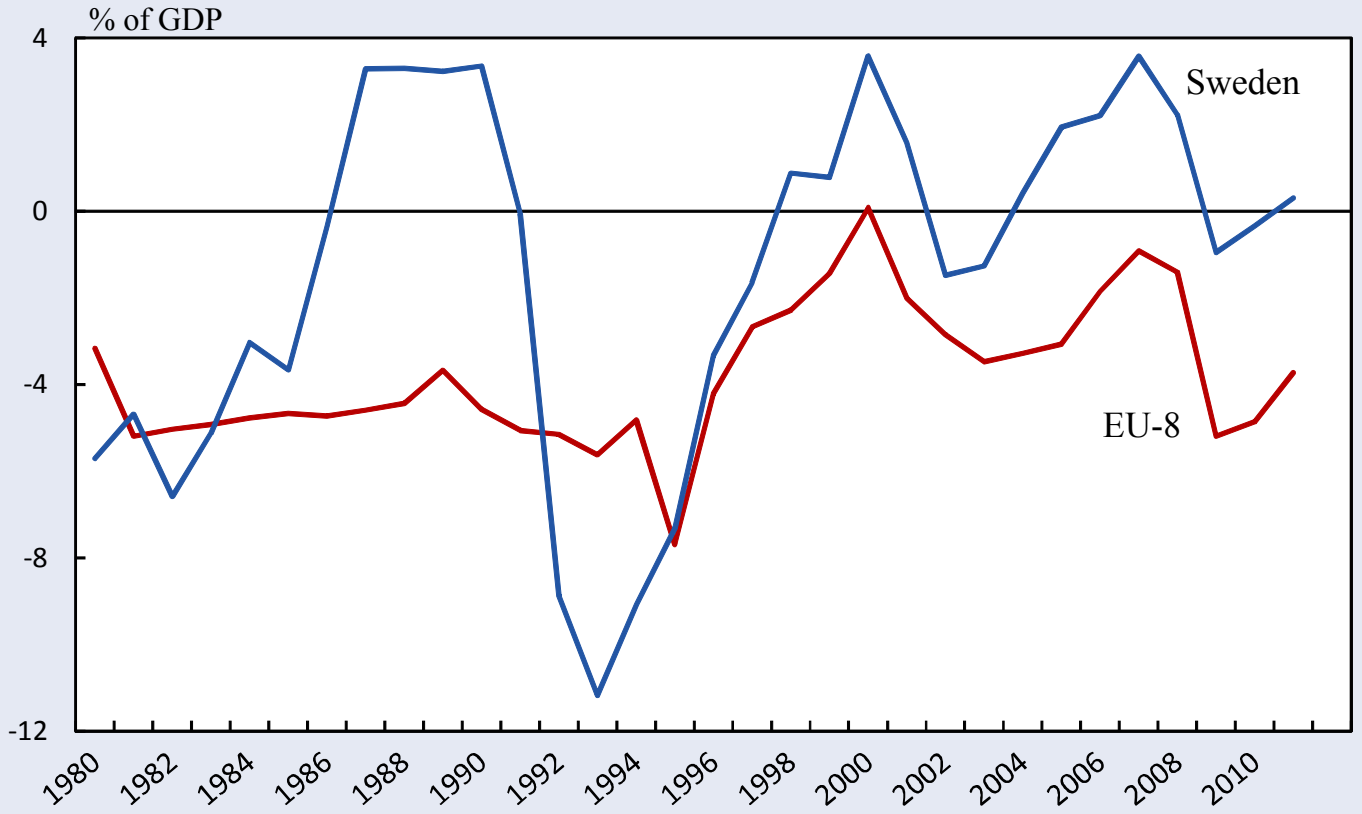
Sources: Ameco and own calculations.

Fiscal consolidation, GDP growth and change in net exports in Sweden, 1993-2000

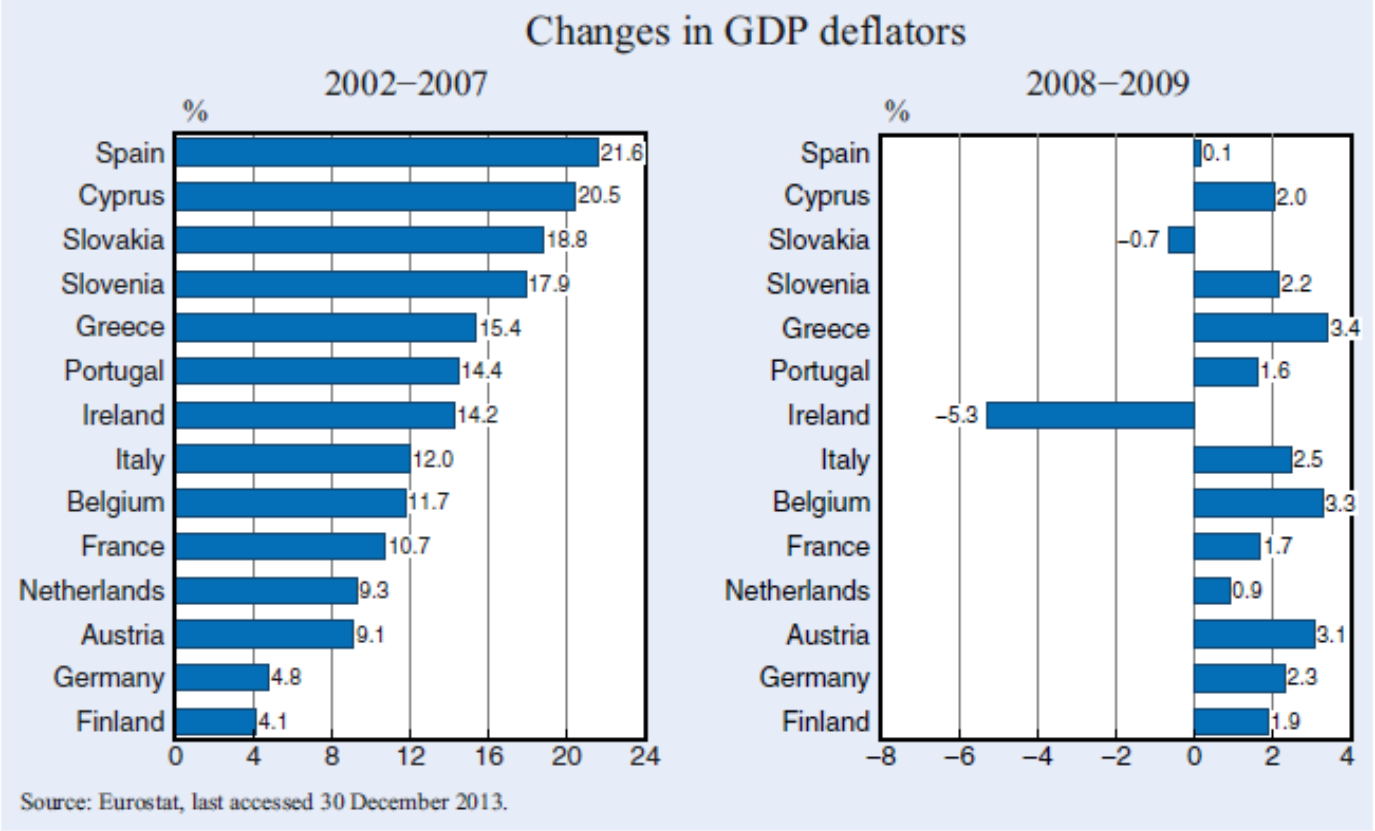


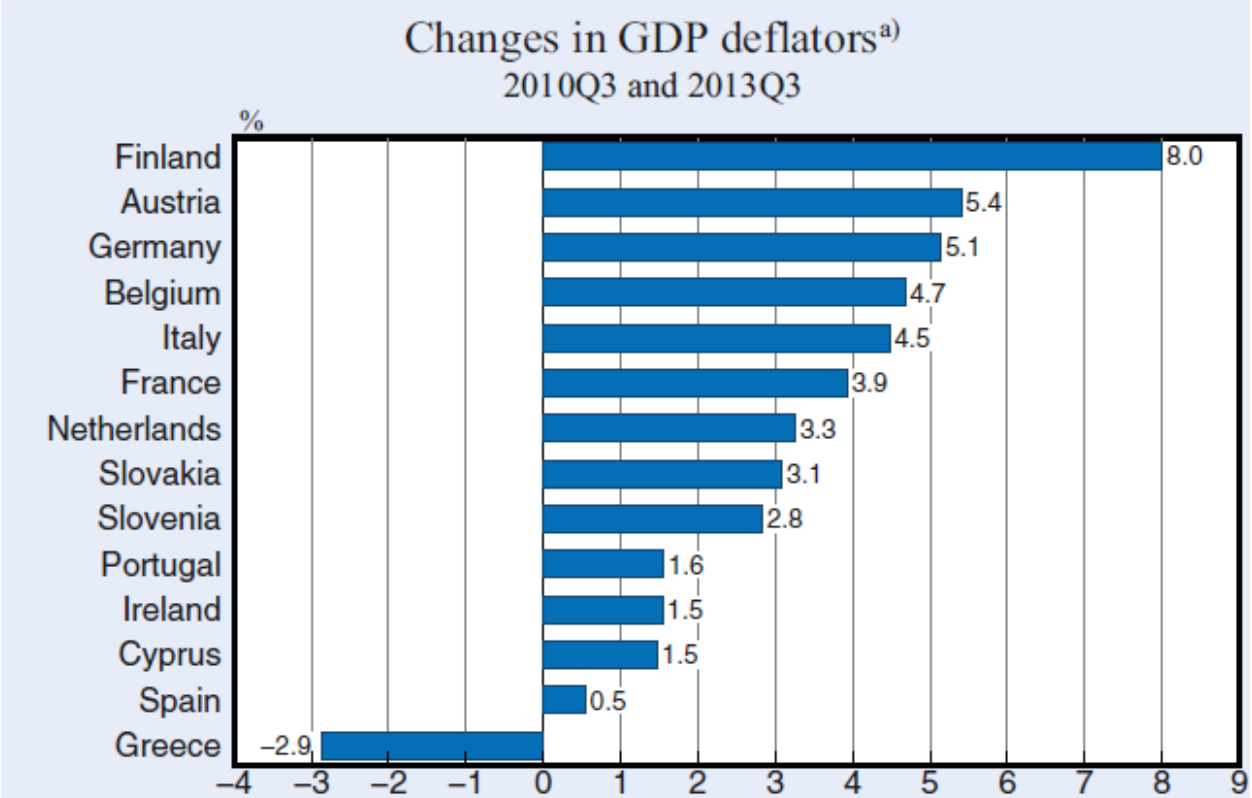
Sources: Ameco and own calculations.

General government net lending in Sweden and the euro area



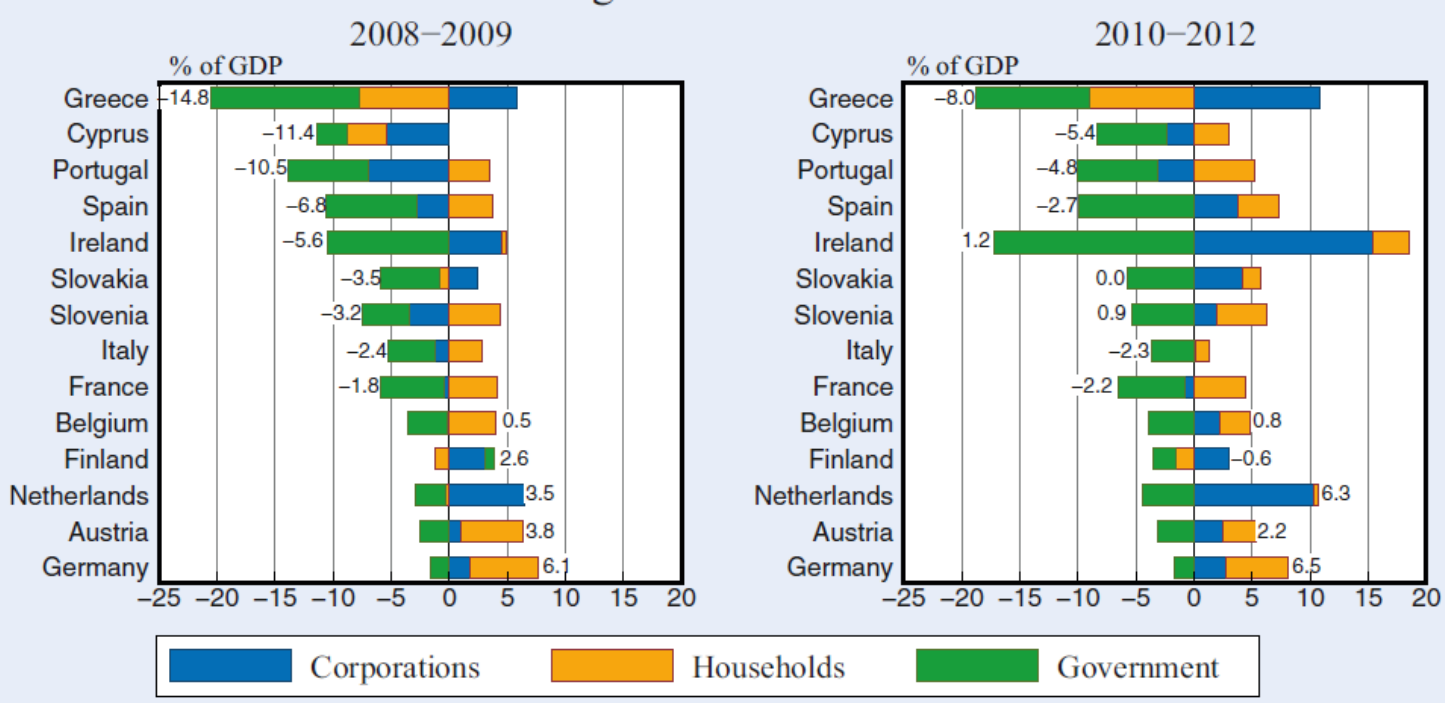
Note: EU-8 is a weighted average for Austria, Belgium, Finland, France, (West) Germany, Italy, the Netherlands and Portugal.
Sources: OECD Economic Outlook No. 89 (Sweden); and Ameco and own calculations (EU-8).


Changes in GDP deflators
2002–2007
%
Spain 21.6
Cyprus 20.5
Slovakia 18.8
Slovenia 17.9
Greece 15.4
Portugal 14.4
Ireland 14.2
Italy 12.0
Belgium 11.7
France 10.7
Netherlands 9.3
Austria 9.1
Germany 4.8
Finland 4.1
0 4 8 12 16 20 24
2008–2009
%
Spain 0.1
Cyprus 2.0
Slovakia –0.7
Slovenia 2.2
Greece 3.4
Portugal 1.6
Ireland –5.3
Italy 2.5
Belgium 3.3
France 1.7
Netherlands 0.9
Austria 3.1
Germany 2.3
Finland 1.9
–8 –6 –4 –2 0 2 4
Source: Eurostat, last accessed 30 December 2013.



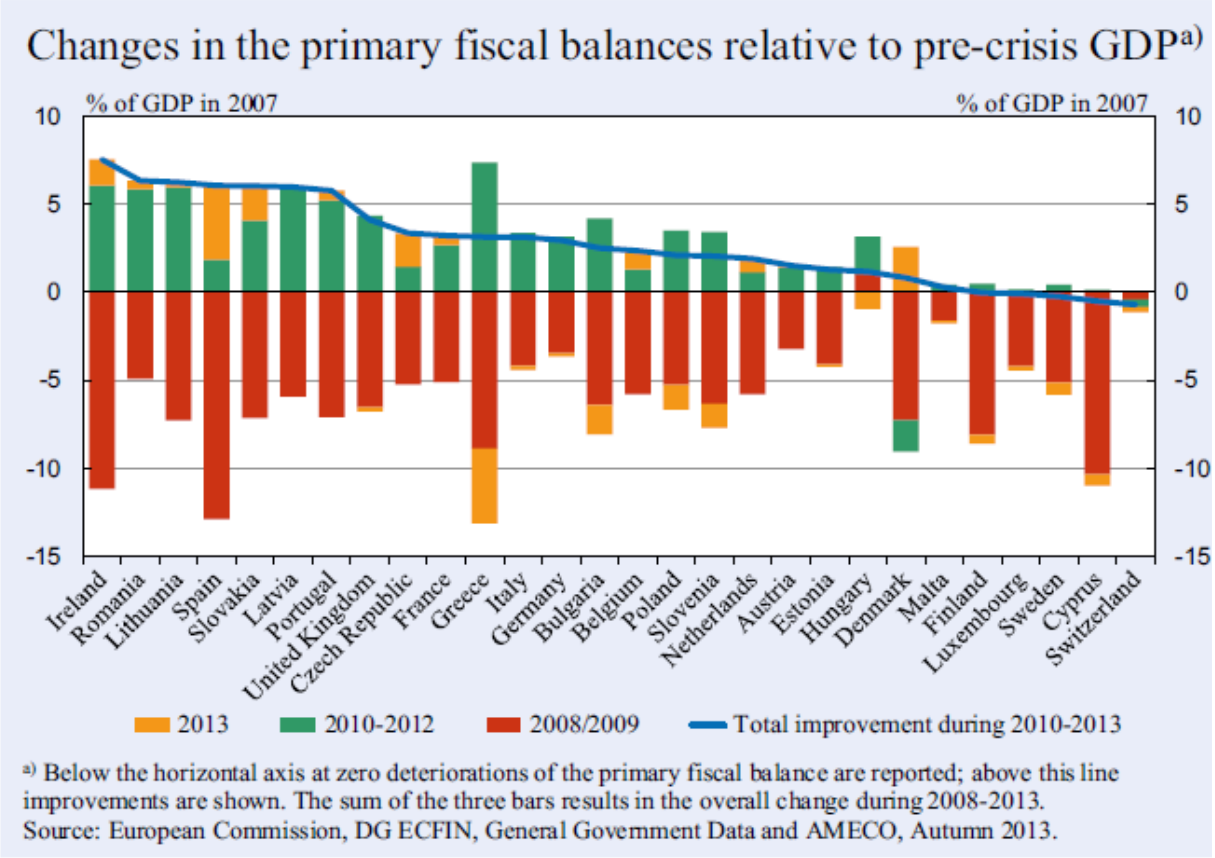
[a)] Data is seasonally adjusted and adjusted by working days except the data of Greece which is unadjusted.
Source: Eurostat, last accessed 30 December 2013.

Average external sector balances[a)]



[a)] The numbers on the graphs indicate the sum of the three sectors' balances which is the external balance. A positive number indicates net lending and a negative number net borrowing from the rest of the world.

Source: DG ECFIN / AMECO, last accessed 5 November 2013.



[a)] Below the horizontal axis at zero deteriorations of the primary fiscal balance are reported; above this line improvements are shown. The sum of the three bars results in the overall change during 2008-2013.
Source: European Commission, DG ECFIN, General Government Data and AMECO, Autumn 2013.

The primary fiscal balance is government revenue minus government expenditure excluding interest payments.