

The worldwide economic and social environment is changing rapidly. The rate of economic and social developments is the main characteristic of the twentieth and especially the beginning of the twenty-first century. These changes concern all participants in the global economic process, whether they are national economies, organisational entities or workers. This chapter aims to introduce the reader to the dynamics of these changes and to enable the reader to place the Greek economy (as a small open economy and society) in the context of the wider global developments. To achieve this, it is necessary to identify the main components of global economic structuring and restructuring.

Which are the real forces that shape new value in the economy, and which are the forces that shape the increase of gross domestic product? In other words, what are the sources of growth in an economy? From one point of view, this question condenses the basic questions raised by classical economists, such as A. Smith (1776, 1977) in “Wealth of Nations,” D. Ricardo (1817, 2001) in “On the Principles of Political Economy and Taxation” and K. Marx (1867) in the “Capital.” It is not deemed necessary to discuss here the axiological approaches that ultimately shape philosophical differentiation in interpreting the creation of human wealth; we will simply accept that growth is created by the basic production factors, which are capital and labour and its improvement (i.e., investments in human capital), technology and others.

Section 2.1 of this chapter presents the basic sources of economic growth and the theoretical framework of the analysis. Section 2.2 presents the “uninterpreted” part of growth, not in the sense of the unknown but in acknowledgement of the importance and intricacy beyond the basic economic growth sources and the construction of the growth process. Section 2.3 discusses the relation between the size of the economy and growth. Section 2.4 presents the main global economic changes of recent years. Section 2.5 analyses developments in monetary economy, Sect. 2.6 the quantitative and qualitative evolution of population flows and Sect. 2.7 changes in technology and innovation. Section 2.8 analyses the field of energy and climate change and, more specifically, the depletion of resources and the demand for energy. Section 2.9 describes the process of configuring the national force of a

country. Finally, Sect. 2.10, analyses the relative position of Greece within Southeastern Europe.

## 2.1 Basic Sources of Growth

The main questions we will address are:

- (a) What are the forces that influence a country's level of per capita income over time?
- (b) What are the forces that create differences in the rates of growth of per capita income between different economies?

According to the neoclassical perception of economic growth (Solow 1957), the main source of long-run economic growth is exogenous technological progress, whereas short-run growth depends on the stock of capital, population growth, and the allocation of output among alternative uses (savings and consumption).

The improvement of the labour force, mainly through education, leads to the improvement of production capacity and thus the improvement of per capita production. Under the influence of Romer (1986) and Lucas (1988), technological progress, as a diffusion phenomenon in all levels of the economy, enters the equation, influencing the capacity of the labour force. However, as North and Thomas (1973) demonstrated, all of these factors referring to the accumulation of production factors (e.g., innovation, economies of scale, education) are not sources of growth; they are growth itself. To calculate the contribution of each factor to GDP, and thus the residuals from these factors, we should deduct the contributions of capital and labour, i.e., the product of the rate of change of capital and labour and the corresponding weight on total cost from GDP change.

Economists refer to this analysis as “growth accounting.” Its exact development assumes a basic step: the calculation of the relevant costs shaping GDP in relation to the two basic factors of labour and capital. These calculations (Timmer et al. 2003, OECD – Factbook 2008) are presented for a series of countries in Table 2.1.

The results are based on the hypothesis of constant returns to scale, i.e., the hypothesis that the sum of the shares of labour and capital equals one. Below, we calculate the contribution of labour as the ratio of wages (and the income of the self-employed) to GDP (minus taxes and industries' operating costs). The subtraction of this percentage gives us the contribution of capital and vice versa. The adjustment of the methods to include the self-employed is achieved based on the hypothesis that their “wage” is similar to that of salaried employees (Timmer et al. 2003, p. 8).

Based on the data of Table 2.1, we see that in certain countries (some of which are very important, such as Germany and Japan), the factor of labour now, surprisingly, plays a negative role in shaping growth factors. On the contrary, in the USA it continues to play an important role, thus expressing the capabilities of the economy to widen the use of the labour factor, mainly because of immigration. Overall, it seems that labour continues to play a significant role in shaping the growth rate of GDP.

**Table 2.1** Contributions to growth: average yearly growth (%), 1985–2006

	Labour (%)	Capital (%)	Uninterpreted part – remaining factors (%) <sup>a</sup>	GDP growth (%)
France	8.38	35.60	56.62	100
Germany	–23.25	45.95	77.61	100
Japan	–20.74	44.16	77.20	100
United Kingdom	16.89	39.32	44.47	100
USA	35.07	28.83	37.04	100
Spain	50.98	42.43	7.32	100
Portugal	11.96	35.68	52.97	100
New Zealand	37.49	36.28	27.07	100
Average	16.36	38.53	48.88	100

Source: OECD Factbook 2008 (p. 269) and OECD data (OECD Statistical Portal). Averages weighted by 2007 country GDP

<sup>a</sup>Usually, the “uninterpreted part” is presented as the Total Productivity Factor (TPF) in the sense that it is the product of the function of key production factors (capital, labour) under the influence of the overall environment in which they operate, i.e., their overall productivity. Here, this part of the contribution of growth is called the “rest,” “uninterpreted part,” “remaining inputs” or “Total Productivity Factor”

This topic can be examined from a pertinent and closely related perspective based on the econometric method of utilising the concept of constant returns to scale of the production function. In order to examine the effect of human capital on GDP growth, we calculate the parameters of Solow’s augmented production function with the least squares method (Mankiw et al. 1992; Cohen and Soto 2007).

Mankiw et al. (1992) and Bernanke and Gurkaynak (2001) studied three groups of countries: non-oil (98 countries), intermediate (75 countries) and OECD members (22 countries) from 1960 to 1995. Their main assumption was that productivity levels are the same among all countries.

Easterly and Levine (2001) studied 64 countries under the assumption that production differs among the different groups of countries. According to the authors, OECD countries have higher production compared to the rest of the world. The results of these basic works are presented in Table 2.2.

We observe that, in all three studies, the contribution of labour ranges from 0.41 to 0.63, while the contribution of human capital ranges from 0.27 to 0.49. Finally, the contribution of capital ranges from 0.04 to 0.3, with an average level around 0.25.

It should be noted that the interpretability of the samples ranges from 28% to 83%. As a result, it is obvious that the “remaining factors,” which are uninterpreted, exert a considerable influence. Combining all of the available data (Timmer et al. 2003, OECD-Factbook 2008, Mankiw et al. 1992; Easterly and Levine 2001; Bernanke and Gurkaynak 2001), it appears that in OECD countries, which include the countries Timmer et al. (Groningen)<sup>1</sup> studied, capital contributes about 30% to

<sup>1</sup> Groningen Total – Economy Growth – Accounting Database – <http://www.ggdc.net>.

**Table 2.2** Literature findings concerning economic growth

Authors factors	Mankiw et al. (1992) period: 1960–1985			Easterly and Levine (2001) period: 1960–1995		Bernanke and Gurkaynak (2001) period: 1960–1995	
Database	Penn World Table 4.0			Penn World Table 5.6		Penn World Table 6.0	
Number of observations	98	75	22	126	90	72	21
Countries	Non-oil	Intermediate	OECD	OECD, East Asia, West Asia, Sub-Saharan Africa, rest of Africa, Europe	Non-oil	Intermediate	OECD
Capital contribution (a)	0.31	0.29	0.14	0.10	0.27	0.25	0.04
Contribution of human capital (b)	0.28	0.30	0.37	0.27	0.30	0.35	0.49
Contribution of labour (1 – a – b)	0.41	0.41	0.49	0.63	0.43	0.40	0.47
Interpretability of GDP growth	78%	77%	28%	81%	79%	83%	46%

GDP growth, labour about 25%, human capital<sup>2</sup> about 10% and “remaining factors” about 35%. Therefore, the proper study of growth sources in an economy should pay careful attention to the above-mentioned sources of growth. The political economy of development should be studied with special reference to the “remaining factors.”

## 2.2 The “Unexplained Part” of Growth, or the Factors Shaping Total Productivity

Since the 1970s, researchers have been interested in the “unexplained part” of growth. Kuznets (1971) concluded that national differences in economic growth can be considered as the Solow residual (Solow 1957), which is simply differences in productivity that are characterised as exogenous in the simple neoclassical model. Abramovitz (1956) defined the residual as the “measure of our ignorance,” a definition also supported by Dougherty and Jorgenson (1996). Today, thanks to extensive research on the topic, our relative ignorance on the subject has been reduced significantly.

The basic international empirical findings show that something else apart from the basic factors (capital and labour) plays a significant role in economic growth (Easterly and Levine 2001). This something else, the “total productivity” (TPF, Total Productivity Factor), is the basic factor that distinguishes the performances of

<sup>2</sup>The influence of human capital has been deducted from the effect of the “remaining factors”.

economies in terms of space and time. In reality, it does not interpret but attributes or represents all of the factors that affect differential growth.

As a result, we now expand research to areas that including the history, culture, geography and political life of the economies studied. It is believed that differences in social structure are sufficient (Hall and Jones 1999) to interpret the greater part of an economy’s growth rate.

A similar perception is used to interpret why different countries, with different economic institutions, structures and political institutions (Acemoglu et al. 2004), exhibit different economic growth rates.<sup>3</sup> Institutions are the political and financial “terms of the game” in a society (North 1990).

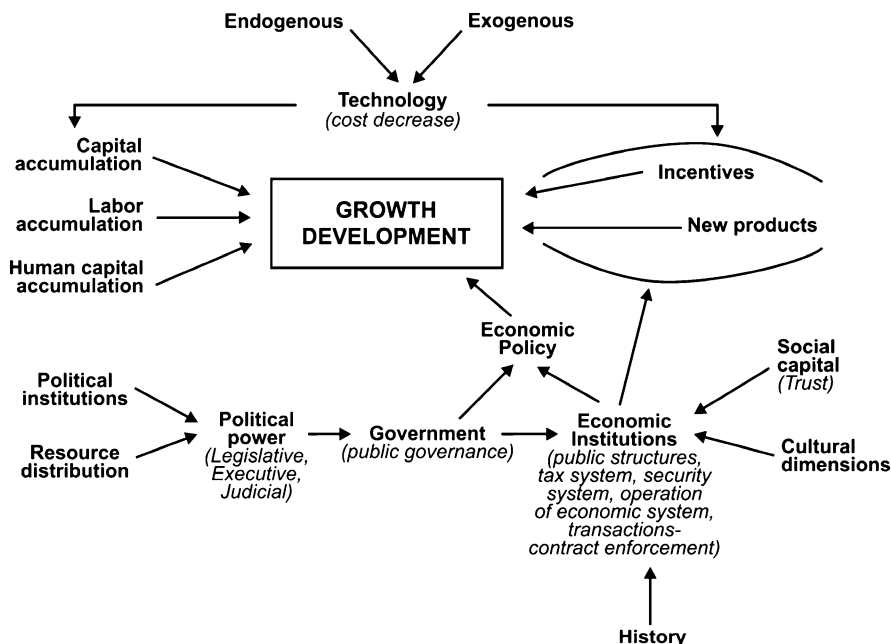
The “beginning of the world” (growth process) lies in the political institutions and the initial system of resource distribution in the economy. The redistribution of resources also has an endogenous character. The interactions of political institutions and the distribution of resources shape the means of exercising political authority. Political authority forms the concept of the state, with three distinct authorities: legislative, executive and judicial. This system consists of the structure and procedures that govern our everyday life and the functions of society. Economic institutions are formed under the influence of these terms and their procedures.

Economic institutions (e.g., the tax system, banking system, and financial system), like most other financial institutional organisations, are mainly products of endogenous processes. They are defined as society’s collective choices and usually express contradictory interests and develop under the influence of historical process and cultural background. Generally favourable (for growth) economic institutions are those that offer secure property rights throughout the range of society’s functions (Acemoglu et al. 2004, Ha-Joon Chang 2006). The relation between institutions and economic growth stems from three different sources: (a) their contribution to coordination and governance; (b) their influence on the process of development, knowledge and innovation; and (c) their effect on income distribution and the development of social coherence.

Economic institutions shape the structure of incentives (for individuals and businesses) that operate in the society, which shape transaction costs. The latter, of course, are affected by technological terms and finally shape the terms of operational contracts of financial transactions. This is how economic results and growth are formed in a society. Obviously, this brings us back to the “beginning of the world,” meaning that financial results and economic growth (and its qualitative characteristics) affect political institutions and the distribution of resources in the society. This allows us to monitor the sequential process of growth at a higher (or lower) level (Fig. 2.1).

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<sup>3</sup> Maybe the most important example of all of the empirically observed cases is the comparison between North and South Korea, which started from the same level of growth and development and today present a vast gap in growth and quality of life of their citizens.



**Fig. 2.1** Configuration of growth and development levels and rates

### 2.3 Small Open Economies and Development

According to Kuznets (1960), a small open economy is defined by two fundamental criteria. The first is a population of fewer than 15 m people. Sometimes, GDP or a country's size are used as indices of a small economy. Population, however, is highly dependent on a country's size and on GDP because of the possibly limited sources of raw materials in these countries.

The criterion for a small open economy is the country's limited international transactions. Its transactions are such that the country's policies do not put it in a position to influence global prices, interest rates or incomes. Consequently, countries with smaller open economies are price takers.

Under no circumstances does the fact that a small economy will not be able to compete with large economies or will have a balance of payments deficit constitute a rule. There is simply a greater danger because of lower transaction levels and because of the country's small population, both of which originate mostly from its low productivity. If, however, it manages to develop the appropriate skills, it will be able to reverse these conditions, increasing its productivity and competing on equal terms with large economies (Frankel and Romer 1999). This answers the question of whether size matters in economic growth; it does, but not as much as most think.

It is widely accepted that small economies rely mainly on the service sector and tourism and aim to increase the inflow of direct foreign investments. The increase of both inflow and outflow of direct foreign investments in a small economy is of significant help because it increases the spillover effect (Hogenbirk and Narula 1999).

## 2.4 Fundamental Global Economic Changes

The medium-term development of the worldwide economy involves two basic components: the up-and-coming Chinese economy and the USA's capacity to preserve positive levels of economic activity. The dynamic of the Chinese economy is based on three pillars: its capacity to export goods and services, export of its capital stock to the USA through the purchase of American debt and the improvement of standards of living domestically. China already carries half of the USA's relative position in global product production (10.8% versus 21.4% for the USA, Table 2.3). It has almost the same export rate (7.8% versus 9.6%) but has 20% of the world's population, versus 4.7% for the USA, with per capita income of \$2,483 compared to \$45,725 for the USA.

The Greek economy carries 0.5% of global GDP, 31% of EU-15 GDP and 2.1% of EU-27 GDP. Furthermore, Greece has 0.4% of total exports and 0.2% of the global population. Based on purchasing power parity (PPP), the per capita GDP of Greece was \$28,152 in 2007, compared to \$32,815 for the Eurozone (EU-15). Therefore, Greece is a very small economy with rather high output and income per capita.

**Table 2.3** Gross domestic product, exports and population (2007 data)

		GDP	Exports	Population	GDP per capita
	Country or region	% of global GDP	% of total exports	% of global population	US dollars, based on purchasing power parity (ppp)
Developed economies	USA	21.4	9.6	4.7	\$45,725
	Eurozone	16.1	29.5	4.9	\$32,815 <sup>a</sup>
	Greece	0.5	0.4 <sup>b</sup>	0.2	\$28,152
	Japan	6.6	4.7	2.0	\$34,296
Developing countries	Russia	3.2	2.3	2.2	\$9,075
	China	10.8	7.8	20.5	\$2,483
	India	4.6	1.3	17.5	\$942
	Brazil	2.8	1.1	2.9	\$6,938
	Mexico	2.1	1.7	1.6	\$9,717

Source: International Monetary Fund (World Economic Outlook, April 2008)

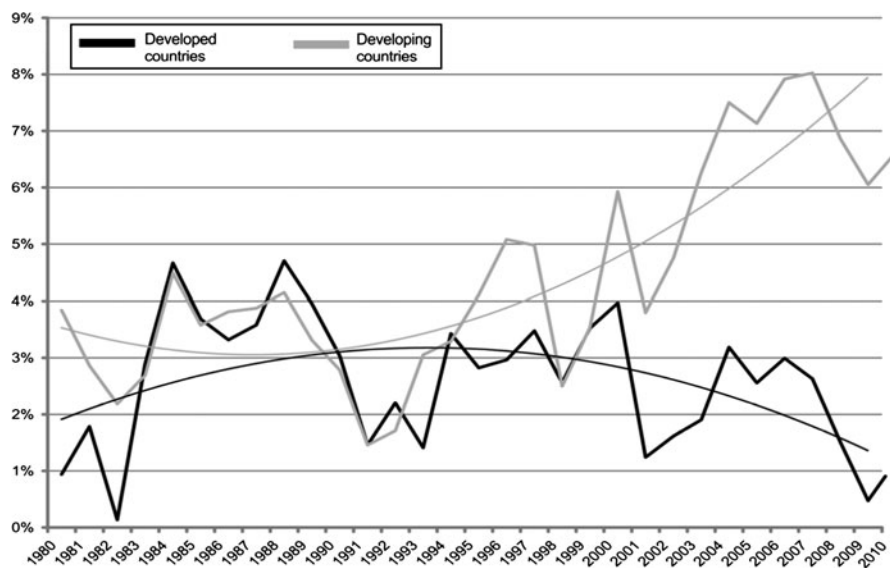
<sup>a</sup>OECD stats ([http://stats.oecd.org/wbos/default.aspx?datasetcode=SNA\\_TABLE1](http://stats.oecd.org/wbos/default.aspx?datasetcode=SNA_TABLE1))

<sup>b</sup>UN data (<http://data.un.org/Data.aspx?d=CDB&f=srID%3A29940>)

Thus, at first glance we can characterise the Greek economy by taking into account the standard of living, exports and imports of capital. A strong relation exists between capital imports and growth. Of course, a similar relation could exist in any developing economy. Therefore, much deeper analysis is required to clarify the nature of the Greek economy.

Global growth, exchange rates, and interest rates largely depend on the relationship between the two giants of the global economy: the USA and China (Deloitte, Global Economic Outlook – 2008). More specifically, in order to preserve a low exchange rate for its currency against the US dollar, and given that it does not have any alternative placement outlets (i.e., markets with prospects) for its export-related income, China purchases American public bonds. However, it would be hasty to blame the Chinese funding for the “bubble” of the financial structure in the United States and the rest of the Western world. The actual capital flows from China are much smaller compared to the value of the monetary instruments generated in the West (see Sect. 2.5). This financing influx has kept interest rates in the USA, and consequently in the rest of the world, low and the exchange rate between the (depreciated) dollar and the (appreciated) Yuan more or less stable. At the same time, American and Chinese development continued while inflationary strain was exerted through demand for raw materials and oil in the global economy. This led to a relative improvement in the economies of developing countries, especially those with oil and raw materials.

This is how the second important development, which involved the formation of a strong growth rate among developing countries (emerging markets) in comparison to advanced economies (Fig. 2.2), emerged.



**Fig. 2.2** Percentage growth of GDP and trend (Source: IMF data, estimates and data processing)



It is now obvious that the next long-term wave of growth<sup>4</sup> will be characterised either by the efforts of the developing countries to improve their standard of living in order to approach the levels of developed countries through the creation of a middle class (totalling 400–500 m people) in these societies or from the advent of one or more fundamental structural technological changes. The issue of the geographical origin of new sources of growth has also been expressed by the relative change of the global political scene as it has been portrayed by the creation of a new deliberation team, the G20, which has replaced the G7. The new core of the G20 is the BRIC countries, which are Brazil, Russia, India and China.

It should be noted that the smooth and gradual transition to a complex world where multiple major forces will play important roles and the centre of gravity will move to the East, presupposes that humanity will overcome, in a peaceful way, the turbulent transitional period that may last until the end of 2020.

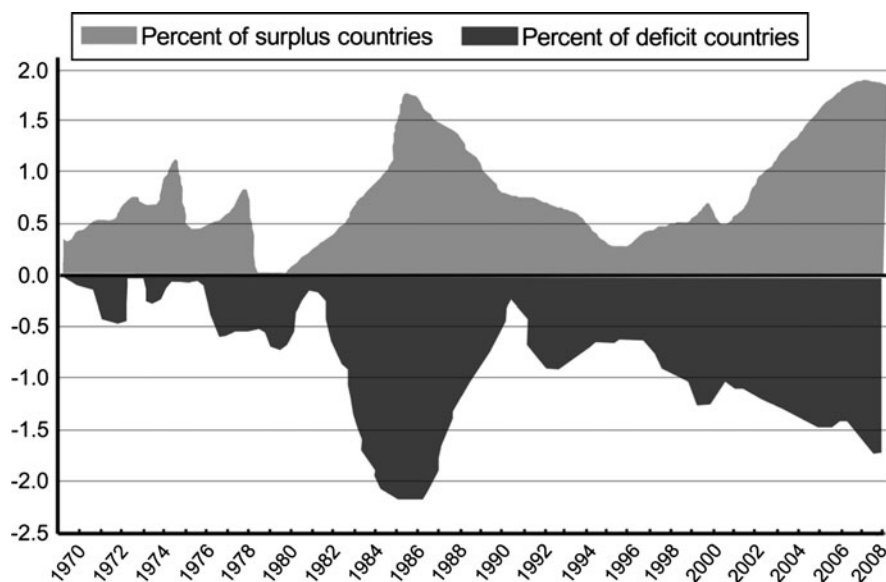
External imbalances that appeared in the late 1990s exceeded 5% of the world-wide GDP in 2008 (from 2% in 1996). Most of these imbalances (total losses) came from the US, whose share in shaping the overall deficit exceeded 70% in 2002 (from 36% in 1996) but declined to 40% in 2008. Surplus countries are mainly China, Germany, the oil-exporting countries, and Japan.

Nevertheless, research (Cheung et al. 2010) has identified a series of partial equilibrium factors that play a role in shaping the current account deficits. Thus, there is a positive relation between fiscal balances and current account deficits (Chinn and Ito 2008; Gruber and Kamin 2007; Bussiere et al. 2005) (twin deficits). More specifically, the impact of budget deficits on the current account balance depends on how fiscal expenses are allocated. Higher social spending could reduce savings (through an increase of imports) in developing and emerging economies. In addition, their funding through higher levels of taxation and the redistribution of incomes across households with different consumption trends lead to reduced savings and thus to the need to import goods. Figure 2.3 presents the budget surplus or deficit as a percentage of GDP for the same groups of countries depicted in Fig. 2.4. An increase in the fiscal deficit – unless offset by an increase in private savings – leads to an increase of the current account deficit and generates a threefold deficit: current account deficit, budget deficit and a deficit of savings in relation to investment.

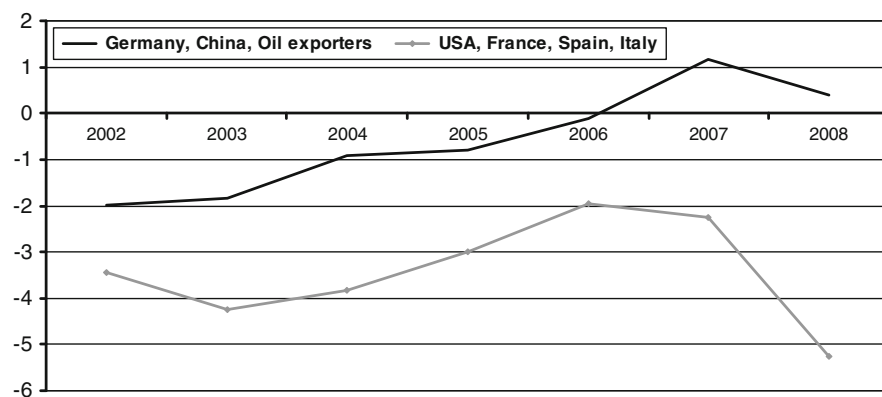
Moreover, under the life-cycle hypothesis, agents borrow a lot when they are young, save a lot during the productive years of their lives and end up consuming their savings after retirement. This hypothesis implies that societies with large numbers of young and elderly people should show larger fiscal deficits (Chinn and Prasad 2003; Gruber and Kamin 2007; Chinn and Ito 2008). The stage of economic development plays an important role as well. The outflow of capital to emerging economies is expected to be smaller than anticipated due to factors in local societies (e.g., underdeveloped financial systems, weak institutions) that

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<sup>4</sup> If we accept that the previous is marked by two major recessions (around 1980 and 2008).



**Fig. 2.3** Fiscal deficit and surplus (% of GDP) (Source: OECD, Economic Outlook, No. 88, 2010/2. Note: Values are weighted based on population per year for both groups of countries)



**Fig. 2.4** Global current account balances (% of worldwide GDP) (Source: OECD, Economic Outlook No. 87 database)

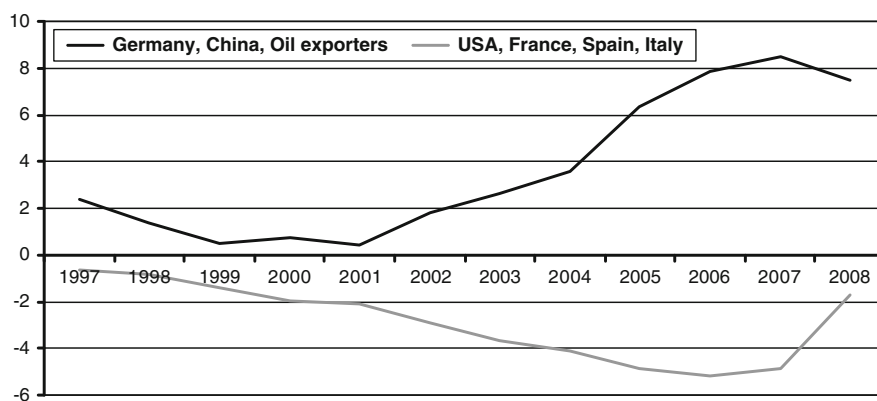
reduce risk-adjusted returns on capital (Lucas 1988). Furthermore, the level of financial development and integration also seems to play a role. One explanation for the large global external imbalances may be that emerging economies with inefficient financial markets export their surplus capital to more efficient economies (Ju and Wei 2006), contributing to the growth of a global savings saturation. If the above suggestion is correct, countries with deep financial markets will reduce levels of saving and thus develop a negative relation between financial development and

the current account balance. However, the opposite relation can be seen as traditional economic development encourages savings, reduces transaction costs and facilitates risk management.

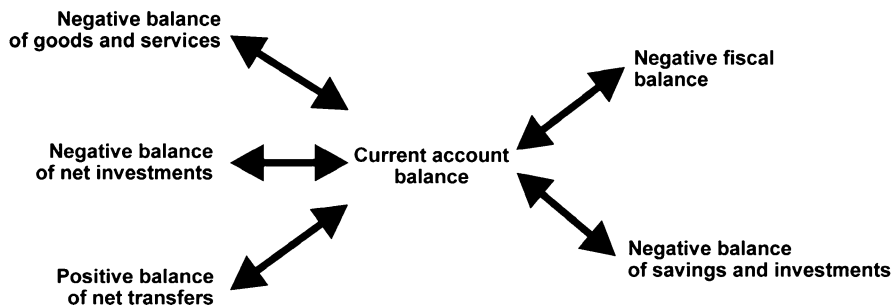
The net foreign assets of a country affect the balance of net investment and hence the movements of current account transactions. Weak institutions in a society reduce the risk-adjusted return on equity of developing countries (Alfaro et al. 2005). In addition, the quality of institutions affects levels of financial development (Levine et al. 2000). Depending on whether a country imports or exports oil and on the extent of the impact of this action on the economic result, the current account balance is affected. More specifically, the greater the dependence on an oil importer is, the slower the adjustment of demand to changes in oil prices and the greater their effect on the current account balance become. Countries with higher growth in productivity attract more international capital flows and are expected to achieve higher returns. Finally, a country with highly developed trade, which is therefore more globalised, is expected to pursue trade and transaction policies that affect the current account balance.

From the perspective of national accounts, the result of the current account balance equals the difference between national savings and investment. Therefore, countries with positive results in the current account balance will present a positive savings minus investment balance, while the opposite is true for countries with a negative external balance (Fig. 2.5).

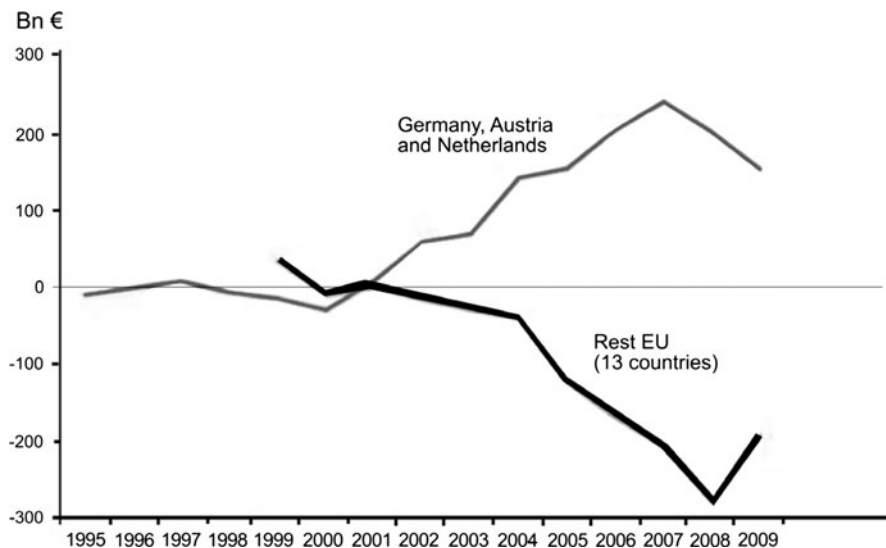
However, the basic imbalances of economies (current account balance, fiscal balance and balance of savings and investment) usually enclose a further threefold imbalance: that of the relation between the balance of trade in goods and services, that of the net movement of investment and that of net capital transfers (Fig. 2.6). What has been confirmed in a significant number of cross-layer longitudinal observations, however, is the existence of the so-called twin deficits, external and fiscal, which are not necessarily accompanied by other types of deficits. However,



**Fig. 2.5** Savings minus investments (% of GDP) (Source: World Bank database. Note: Values are weighted based on population per year for both groups of countries)



**Fig. 2.6** Global imbalances



**Fig. 2.7** Current account balances in the European Union (Source: Hans-Werner Sinn, CESifo, Volume 11 [August, 2010])

we could say that the emergence of the next two imbalances (savings-investment and trade balance) are particularly characteristic of the present crisis.

Imbalances between the balance of goods and services and capital transfers (either as investments or in the form of net transfers) were evident, even within the European Union. Thus, Northern European countries, especially Germany, Austria and the Netherlands, have developed significant external current account surpluses, which correspond precisely with the deficits of other European countries (Fig. 2.7).

In 2007, these countries developed a surplus of the external current account balance of €244 bn (Germany alone presented €185 bn), while the rest of Europe

had a corresponding deficit in the current account balance of €280 bn in 2008. Thus, in 2007, Germany was the second largest capital exporter in the world after China.

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## 2.5 The Monetary Economy

The global financial system over the past two decades has been characterised by the systematic expansion of monetary output.

The 2007 global GDP was \$54.5 tr. In the same year, the capitalisation of financial markets, public and private securities and banking system assets reached 4.2 times the global GDP. However, if we add to this figure the “value” of OTC products and derivatives, then this figure is 16.6 times. It is worth highlighting that the excessive expansion stems from OTC products – that is, derivatives – and not from the derivatives exchanged in the markets. Of course, the relation of the real economy (GDP) and monetary values is indirect. This comparison, however, still provides us with an idea of the rate of growth of financial expansion, which, in the end, was largely responsible for the 2008 crisis.

The relation between the monetary and real economy in Greece is similar to the global relation. The ratio between the banking system’s assets and GDP was 1.60 in Greece, 0.90 in North America, 2.75 in Europe and 1.55 globally. The comparative indices for the EU and North America portray the different role of the banking systems in these economies (see below): in North America, in contrast to the EU, the financing of the economy passes mainly through non-banking channels. In Greece, however, the banking system’s assets expanded more conservatively compared to the EU. This is probably due to the smaller role that the banking plays has in funding the Greek economy, mainly because of the delay in development and the role of the parallel (shadow) economy. Negotiable instruments, bonds and bank assets as percentage to GDP display an approximately equal relation to GDP in all regions (Greece included), except for developing countries, where this is 2.53 (almost half).

Globally, at the end of 2007, OTC derivatives were interest rate “debts” (66%), foreign currency derivatives (9.5%) and associated with bankruptcy risks (9.7%). The rest concerned equities, merchandise, and so on. Moreover, 23% of financial products had durations of longer than 5 years. The above formulation shows that this large volume of financing tools is still an instrument of debt, which excessively expands monetary variables.

During a period of prosperity, those responsible for the Western financial system demonstrated, in essence, procyclical behaviour. That is, during periods of growth, they were inclined to undertake continually higher risks, pushing the monetary economy to greater expansion and thus grossly increasing systematic risk.

It should also be noted that global reserves amount to 12% of GDP in developed countries and 28% in developing ones. The value of this relation in developing countries is mostly due to the smaller issuance of (mostly) public and private debt securities.

## 2.6 Population Flows

The main feature of population trends today is the observed change in the structure of age groups. The impact of baby boomers is due mainly to their increased life expectancy. Birth rates are declining as a result of efforts to raise the per capita income and of a change in lifestyle characterised by the increased participation of women in production. The absence of structured measures for protecting motherhood has resulted in decreasing birth rates and an upward bulge in the age pyramid.

The changes in the population pyramid are straightforward. From 1960 to 2006, the under-15 age group lost about 10 percentage points of population participation. The share of the population in this age group decreased from 28.6% in 1960 to 19.1% in OECD countries and from 23.6% to 15.9% in the EU. The same change is observed in the Mediterranean countries and the Greek economy, but not in Northern European countries. In the latter, a decrease in the participation of this age group is observed, but it is not that significant (at least in Denmark and Sweden). Obviously, this difference is due to the development of systems for the social protection and promotion of motherhood in these countries.

The decreasing share of the population in this age group resulted in the increased share of dependent individuals (i.e., those who depend on social funds) aged over 65. As a result, the participation of this age group increased in the OECD from 8.5% to 14% and in the EU from 10.1% to 17.5%. In the Mediterranean countries, there is a clear increase of 10 percentage points: in Greece from 8.1% to 18.5%, in Italy from 9% to 19.6%, and in Spain from 8.2% to 16.7%. The same holds for the Balkan countries.

These trends are universal and longitudinal in nature and follow the improvement of the per capita income. Thus, the youthfulness of the population that today is a striking feature of China, India and many African countries will tend to decrease over time as living standards improve.

At the same time, another important change is observed. In certain countries, there is a significant increase of the net inflow of people born in other countries (i.e., immigration). In 2006, 12% of the total population of OECD countries was born in another country. This value is 20% more than it was in 2000. The countries with the biggest increases in the percentages of people born in other countries were Ireland, Finland, Austria and Spain. The countries with the biggest outflows of population were China, Poland and Romania. More specifically, in 2006, 60% of migratory inflow in Europe came from Europe itself (Table 2.4).

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## 2.7 Technology and Innovation

Technology and innovation constitute a key source of growth in economic activity and improved living standards. It is obvious that the future change and development will emanate from the capability to produce and use technology and innovation.

Table 2.5 portrays indicative data concerning two basic indices of the role of technology in the productivity of the economies, which testify to the importance of

**Table 2.4** Population data

	Population		Distribution of population by age groups (percentage of total population)						Population of individuals born in other countries	
	2006	1996	Rate of increase 2005–2006 (%)		Under 15 years old		15–64 years old		65 years old and up	
	(in thousands)				2006 (%)	1960 (%)	2006 (%)	1960 (%)	2006 (%)	1960 (%)
Mediterranean countries										
Greece	11,149	10,709	0.4		14.3	26.1	67.1	65.8	18.5	8.1
Italy	58,435	56,826	0.5		14.2	23.4	66.3	67.6	19.6	9.0
Spain	44,068	39,479	1.5		14.5	27.3	68.8	64.5	16.7	8.2
Portugal	10,586	9,866	0.2		15.5	–	67.2	–	17.3	–
Balkan countries										
Bulgaria	7,699	8,363	–0.5		13.5	26.1	69.3	66.4	17.2	7.5
Romania	21,588	22,619	–0.2		15.5	–	69.7	–	14.8	–
Turkey	72,974	62,909	1.3		28.1	41.2	66.0	55.1	6.0	3.7
Northern countries										
Denmark	5,435	5,263	0.3		18.7	25.2	66.1	64.2	15.3	10.6
Netherlands	16,346	15,531	0.2		18.2	30.0	67.4	61.0	14.4	9.0
Sweden	9,081	8,841	0.6		17.1	22.4	65.5	65.9	17.3	11.8
EU (15 countries)	388,200	371,983	0.5		15.9	23.6	66.6	63.2	17.5	10.1
OECD (30 countries)	1,175,344	1,096,466	0.7		19.1	28.6	66.9	61.6	14.0	8.5

Source: OECD in figures, 2008 (Eurostat), ([http://epp.eurostat.ec.europa.eu/portal/page?\\_pageid=0,1136184,0\\_45572595&\\_dad=portal&\\_schema=PORTAL](http://epp.eurostat.ec.europa.eu/portal/page?_pageid=0,1136184,0_45572595&_dad=portal&_schema=PORTAL))

**Table 2.5** The role of technology (2006 data)

		Exports as a percentage of imports (%)		Share of high tech exports as a percentage of the member countries of OECD (%)
		High-tech industries (1)	Medium-tech industries (2)	(3)
Northern countries	Denmark	106.2	85.2	1.0
	Netherlands	105.1	122.7	6.1
	Sweden	134.0	121.5	1.8
Mediterranean countries	Greece	23.0	19.7	0.1
	Italy	68.6	123.0	2.5
	Spain	44.3	76.9	1.3
	Portugal	45.9	65.4	0.3
BRIC	Brazil	44.2	98.0	0.6
	China	116.4	91.1	20.5
	India	25.9	61.1	0.4
	Russia	16.6	37.2	0.2
	USA	81.0	69.5	19.5
	Japan	133.1	366.9	9.3

Source: OECD, OECD in figures, 2008

this factor: the relation of exports to imports for high- and medium-technology industrial products and the industry share in exports of high-technology products.

The United States exports 70–80% of the volume of its high- and medium-technology imports. Japan, which is clearly export oriented, exports more technologically advanced products (133% for high-technology products and 366% for medium-technology products). The countries of Northern Europe also have high ratios. On the contrary, Mediterranean countries (Greece included) are clearly importers of technology. The same does not hold for China, which, despite the prevailing perception, has a remarkable performance in exporting high- and medium-technology products that is clearly superior to that of the United States. On the contrary, the rest of the BRIC countries are definitely technology importers.

The USA, Japan and China export 50% of all high-technology products exported globally (column 3). On the other hand, countries such as those of the Mediterranean have a much smaller (or even minimal) effect on shaping high-technology exports.

Measuring the global innovation of economies is not an easy task, especially when we want to derive useful conclusions, as estimating certain measures is very difficult. We will use two different methods of measurement, each with its own unique characteristics. These are the European Innovation Scoreboard – EIS, formulated in relation to the EU and the Global Innovation Index (2008) and produced by INSEAD and the Indian Confederation of Industries. The European Innovation Scoreboard EIS 2008 evaluates three innovation fields: (a) businesses and their production (indices such as patents and entrepreneurial R&D as a percentage of GDP), (b) investments in human capital (e.g., graduates of tertiary



education or published articles), (c) structures and absorption capability (ICT expenses, broadband networks and public R&D). The shaping and the theoretical background of innovation indices show that it is now widely accepted that innovation is not unidimensional. Primarily, two-dimensional structures of human capital and real high-tech material (e.g., broadband networks) play an important role in promoting research.

Table 2.6 presents a ranking of 45 countries using the EIS innovation indices (European Innovation Scoreboard, 2008). Based on their total rankings (which include corporate influence, influence caused by the changes in human resources and the effect of the situation of infrastructure), the United States ranks 6th, Japan 5th and the EU-27 20th. Northern European countries hold the first ten places; Mediterranean countries rank between the 20th and 30th positions; and Balkan countries hold the next ten places. BRIC countries are in the last ten places.

It should be noted that Mediterranean and BRIC countries (except for Russia) show significant positive changes in their relative positions. The improvement of Greece's position is due exclusively to the improvement of human capital, contrary to the deterioration that is observed in corporate activity.

On the contrary, the improvement of BRIC countries is due to the improvement of the innovative activity of corporations and infrastructure.

In the same table, the first column presents a ranking produced by the Global Innovation Index, which follows a different methodology and is probably more comprehensive than the EIS index. It ranks 130 economies but is rarely calculated (twice at the time of this writing).

Its main methodological difference is that it evaluates the roles of inflows in the production of innovation (such as institutions and policies, human capability, infrastructure, levels of market and business development) and of outflows (knowledge, competitiveness and wealth) to rank the countries. According to this index, the US, Japan and Northern European countries form the top ten. Italy and Spain are in the top 30, Portugal in the top 40 and Greece in the top 50. Of the BRIC countries, China makes it to the top 30. India is in the top 40, Brazil in the top 50 and Russia in the top 70.

Obviously, the potential of economies and the consequent improvement of the living standards stem and will continue to stem mostly from the improvement of innovation. According to all evidence, China shows rapid rates of improvement, Russia lags behind, and Northern Europe preserves high rates of innovation.

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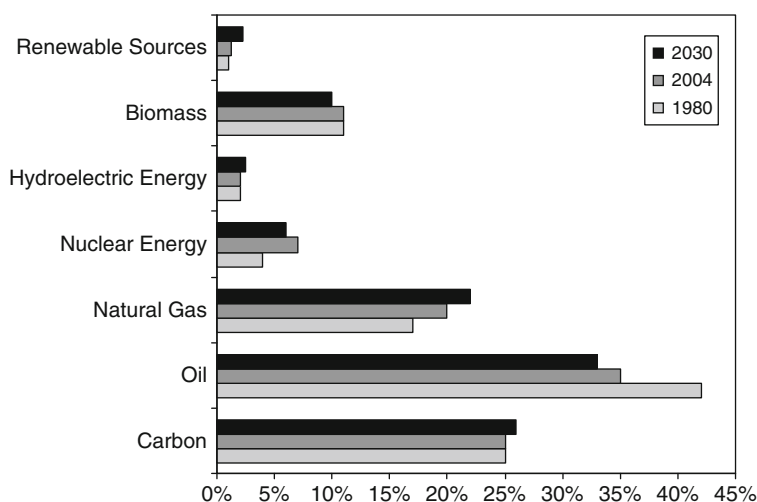
## 2.8 Energy and Climatic Change

In the future, the global economic and social system will face limitations in its growth due to the availability of resources – mainly energy, food, water, and the environment. These constraints will lead to limitation of these resources' consumption and increase their usage price. Figure 2.8 describes the global demand for energy by type. Oil remains the most important source of energy production.

**Table 2.6** Country rankings based on innovation indices

Global innovation index 2008–2009 <sup>a</sup>		European innovation scoreboard 2008 <sup>b</sup>							
		Total rankings		Corporate activity		Human resources		Infrastructure and absorption capability	
Total ranking 2008/2009		2005 ranking	Change from 1995	2005 ranking	Change from 1995	2005 ranking	Change from 1995	2005 ranking	Change from 1995
Mediterranean countries	Greece	54	31	4	43	–8	24	35	–2
	Italy	31	26	2	26	–3	32	22	3
	Spain	28	24	6	28	0	15	24	4
	Portugal	40	30	7	35	3	31	26	3
Balkan countries	Bulgaria	74	38	–5	47	–11	33	37	–7
	Romania	69	48	–12	44	–19	41	45	–1
Northern countries	Denmark	8	7	3	10	3	8	4	7
	Netherlands	10	11	–4	9	1	20	6	0
	Sweden	3	1	0	4	–3	4	1	1
EU-27	–	20	20	–3	16	–1	19	21	–2
USA	1	6	6	–3	8	–2	6	7	–6
Japan	9	5	5	–1	1	2	13	9	–4
BRIC	Brazil	50	42	5	34	11	46	32	10
	China	37	34	8	25	7	48	31	9
	India	41	46	1	36	11	42	38	7
	Russia	68	29	–2	27	–1	11	42	–3

<sup>a</sup>Global Innovation Index, 2008 (Confederation of Indian Industries and INSEAD)<sup>b</sup>European Innovation Scoreboard, 2008



**Fig. 2.8** Global structure of primary energy demand (percentage) (Source: International Energy Agency, World Energy Outlook, 2006)

In the long term, the use of oil diminishes as natural gas and coal, especially the latter, demonstrate particularly rapid growth of use.

In addition, nuclear energy (third-generation nuclear reactors) together with renewable energy sources claim a market share. Renewable energy will grow rapidly and will surpass natural gas after 2010. It will be the third most common energy source after oil and coal (IEA 2008).<sup>5</sup>

The much-expected new technology that will inexpensively replace traditional energy sources seems likely to appear in about 15 years (NIC 2008).<sup>6</sup> If this happens and the price of oil decreases, if they do not change their production orientation, the countries depending on oil (especially in the Middle East and Russia) will see their positions change dramatically in the new circumstances.

Nowadays, the EU-27 generates 37% of its energy from oil, 24% from natural gas, 18% from coal, 14% from nuclear energy and 7% from renewable sources (Eurostat).

The energy security of the European Union is a crucial objective for the maintenance of economic growth and the living standards of its citizens. According to all scenarios, in 2002 the dependence of the EU on energy imports will have increased to 56%, assuming that the energy policy of the EU will have taken effect and that the barrel price will be around \$100.

These scenarios assume the implementation of some vital infrastructure projects, including: (a) the linking of the Baltic with the EU; (b) exploration of the possible

<sup>5</sup> International Energy Agency, World Energy Outlook 2006.

<sup>6</sup> National Intelligence Council (2008). Disruptive Civil Technologies Six Technologies with Potential Impacts on US Interests out to 2025.

supply of liquidated natural gas (LNG), which is of vital importance for countries with unique natural gas suppliers; (c) the completion of a Mediterranean energy network, which will connect Southeastern Europe with the rest of Europe and include solar and wind energy potential; and (d) the development of linkages of Northern and Southern Europe with Central and Southeastern Europe (Second Strategic Energy Review 2008).

Today, total Greek energy consumption consists of 64% oil, 23% coal, 8% natural gas, 4% hydroelectric energy, and 1% renewable sources. Oil imports come from Iran, Saudi Arabia, Russia, Libya, and Kazakhstan. Greece purchases 80% of its natural gas from Russia. The known coal reserves are in the US (28.6%), Russia (18.5%), and China (13.5%), among others (BP Statistical Review of World Energy, June 2008).

Based on the above policy framework for the development of networks, Greece falls into a broader organisation that is vital for European interests on one hand and suppliers on the other.

Thus, it is understood that the Greek economy has limited energy capabilities as Greece is nearly entirely an energy importer. It acts as a transit point for energy transport, especially from the Caspian region to Europe, through three main projects: the Bosphorus-Alexandroupolis gas pipeline, the interconnection with Turkey and further connexions of these regions with Italy. A good depiction of the extent of the involvement of the Greek area in this international transport network – mainly for natural gas and oil – is shown in Map 2.2, including the smaller map of Greece (Map 2.1). This image, however, clearly shows that the “energy hub” definition usually attributed to Greece is not accurate; Greece has a relation of proximity with the areas of energy transportation. More specifically, the developments in the relations between Russia and Turkey (Map 2.1) concerning the construction of the Samsounta-Tseihan pipeline, which, in a way, rivals the Bourgas-Alexandroupoli pipeline, supports this opinion.



**Map 2.1** Natural gas pipelines and Greece

Internationally, growing energy consumption leads to environmental pollution. If the current rate of gas emissions continues, in the long term, it will increase average global temperature up to 6°. These changes will affect the entire world, including the specific area of the Southeastern Mediterranean. These changes will involve decreased volumes of available drinking water, rising sea levels and the opening of areas in the world that are currently inaccessible, such as Siberia, certain areas of Canada and the Arctic.

The opening of these areas may affect global economic geography as it will increase the potential energy production of the countries who own these territories, such as the United States, Russia, Canada, Denmark, and Norway.

In the Southeastern Mediterranean, climate change will primarily lead to rising sea levels, which will affect population movement, while also leading to an extended summer season, which will affect the most important industry for these regions, tourism. At the same time, there will be greater demand for energy consumption during those months.

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## 2.9 The Formation of National Power

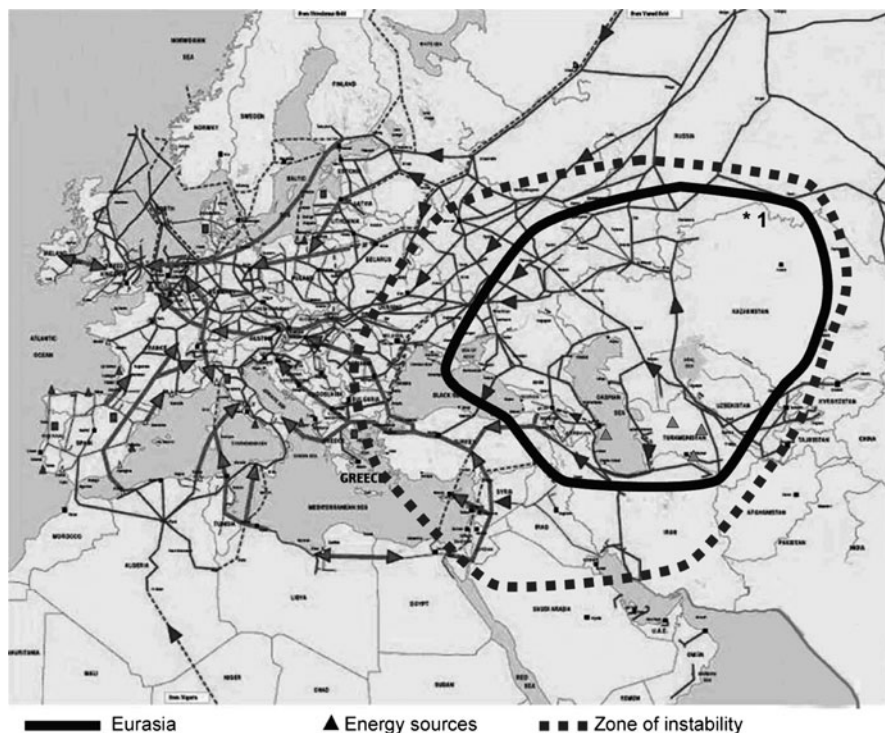
Although a country's economy reflects all aspects of the development process, these are not the only conditions for establishing the living standards of its citizens. The reason is very simple: An unfortunate military adventure with a neighbouring country could have a devastating effect on the standard of living. It is very important, therefore, to see what fields affect the development of forces in the international front, always in reference to the country under observation (in our case, Greece).

Power, in strategic terms, is the capacity to kill and protect oneself from being killed. After this, the abilities to exploit, enforce financial terms, and inspect come naturally. Power is not only exerted when one kills, but also when one threatens to kill.

National power is the comprehensive expression for all of the capabilities a nation has at a specific moment in time in order to promote internally and internationally the conquering of national goals, regardless of the difficulties that may be faced (Kelly 1994).

The geostrategic environment in which these changes take place involves the exercise of power and international influence, which is founded on the availability of military force (i.e., the possible use or threat of use). The Greek economy and society neighbour parts of the world where international influence does not yet have a definite shape, the so-called "Eurasia" (continuous line, Map 2.2), which creates a large zone of instability (dotted line, Map 2.2). If to that we add the tension with Greece's eastern neighbour (Turkey), the international environment in which the Greek economy operates becomes turbulent. This is not a situation that is shared with most other EU countries.

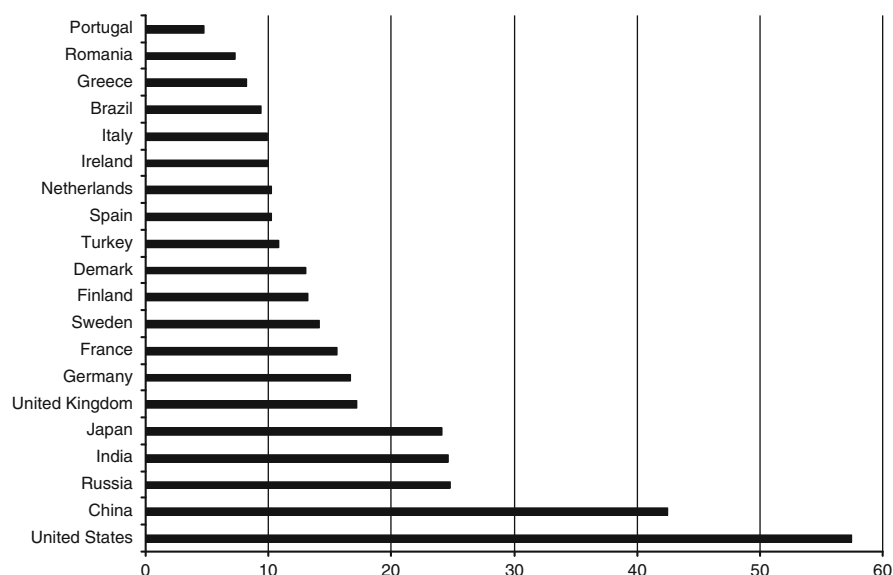
The prevalence of a globalised capitalistic system has led to the collapse of the dividing lines of international political influence. As a result, the simplistic declaration of integration in the "West" under a capitalistic system is void of meaning



**Map 2.2** Natural gas transport routes in Europe, Central and South Asia (Caucasia) and disputed geographical areas: composite view (Source: Ramsay [2006] and Brzezinski [1997])

because this social system has established global dominance. As a result, new problems concerning strategic choices arise. In essence, we are called upon to locate the new or upcoming international centres of influence and to decide how much and in what ways we will connect with them. It should be noted that Greece, geographically and historically, neighbours one of the major uprising players of the international scene: Russia. As a result, questions of orientation have a special character.

The debate surrounding the development of quantitative indicators that can reflect the term “national power” begun in the eightieth century with emphasis on the strength of nations as stemming from the size of their population. This led to the development of an entire body of research that continues to expand today, especially around the topics of international relations and politics. Since the beginning of the twentieth century, the indicators measuring national power have included population, steel production and energy production. Military expenses, the value of external trade, and other indicators were added later. The main protagonists in this debate originated from the United States, China, India and Russia, which are the most important of the countries claiming primacy in the global rankings.



**Fig. 2.9** Index of national force (Source: Hwang [2008])

Kumar (2008) describes the Indian index, the National Security Index (NSI), as follows: 25% financial power, 25% defence capability, 20% energy security, 15% technological force and 15% active population. The model used by the National Intelligence Council of the United States (the International Futures Computer Model) produces an index based on GDP, military forces, population and technology (NIC – Global Trends 2025, 2008).

Figure 2.9 shows the calculation of national force by the German Institute of Global and Area Studies (Hwang 2008). Hwang's ranking is shaped based on the following basic weights: 6.25% economic figures, 6.25% life expectancy, 6.25% education, 6.25% level of society's dignity (corruption), 25% energy production, 12.5% defence expenses, 12.5% weapons production and 25% nuclear weapons.

The total classification of power depicted in Fig. 2.9 shows a world image that is different from that achieved through the simple examination of economies and production structures. We see that BRIC countries are very close to the USA. Northern European countries are in satisfactory positions (22nd to 43rd), as is Italy. Turkey has an even better ranking (28th). Greece is in 52nd place, and Portugal, Bulgaria and Romania hold similarly low positions.

The conclusion from the above analysis in terms of “national power” indicates that the temporal dynamics of this index are not in favour of Greece, and the resolution of certain long-standing issues over time (especially with Turkey) does not seem to be favoured by the evolution of active forces unless the emerging trend of this indicator is reversed. In any case, the present value of a future agreement under uncertainty increases as the time of agreement approaches.



With regard to global developments, the findings of the U.S. National Intelligence Council (NIC), which were included in its study of developments by the year 2025, are characteristic:

1. The entire international system, as established after World War II, will be re-established. Not only will new players appear (Brazil, Russia, India and China) in the international scene, but they will be the ones to determine the new rules of the game.
2. Wealth will continue to move from West to East.
3. The entry of 1.5 bn people on the international scene will put pressure on resources, especially energy, food and water, and increase global purchasing power.
4. The danger of conflict will increase, especially in the greater Middle East.

If we take into account that the NIC represents the concern of the community of the security services of the US and that this concern does not seem to be positive for the US, then these conclusions are of greater value.

It is obvious, then, that there is a tendency for the development of a world with a wider distribution of economic and political power. Such a world will require more effort to come to an agreement. Fortunately, communications have been improved faster than the distribution of the governance centres has widened.

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## 2.10 Southeastern Europe and Greece

Throughout human history, Southeastern Europe<sup>7</sup> has been characterised by strong economic and cultural convergences and conflicts. The network of relationships that have developed in Southeastern Europe could be a source of economic development.

Today, as shown in Table 2.7, there remain significant ethnic and cultural tensions, although the area demonstrates economic development and diffusion of economic interests.

This tension has caused Greece to keep a military presence – albeit in some cases purely symbolic – in many areas of the broader region.

Meanwhile, the existing tension with Turkey complicates Greece's economic development as it imposes increasing pressure on spending for defence. This tension fluctuates depending on the broader political and geographical rearrangements and influences on all sides. The supposed existence of oil deposits in Southeastern Europe, including Cyprus, is a typical example. It highlights the issue of the continental shelf and the economic zone of 200 miles. These matters could cause a new round of mid-term tension. Possibly, however, they could constitute an opportunity for the re-exploration of the deposits in the region, as

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<sup>7</sup>It concerns the following countries: Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Montenegro, FYROM, Romania, Serbia and Turkey. The region includes Black Sea countries such as Ukraine and Georgia.



**Table 2.7** National tensions in Southeastern Europe and neighbouring areas

Serbia – Kosovo
FYROM – Greece
Greece – Turkey
Greece – Cyprus – Turkey
Ukraine – Russia
Georgia – Russia
Turkey – Kurdish population
Middle East – Suez

resources are located (North and South Cyprus) in NA edge of the region, where the economic areas of Greece, Cyprus, Israel, Egypt and Turkey meet.

Between 2000 and 2008, the economies of Southeastern Europe recorded strong growth of around 6% per year on average. In the first half of this period, the development in the region was promoted by supply, particularly the rehabilitation of unutilised labour capacity, and hence by productivity growth that was a result of structural reforms. Until the crisis of 2008, the increase of domestic consumption and investment demand, combined with the increase of exports, constituted strong advancement factors. Credit expansion and net inflows also played important roles.

Greece is the largest direct foreign investor in Albania, Serbia, and the Former Yugoslavic Republic of Macedonia (FYROM), and the second largest foreign investor in Romania. Greek companies have invested more than €630 m in Albania. This amount corresponds to about 27% of Greece's total foreign investments in neighbouring countries. There are about 270 Greek businesses and businesses with Greek interests in Albania, creating 9,000 jobs. Greece is also first in direct foreign investments in FYROM. The 251 companies with Greek interests that operate in FYROM have invested €1 bn in FYROM and have created 20,000 jobs. In Serbia, the total Greek invested capital amounts to €2.5 bn. There are 150 mixed Greek-Serbian companies as well as 120 solely Greek ones, which together employ 20,000 people. The Greek banking sector has a strong presence in Serbia, with branches of Alpha Bank, Piraeus Bank, EFG-Eurobank and National Bank. In Romania, Greece is the second largest foreign investor, with over €3 bn invested. The Greek banking sector is now in second place (with 16.5%) among foreign investors, after Austria. From the existing data, one can conclude that the sum of current assets of the seven Greek banks has increased by 81% and reached €11.5 bn in 2007. Together with the Greek banks, 800 businesses are in operation. Finally, Greece ranks third in the list of foreign investors in Bulgaria, having invested over €1.5 bn, which translates into 10% of total banking investments. Greek banks hold 23.6% of total bank capital, and 1,500 Greek enterprises are also active. Table 2.8 shows Greece's economic presence in the countries of Southeastern Europe. It is characteristic that 68.87% of the claims of Greek financial institutions abroad are located in Southeastern European countries.

The Balkans and Southeastern Europe constitute a preferential region for the development of external trade for the Greek economy. It should be mentioned that

**Table 2.8** Claims of Greek financial institutions abroad

Country	Claims of Greek banks abroad (millions of dollars)	Percentage of the total claims of Greek banks abroad (%)
Turkey	20,823	20.58
Romania	18,689	18.47
Bulgaria	10,358	10.24
Cyprus	8,605	8.50
Serbia	4,703	4.65
FYROM	1,834	1.81
Albania	1,737	1.72
Russia	1,041	1.03
Ukraine	999	0.99
Egypt	413	0.41
Total of Southeastern Europe	69,681	68.87
Grand total	101,177	100

Source: Bank of International Settlements (<http://www.bis.org/statistics/consstats.htm#>)

Note: Also includes other countries in the area with very low participation

in 2007, Greek exports to the Balkans constituted 18.7% of total exports, whereas imports from the area amounted to only to 3.6%.

Because of the existence of so many Greek banks in Southeastern Europe, the region constituted a source of financial instability for the Greek economy during the crisis of 2008. This was due to the decrease of exports caused by the consumption inability of those countries and to the threat to the stability indices of the Greek banking system. The support package amounting to €24.5 bn that was designed for the banking sector in Central and Eastern Europe by the European Bank of Restructuring and Development (EBRD), the European Investment Bank (EIB) and the World Bank (WB), was aimed at the reinforcement of the real economy and the provision of support for the survival of small and medium enterprises (SMEs) in Eastern European countries.

In conclusion, Greece is geographically situated in a broader environment that remains under development. The Greek economy is currently in the middle of a rather serious economic fluctuation that initially originated from the operation core of the global economic system and is supported by its internal weaknesses. It should be seriously examined whether the national capability (economic standard of living, military forces, human capital and the innovation environment) can be preserved. Furthermore, external relations should take into account the actual possibilities and future prospects generated. In any case, sufficient thought should be given to the quality that the concept of national status and power should assume, considering that the deterioration of national financial conditions leads to a decrease in political choices.

Observing the development of Greek economy compared to the economies of Southeastern Europe, it becomes apparent that this is a region of tension and wealth production. The case of Turkey is illustrative because Turkey is the biggest debtor

of the Greek financial services system, while at the same time Greece's relationship with Turkey is the most important reason for preserving the spending on defence.

At the same time, though, Southeastern Europe is a large market of 141 m (if we include only the Balkan countries) to 193 m consumers if we include Ukraine, Georgia and Armenia. The level of its development promises catching-up effects, i.e. high growth, due to the effort of the countries to approach higher levels of per capita product and income.

What does this practically mean for developmental politics in the Greek economy? It is vital for an economy to be adjacent to large areas that are entering periods of strong growth. This process, though, demands large national investments across the region, which entail a significant social (public and private) cost.

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Petrakis, P.E.

2012, X, 450 p., Hardcover

ISBN: 978-3-642-21174-4