

# Basic Concepts in International Economics

Η ΕΛΛΑΔΑ ΣΤΗΝ ΟΝΕ

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# Comparative Advantage and Relative Wages

- A brief presentation of the concepts of:  
*absolute advantage (AA)*  
*comparative advantage (CA)*
- How international trade impacts on real wages, and how it places limits on relative (domestic-to-foreign) wages
- How differential productivity developments in foreign countries may benefit or harm domestic workers

# Main Assumptions of the Model

- 2 Countries: Denmark(D) and Greece (G)
- 2 Goods: Agricultural (A) and Manufacturing (M)
- Labour is the only factor of production, and all workers are identical within each country.
- Labour productivity differs across countries (possibly due to differences in technology).
- Labour productivity remains constant as output changes, i.e. both marginal and average cost are constant.
- Perfect competition prevails, and so prices are equal to marginal and average costs.

The Table below shows the units of labour required to produce 1 unit of each good in each country. Thus, to produce 1 unit of M in Greece (G) you need 4 units of labour, whereas in Denmark (D) you need 1 unit of labour. We observe that, for both goods, you need fewer units of labour in D than in G. We thus say that D has **absolute** advantage in the production of both goods over G (i.e. D it is more productive in both goods). However, the productivity advantage of D (over G) is four times as high in M, and “only” twice as high in A. Thus, D has **comparative** advantage in M. By same token, although G has absolute disadvantage in both goods , it has comparative advantage in A ( in A, Greece has 50% of Danish productivity, and in M, 25% of Danish productivity – thus Greece is comparatively better in A).

	LABOUR UNITS REQUIRED TO	PRODUCE 1 UNIT OF THE GOOD
	AGRICULTURAL GOODS (A)	MANUFACTURING GOODS (M)
GREECE (G)	2	4
DENMARK (D)	1	1

# Relative Prices in Autarky

Assuming perfect competition, the price of each good in autarky will be equal to the average cost of producing it. Thus:

$$P^{A,G} = AC^{A,G} = 2 (W^G)$$

$$P^{M,G} = AC^{M,G} = 4 (W^G).$$

Therefore the relative price in Greece in autarky will be equal to :

$(P^{A,G} / P^{M,G}) = 0.5$ . This makes sense, since it takes half as much labour to produce the A good in Greece as the amount required to produce the M good.

Applying the same logic, the relative price in Denmark in autarky will be equal to:  $(P^{A,D} / P^{M,D}) = 1$ .

NOTE: UNDER AUTARKY, THE RELATIVE PRICE OF GOOD A IS LOWER IN GREECE - COMPARATIVE ADVANTAGE (**CA**) IMPLIES THAT UNDER AUTARKY THE RELATIVE PRICE OF THE GOOD IN WHICH THE COUNTRY HAS **CA** WILL BE LOWER THAN IN THE OTHER COUNTRY.

(GOOD M WILL BE RELATIVELY CHEAP IN DENMARK.)

# Real Wages in Autarky

Workers within each country are identical, and earn the same wage.

Under autarky, the real wage in terms of A in Greece will be  $W^G / P^{A,G} = W^G / 2 (W^G) = 0.5$ .

This implies that a worker can acquire half a unit of A if he provides 1 unit of labour and devotes his entire income to acquire the A good; in other words, real wages are equal to labour productivity, since 1 unit of labour produces half a unit of A.

The real wage in terms of M goods in Greece will be

$W^G / P^{M,G} = W^G / 4 (W^G) = 0.25$ . (This implies that a worker can acquire 0.25 units of M if he provides 1 unit of labour and devotes his entire income to acquire the M good.)

# Real Wages in Autarky

By similar reasoning, the real wage in Denmark will be:

$$W^D / P^{A,D} = W^D / W^D = 1 \quad \text{- in terms of A}$$

$$W^D / P^{M,D} = W^D / W^D = 1 \quad \text{- in terms of M}$$

Real wages will be higher in the more productive country.

# A Hypothetical Consumption Pattern in Autarky

- Given that in autarky in Greece

$W^G/P^{A,G}=0.5$ , and  $W^G/P^{M,G}=0.25$ , a worker could, for example, find it optimal to devote half her income (from supplying 1 unit of labour) to buy 0.25 units of A, and the other half to buy 0.125 units of M. We denote this as:

$$C_a^{A,G}=0.25, \quad C_a^{M,G}=0.125. \quad (\text{subscript } a \text{ denotes autarky})$$

- Given that in autarky in Denmark

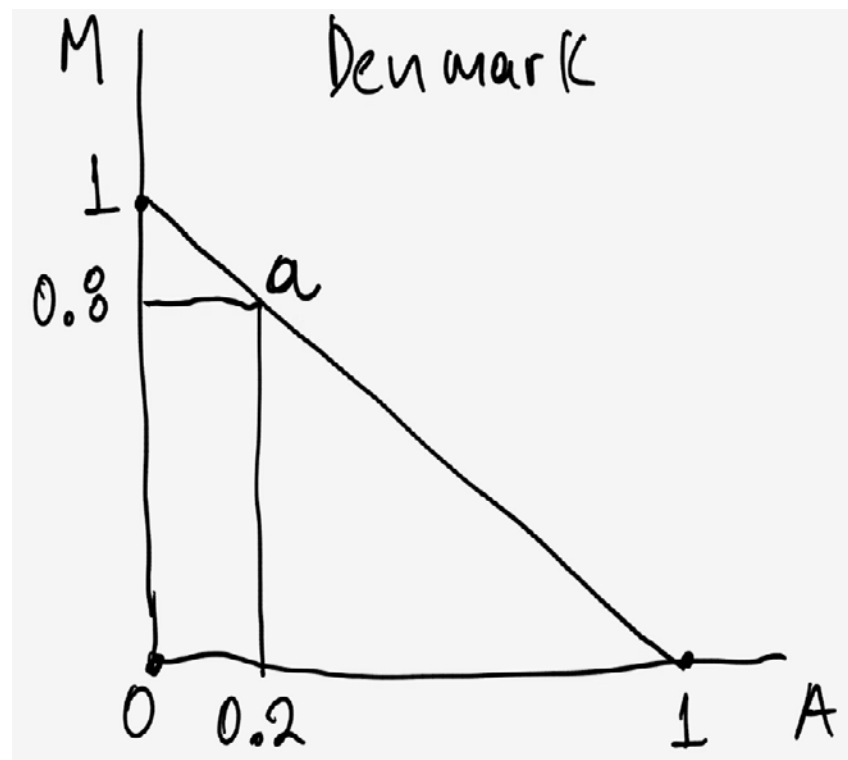
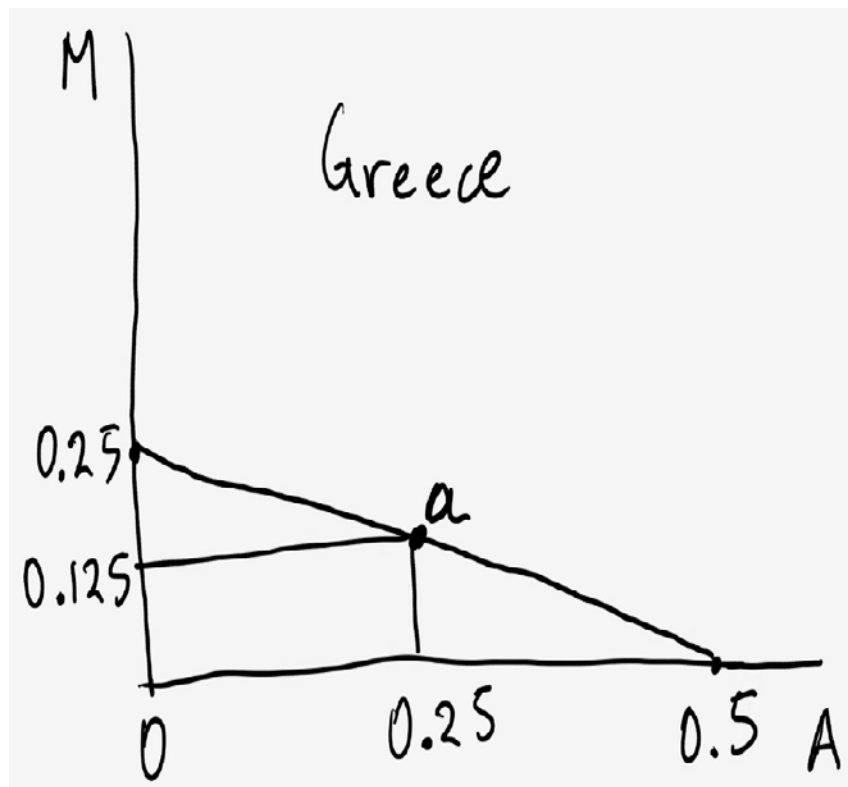
$W^D/P^{A,D}=1$ , and  $W^D/P^{M,D}=1$ , a worker could, for example, find it optimal to devote 80% of her income (from supplying 1 unit of labour) to buy 0.8 units of M and the rest 20% to buy 0.2 units of A. We denote this as:

$$C_a^{A,D}=0.2, \quad C_a^{M,D}=0.8$$



## Consumption Pattern in Autarky:

Under Autarky, point  $\alpha$  (in both diagrams) is the production **and** consumption point, since consumption of each good can not differ from the production of each good in the absence of international trade.



# Free Trade

- Under autarky we found that that the relative prices will be different in the two countries:  $(P^{A,G}/P^{M,G})=0.5$  ,  $(P^{A,D}/P^{M,D})=1$ .
- Free trade (and the absence of any regulations or taxes) will equalize the prices, and a common relative price will prevail, denoted as  $(P^A/P^M)$ .
- We expect that free trade will result in a relative price that will be in-between the autarkic relative prices, i.e.  $0.5 < (P^A/P^M) < 1$ . (The case that the relative price under free trade will be equal to either 0.5 or 1 cannot a-priori be excluded, but we ignore it here.)
- For purposes of illustration, let's assume that the free-trade relative price is:  $(P^A/P^M)=0.8$ .

# Are There Gains from Trade?

- With free trade it makes sense for each country to specialize in producing only the good in which it has comparative advantage (i.e., G in A, and D in M). For simplicity, assume that there is only 1 worker in each country, who supplies 1 unit of labour.
- Suppose that the Greek worker, who produces 0.5 units of A, wishes to maintain her consumption of 0.25 units of A (as in autarky), and trade (i.e. export) her remaining 0.25 units of A in order to acquire, thru imports, some units of M.
- How many units of imports can she receive in exchange?
- In the absence of gifts (i.e. assuming trade balance), the value of imports must be equal to the value of exports, i.e.

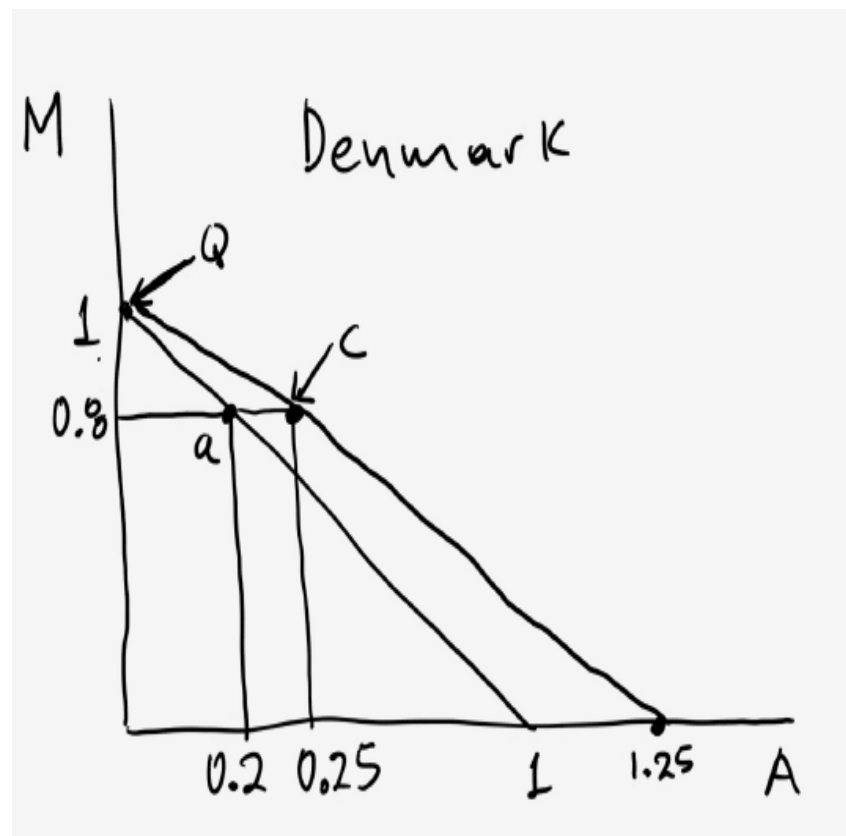
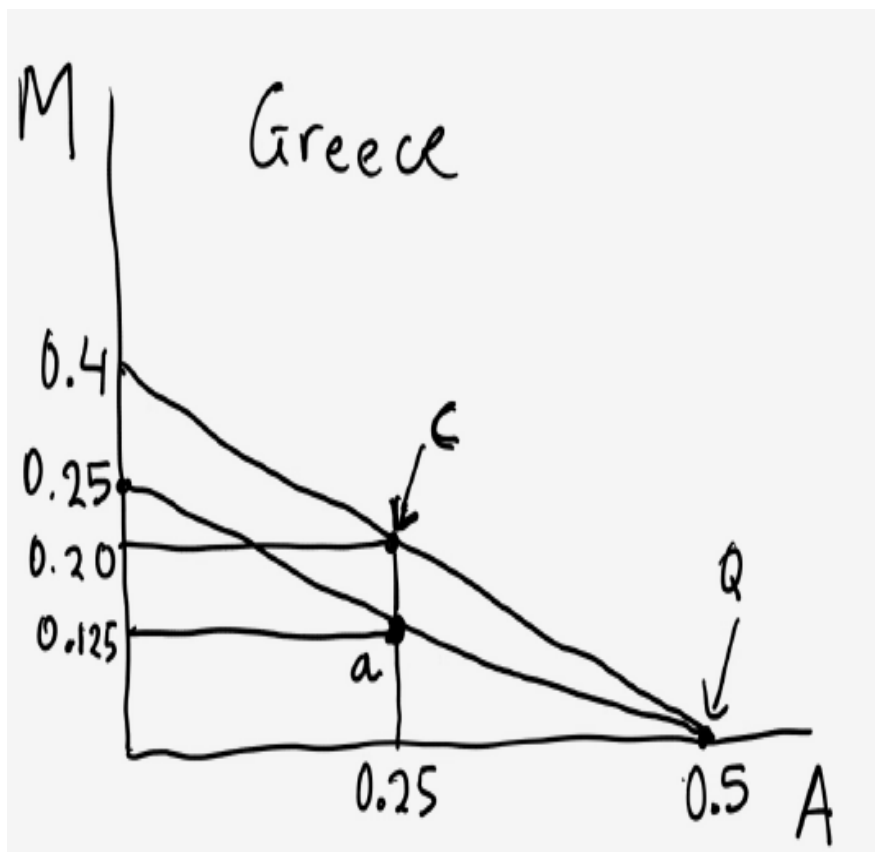
$$(P^A)(X^A) = (P^M)(IM^M), \text{ or } IM^M = (P^A/P^M)(X^A),$$

where  $X$  denotes exports, and  $IM$  denotes imports. Since  $X^A = 0.25$ , and  $(P^A/P^M) = 0.8$ , we find that  $IM^M = 20$ .

# Are There Gains from Trade (continued)

- Thus, the worker can, thru trade, maintain her consumption of 0.25 units of A, and consume 0.20 units of M as well, which are higher than the consumption of 0.125 units of M which she would have in autarky.
- In such a case, since Greece's exports of A are 0.25 units, Denmark's imports of A will be 0.25 units, and that will be the Danish worker's consumption of A, which is higher than his consumption under autarky. Moreover, since the Danish worker produces 1 unit of M, and exports 0.20 units of it to Greece, his consumption of M would be 0.80 units – as much as her consumption during autarky.
- This case is depicted for both countries in the next slide, with  $\alpha$  depicting the production and consumption point under autarky, and Q and C the production and consumption points (respectively) under free trade.

**Gains from Trade:** In the example presented, for both countries, free trade allows them, by fully specializing in the good in which they have **CA**, to consume as much of the good in which they have **CA**, and to increase the consumption of the other good thru imports. This obtains because world production of both goods rises under free trade relative to autarky.



# Gains from Trade (continued)

- Of course, the worker could enjoy, thru free trade, higher consumption of both goods relative to autarky.
- For example, the worker in Greece could consume 0.28 units of A, export 0.22 units of it, and import and consume 0.176 units of M – since  $(P^A/P^M)(X^A)=(0.8)(0.22)=17.6$
- In that case, the consumption of the Danish worker will be equal to  $0.5-0.28=0.22$  units of A, and  $1-0.176=0.824$  units of the M good.
- The fact that workers can enjoy higher consumption of both goods under free trade relative to autarky signifies Gains from Trade. It also implies that the real incomes will be higher under free trade.

# Relative Wages

- Given the productivity differences between the two countries, how high could the Greek wage be relative to the Danish wage ( $W^G/W^D$ )?
- It is obvious that the Greek wage should be such that Greece can produce at least one of the goods at a lower cost – otherwise, with free trade, no Greek producer could survive.
- We need  $AC^{A,G} \leq AC^{A,D}$ , or  $(2)W^G \leq W^D$ , or  $(W^G/W^D) \leq 1/2$ . This says that the Greek wage can be, at most, 50% of the Danish wage. Why? Because Greek workers have 50% of the productivity of Danish workers.
- How low could  $(W^G/W^D)$  be? By similar logic we can establish that if  $(W^G/W^D) < 1/4$ , then even M could be produced in G at a lower cost than in D. Thus...

- How low could  $(W^G/W^D)$  be? By similar logic we can establish that if  $(W^G/W^D) < 1/4$ , then even M could be produced in G at a lower cost than in D. Thus, the relationship:

$$1/4 \leq (W^G/W^D) \leq 1/2 ,$$

provides the range of the Greek wage relative to the Danish wage that allows both countries to produce at least one of the goods.

- For example, if  $W^G = 0.4$ ,  $W^D = 1$ , then  $AC^{A,G} < AC^{A,D}$ , and  $AC^{M,G} > AC^{M,D}$ , so G will produce the A, and D the M.
- The relative demand for the two goods determines whether  $W^G/W^D$  should be closer to the lower or the higher value of the range (i.e. closer to 0.25 or to 0.5). For example, an exogenous increase in the (relative) demand for A will result in higher demand for labour in Greece, and a higher  $W^G/W^D$ .



# Changes in Foreign Productivity

- We have seen that in autarky real wages are equal to (labour) productivity, and that with free trade the real wage in terms of the imported good will be higher. Moreover, the rise in the real wage (and consumption possibilities) for Greece after free trade obtains even if the trading partner (**D**) is more productive in both goods.
- What if, starting from a situation of free trade, **D** becomes more productive? Will Greece become better-off?
- Consider that **D**'s productivity in agricultural goods rises, and that it now requires only 0.666 units of labour to produce 1 unit of A.
- Greece retains its **CA** in A, since it has 33% of **D**'s productivity in it, and only 25% of **D**'s productivity in M. Thus, Greece can continue to specialize in producing the A.

- The range of the Greek wage relative to the Danish wage now is  $1/4 \leq (W^G / W^D) \leq 1/3$  ; i.e. Greek wages can now be up to 33% of Danish ones.
- Although we may care about *relative* wages (e.g. Harvard survey), what happens to real wages?
- If, as assumed earlier,  $(W^G / W^D) = 0.4$  before the rise in D's productivity, assume that after the rise in D's productivity  $(W^G / W^D) = 0.3$ . Let  $W^D = 1$ , in both cases, so that  $W^G = 0.4$  , and  $W^G = 0.3$ , respectively.
- Note that the price of each good under free trade is equal to the AC of producing, and that with full specialization G produces A and D produces M.

- Real wages (under FT) before the rise in D's productivity:

$$W^G/P^A = W^G/AC^{A,G} = \frac{0.4}{(2)(0.4)} = 0.5$$

$$W^G/P^M = W^G/AC^{M,D} = \frac{0.4}{(1)(1)} = 0.4$$

- Real wages (under FT) after the rise in D's productivity:

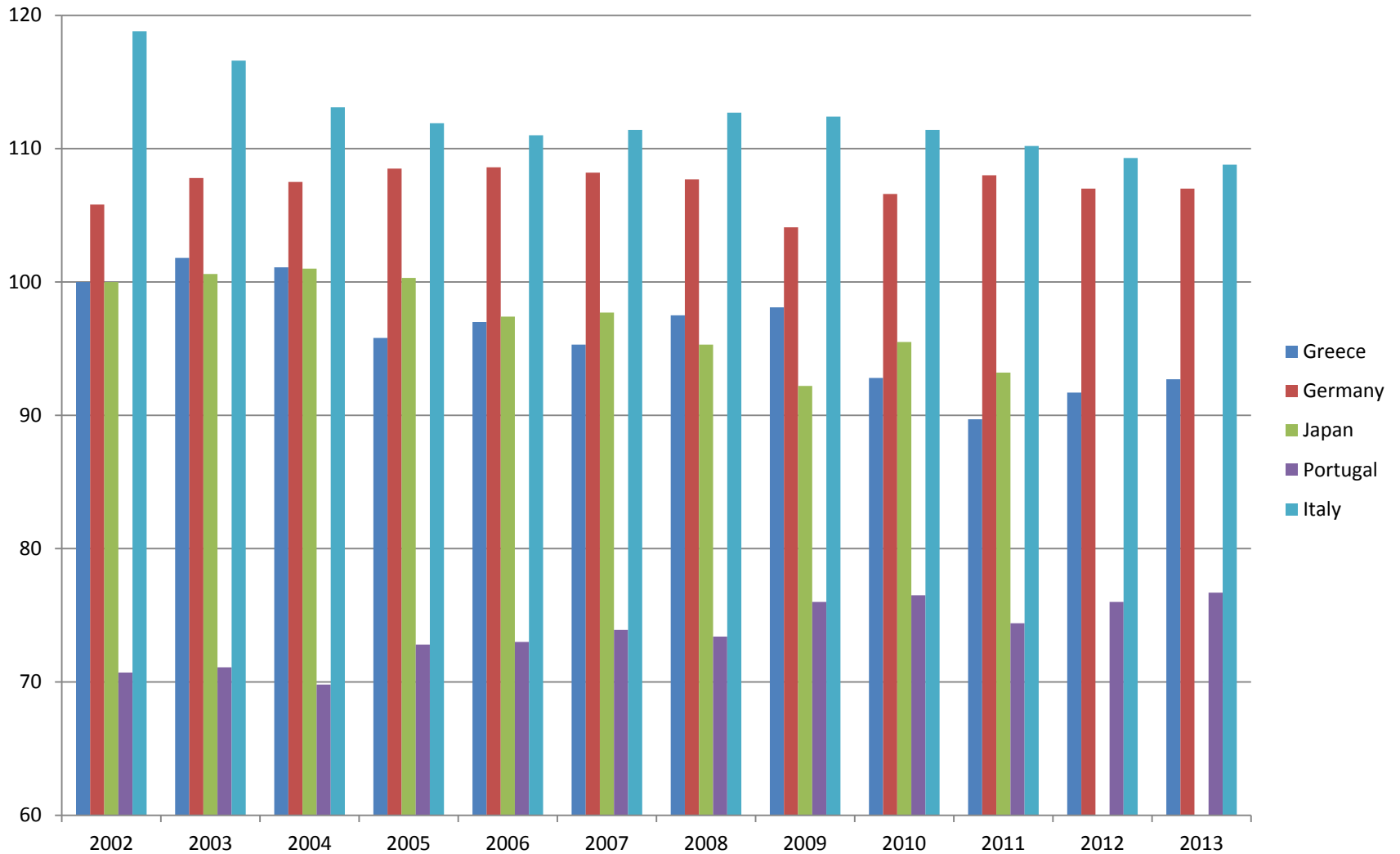
$$W^G/P^A = W^G/AC^{A,G} = \frac{0.3}{(2)(0.3)} = 0.5$$

$$W^G/P^M = W^G/AC^{M,D} = \frac{0.3}{(1)(1)} = 0.3$$

Thus, the rise in D's productivity in the good in which G has CA can lower the *overall* real wage in G.

- Could the same result obtain if D became more productive in M?

## Labour Productivity per Person Employed (EU27=100) (can we conclude anything on the basis of these data?)



# Basic National Accounting Identities

A brief presentation of the meaning and the interrelationships between the main macroeconomic aggregates, such as:

- GDP and GNI
- National Saving, Investment, and the Current Account Balance
- Net Foreign Assets and National Wealth

# Basic National Accounting Identities

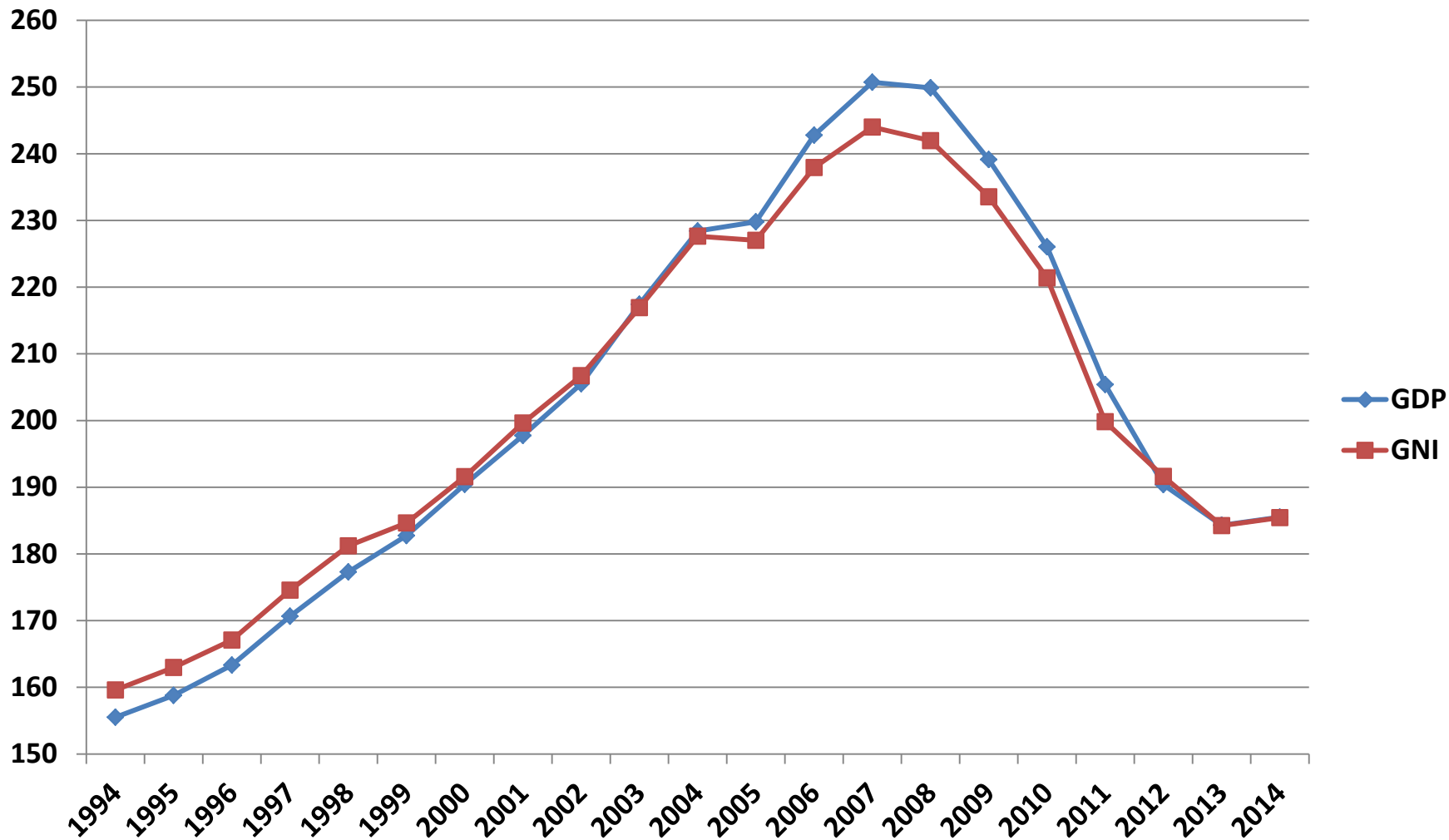
- **Gross Domestic Product (GDP)** is the total value added of goods and services produced during a time period by factors of production located within Greece. It is also equal to the total value of incomes accruing to all factors of production located within Greece.
- **Gross National Income (GNI)** is the total value added generated by factors of production owned by Greeks, including those employed in foreign countries.
- Example: A Greek firm's profits from producing in Bulgaria would count in Greek GNI but not in Greek GDP. (They would also count in Bulgarian GDP.)
- Thus,

**GNI = GDP –**

**– factors payments made to foreigners** (dividends, interest, rent to foreigners owning assets in Greece and wages of foreigners working in Greece) +  
**+ factor payments received from abroad** (dividends, interest, rent to Greek residents owning assets abroad and wages of Greeks working abroad).

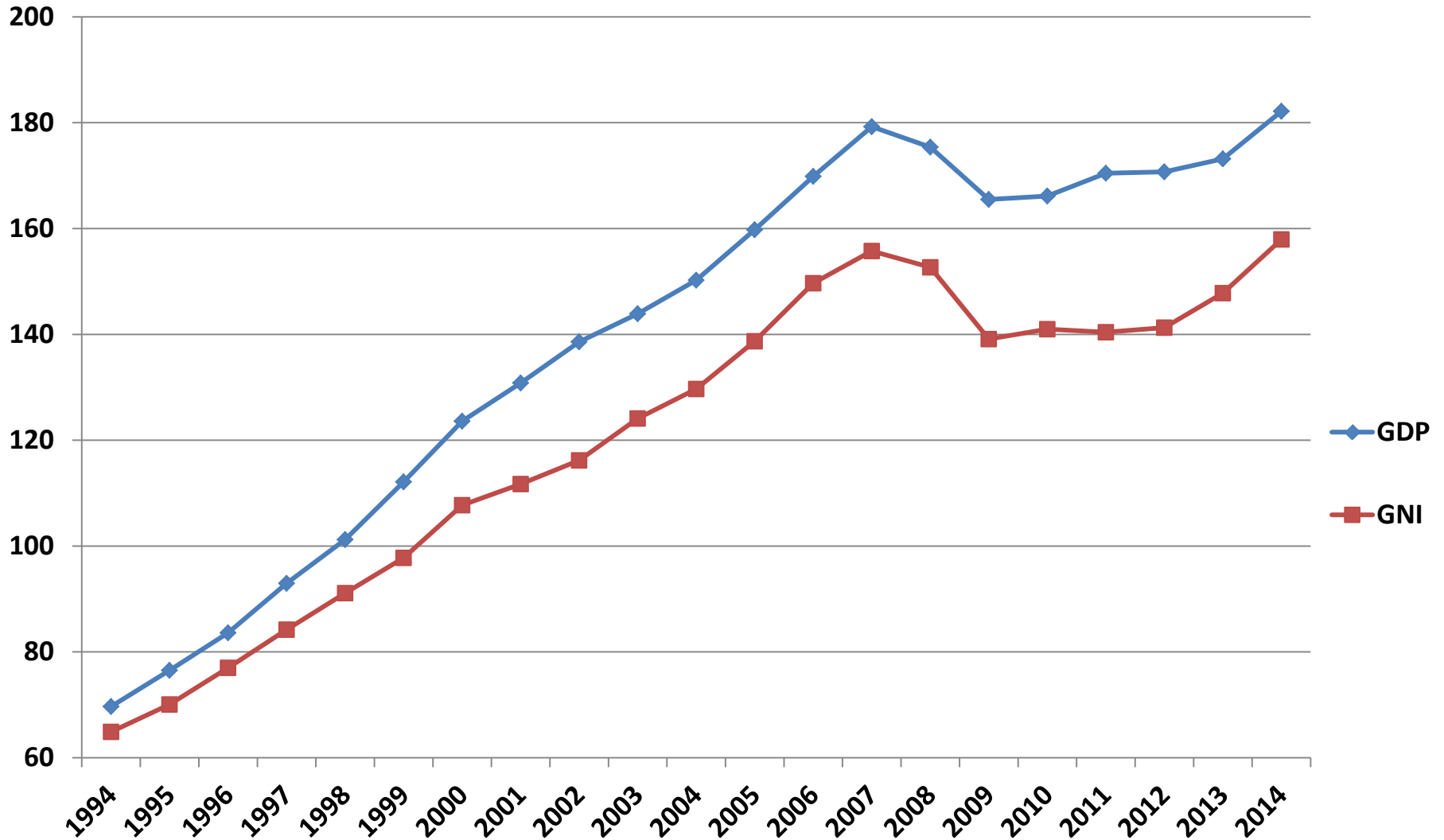
- In Ameco database, the difference between GNI and GDP is called Net Primary Income from abroad
- Difference between GDP and GNI not large in most countries (i.e. less than 1% of GDP), but for some countries (Greece: 2% in 2011), Mexico, Bangladesh) can be substantial, and in some cases it can be even as high as 18% of GDP (Ireland) or even 30% (Luxembourg).
- The difference is shaped by the evolution of Net Foreign Assets (**NFA**), and by migration flows.
- **NFA** = Assets owned by Greeks abroad – Assets Owned by Foreigners in Greece
- Assets include stocks, bonds, loans, real estate, etc.
- The biggest (in absolute terms) net debtor country in the world is the USA (its NFA are about -5 trillion USD). As a percentage of GDP, its NFA are about -30%.
- Greece is one of the biggest net debtors in terms of GDP. Its NFA (sometimes called NIIP), are (in 2015) about -120% of GDP (it was about -10% in 1995).
- If (negative) NFA exceed 50% of GDP, this is usually a sign that the country must quickly adjust.

## Greece: Gross Domestic Product and Gross National Income (bn euros, constant 2010 prices)



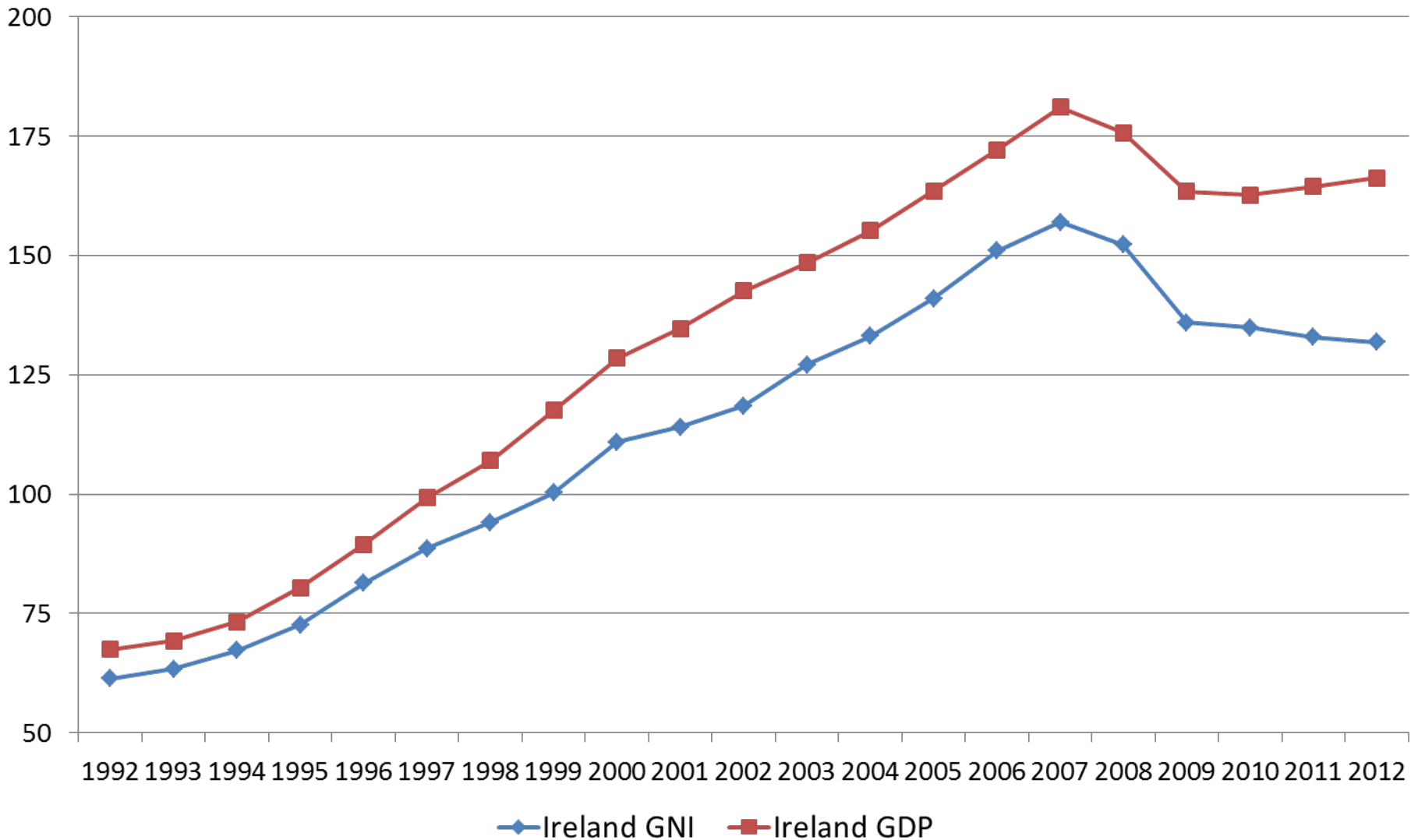


## Ireland: Gross Domestic Product and Gross National Income (bn euros, constant 2010 prices)

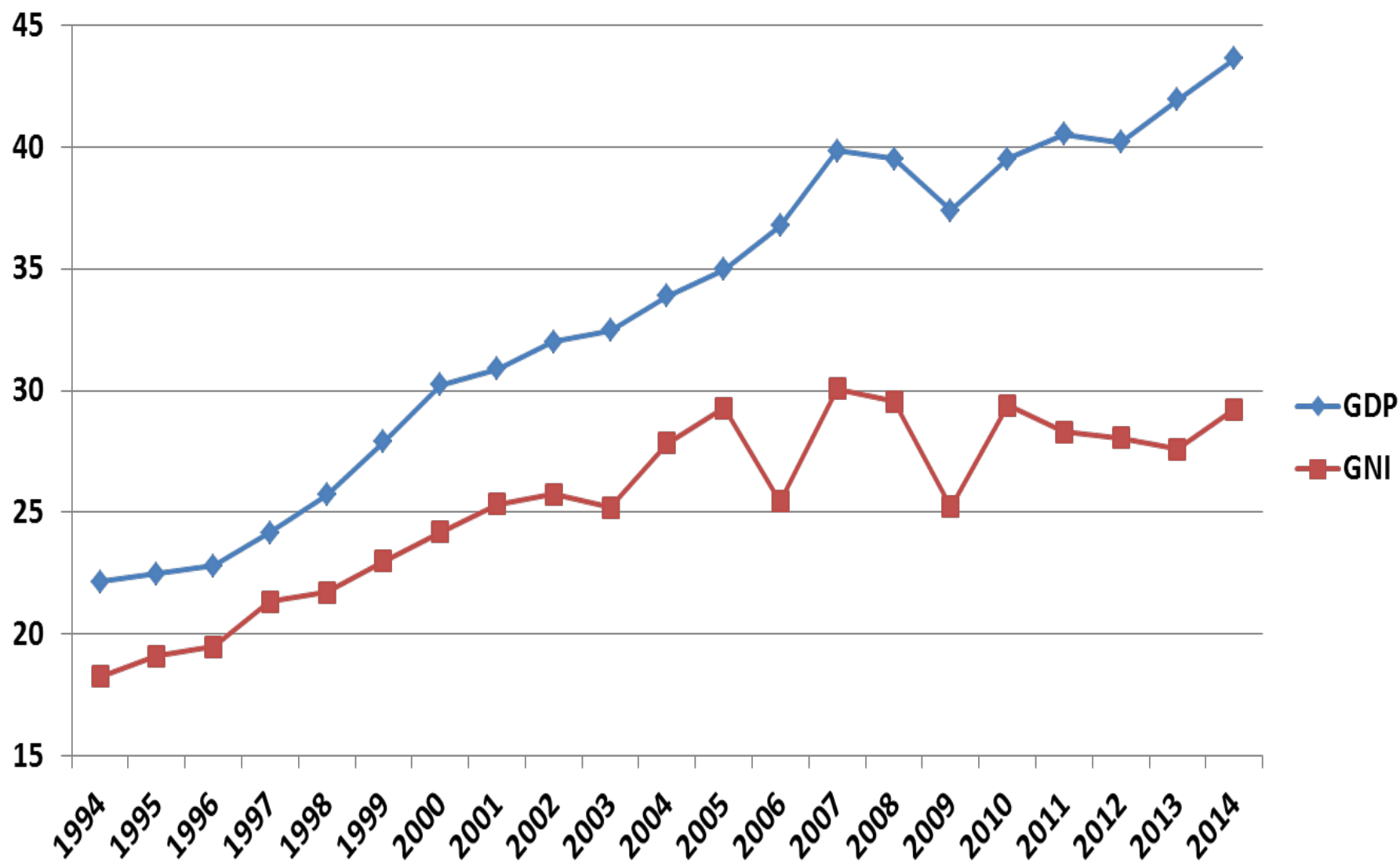


# (Footnote: How Data are Revised...)

IRELAND: GNI, GDP; Bn euros, 2005 prices



Luxembourg: GDP and GNI (bn euros, constant 2010 prices)



## Three Equivalent Ways to Understand the Current Account Balance (CAB)

- It is the difference between exports and imports, plus the net primary income balance
- It is the difference between national income and national spending
- It is the difference between national saving and investment

# Definition of CAB according to the Balance of Payments Statistics

- **CAB=Exports of goods and services**
  - Imports of goods and services
  - + Net primary income balance
  - + Current Transfers Balance =
  - = Net Exports + NPIB + CTB
- The current transfers balance (CTB) comprises mostly (in the case of Greece) the net transfers Greece receives from the EU. For ease of exposition we assume that  $CTB=0$ .
- *Assume, also, that no Greeks are working abroad, or foreigners in Greece.*
- Let,  $i$  = average interest rate (rate of return) on net foreign assets (foreign assets - foreign liabilities)
- *Then,  $i$  NFA = NPIB , and so*  
**CAB=NX +  $i$  NFA**

# CAB is the difference between national income and national spending

- **GDP = consumption + investment + government spending + net exports**
  - **$NX = X - M$**
  - **$GDP = C + I + G + NX$**
  - **$GNI = GDP + iNFA = C + I + G + (NX + iNFA)$   
 $= C + I + G + CAB \quad (1)$**
- where  **$CAB = NX + iNFA$**
- **(1) implies that  $CAB = GNI - (C + G + I)$**
  - ***(C + G + I) is total domestic spending, thus the CAB is also the difference between (a country's) income and spending.***
  - **What happens to an individual if her spending exceeds her income? She accumulates debt. In the case of a country, it accumulates foreign debt (or its NFA are reduced )whenever its CA is in deficit.**

# The CAB is the difference between National Saving and Investment

- **Gross National Saving (GNS)** is the sum of private sector saving and government saving, i.e.,  $GNS = PS + GS$ .
- Since  $PS = GNI - T - C$ , and  $GS = T - G$ ,  
 **$GNS = (GNI - T - C) + (T - G) = GNI - C - G$  (1)**

which just says that GNS is the difference between Gross National Income ( $GNI=Y$ ) and total current (as opposed to investment) spending (We assume that the government doesn't invest – nothing depends on this assumption).

- Since,  $GNI = GDP + iNFA = C + I + G + NX + iNFA$   
 **$= C + I + G + CAB$  (2)**

From (1) and (2) we get  $GNS = C + I + G + CAB - C - G$ , which implies,  **$CAB = GNS - I$** , and so the current account balance is the difference between national saving and investment.

- **How can you invest more than what you have saved? By borrowing (or, by “exporting” its assets – we ignore this). Thus a country that invests more than it saves, and thus has a CA deficit, borrows from abroad, and accumulates foreign debt.**

# How do a country's NFA evolve?

- A current account (**CA**) surplus results in an increase in the NFA of a country while a CA deficit results in a decrease of NFA or, if the country is already a net debtor, it results in an increase in the net foreign debt of the country. (We ignore the case of receiving capital transfers from abroad – we discuss this below.)
- For example, and ignoring valuation effects (e.g. the “Nokia effect”),

**NFA** at the end of 2011=

$$= \mathbf{NFA} \text{ at the end of 2010} + \mathbf{CAB} \text{ in 2011}$$

- Is it possible that a country has a positive NPIB even if its NFA are negative. Yes, if rates of return on your assets are higher than rates of return on your liabilities (e.g. USA).



- A CA deficit allows a country to maintain a higher rate of investment than what national savings would allow.
- Important Note:

**IT IS IMPOSSIBLE TO IMPORT FOREIGN CAPITAL WITHOUT A CA DEFICIT (this implies that –ceteris paribus – an increase in inward FDI in Greece will be associated with LARGER CA deficits)**

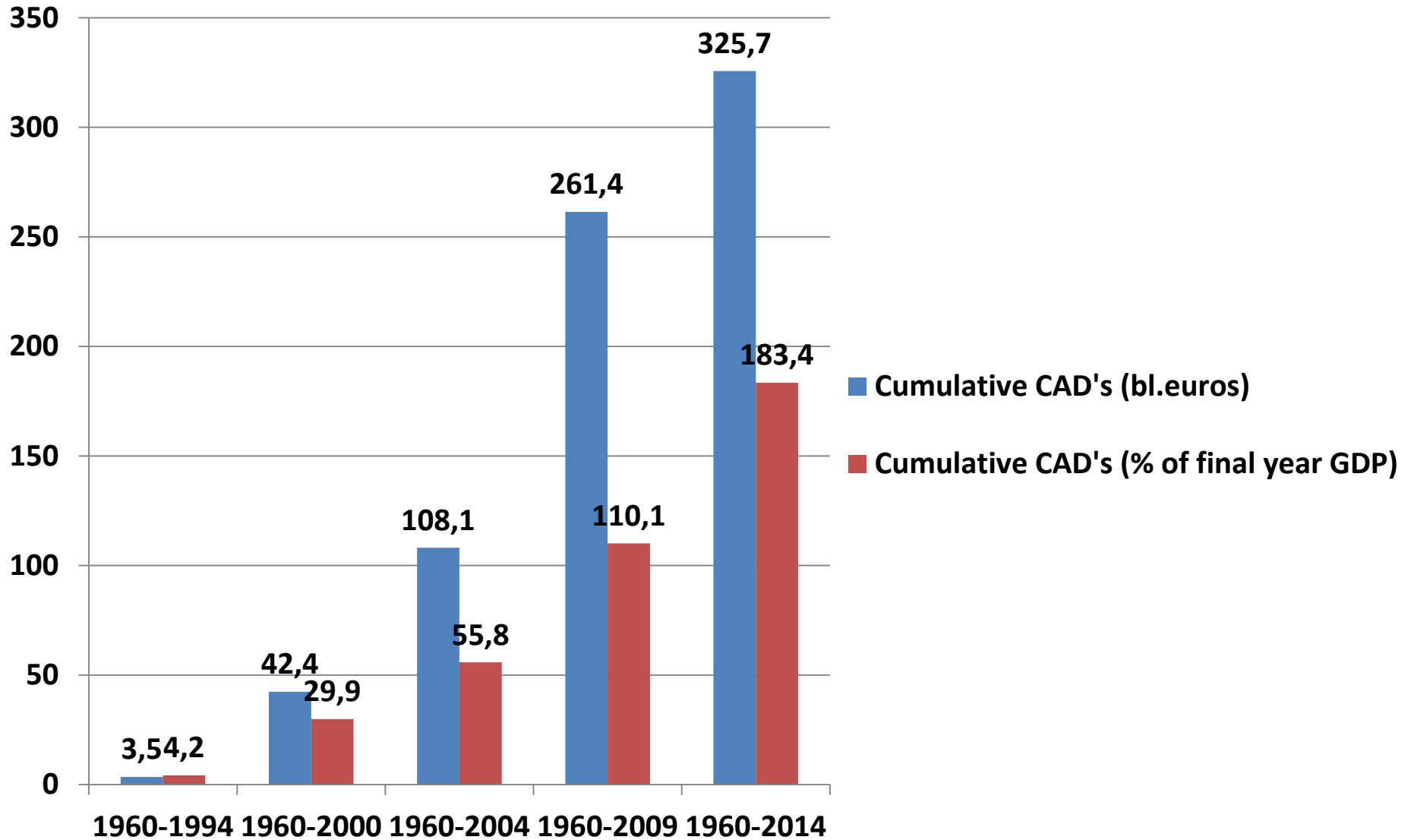
- However, the corresponding foreign capital inflow is essentially a loan; therefore, it represents claims on future national income.

Whether current account deficits and the associated foreign debt burden represent a policy concern depends on one's view of the trade-off between higher investment and higher external indebtedness.

- One possibility is that the source of the CA deficit is a favorable domestic investment climate, which acts as a magnet for foreign capital. According to this view, foreign investment funds raise the domestic capital stock. By boosting future domestic GDP, the higher capital stock makes it easier for the nation to pay off the higher foreign debt. (Although, not necessarily, if investment is in the non-traded sector.)
- A less optimistic view is that the source of the deficit lies in a falling national saving rate, which forces the country to rely on foreign capital to maintain its current level of investment, i.e. there is no rise in total investment. In this case, the country's CA deficit has financed the increased consumption of the private sector and/or the government sector.

# “Going for the Euro”

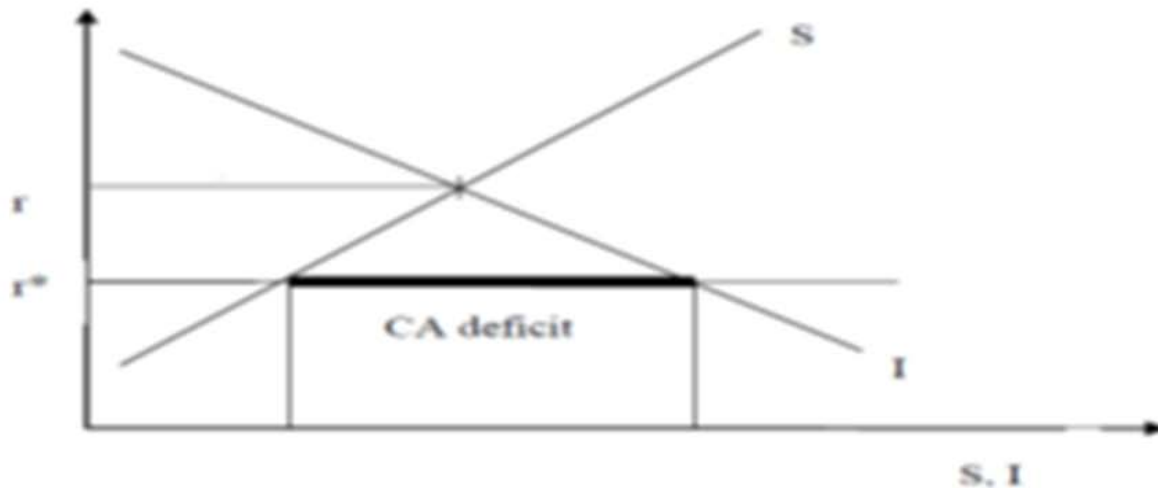
## Greece: Cumulative Current Account Deficits



# Savings-Investment Approach to the Current Account

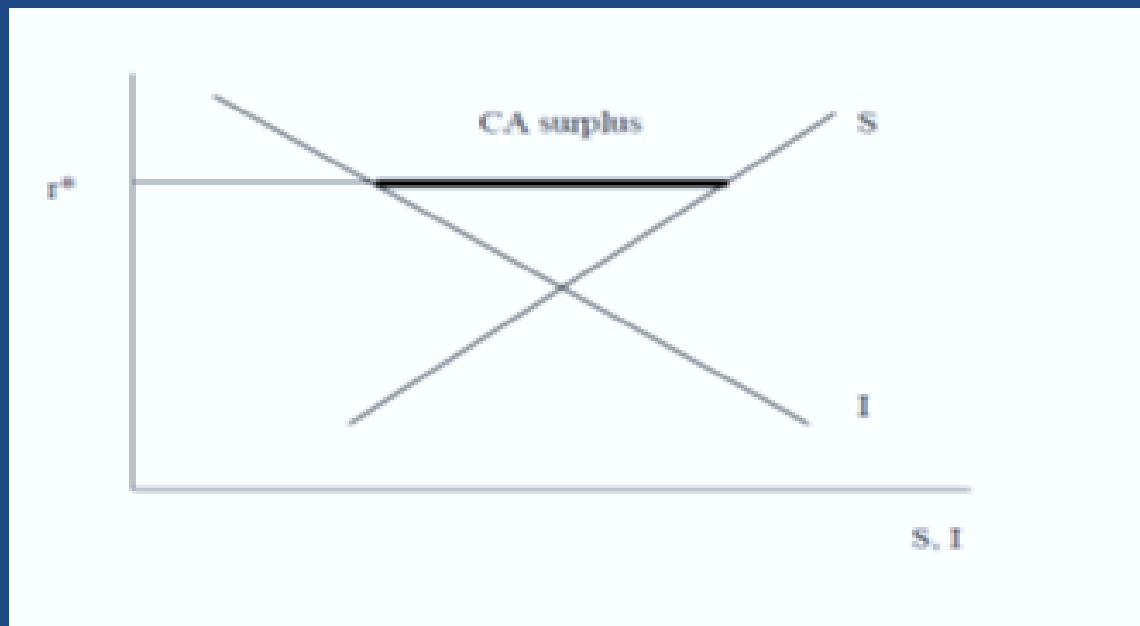
(and some implications of economic interdependence)

# Small Open Economy with $CAB < 0$



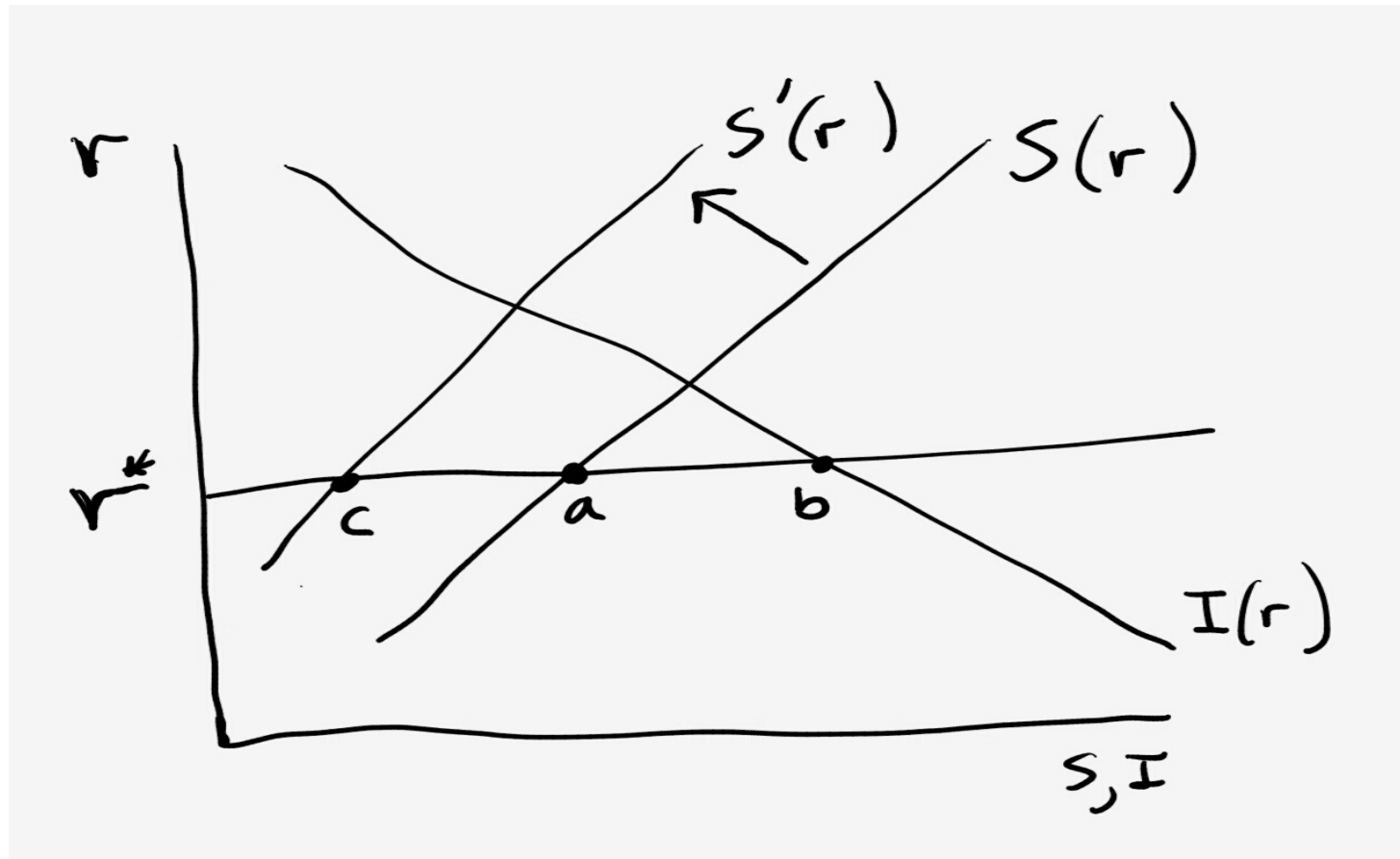
The diagram above shows the national saving ( $S$ ) and investment schedules for the case of a small economy which can either borrow or lend at the fixed world interest rate ( $r^*$ ). This country is running a current account deficit equal to the difference between  $I$  and  $S$  at  $r^*$  (the bold segment of the horizontal line at  $r^*$ ).

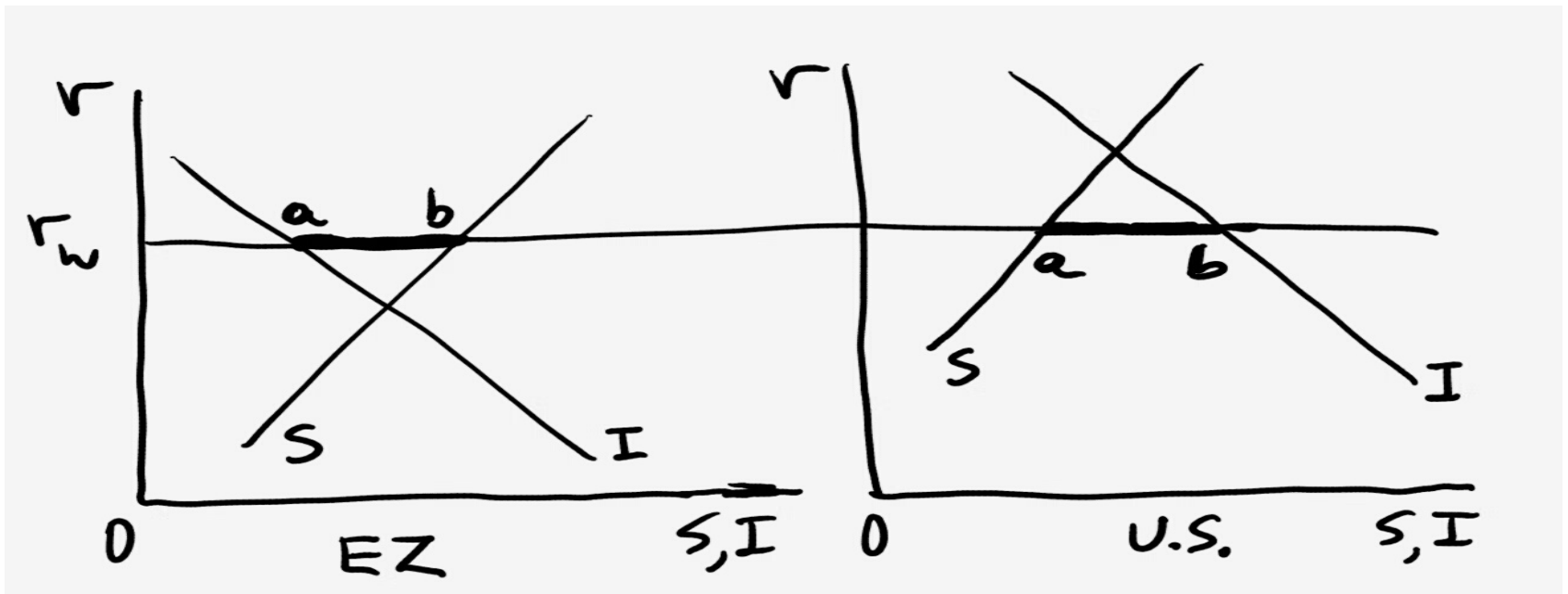
# Small Open Economy with $CAB > 0$



The diagram above shows the case of a small economy with a current account (CA) surplus since  $S > I$ .

Small Open Economy: A decrease in the country's desire to save (e.g. because its residents think that their future incomes will be higher than they previously thought) shifts the S schedule to the left and increases the CA deficit, from ab to cb.





The diagram above shows the case of a world economy consisting of two large countries. As drawn, one country (the EZ) is running a current account surplus, and the other country (U.S.) is running a current account deficit of equal magnitude. The common world interest rate is determined so that one country's lending (EZ's) is equal to the other country's borrowing (U.S.'s).



In the diagram below, starting from a situation of current account balance for both countries, an increase in the desire to save in the EZ, results in current account imbalances ( equal to **ab**) in both countries. Note that the CA deficit in the U.S. appears due to changes taking place in the EZ: this is a manifestation of economic interdependence.

