POLAND

COMPETITIVENESS REPORT 2012

Focus on Education

Edited by
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COMPETITIVENESS REPORT 2012

Focus on Education

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Preface

This is the 27th edition of the economic report published by the World Economy Research Institute assessing Poland's competitiveness as compared with that of other countries. The main aims of this year's edition are the following:

– to determine the competitive position of the Polish economy in 2011 compared with other countries in the world, including other member states of the European Union,
– to assess changes in the competitive position of the Polish economy during the global financial crisis and to identify the key factors determining these changes;
– to evaluate the competitiveness of Polish education, including its future role in shaping the country's competitive capacity;
– to provide tentative scenarios concerning the rate at which Poland will be closing its development gap with some other EU countries in Central and Eastern Europe (EU10) and with the EU15 group of countries;
– to draw conclusions for economic policy and point out policy actions necessary to improve the competitive position of the Polish economy in the next few years.

This report consists of three parts followed by a concluding section. The first part (Chapters 1–2) and the second one (Chapters 3–4) focus on a macroeconomic assessment of Poland's competitiveness and on factors that determined it in 2011. The third part (Chapters 5–6), as in previous years, focuses on evaluating a selected factor influencing the competitiveness of the Polish economy. This year, the focus is on education. The competitiveness of Polish education is examined in depth in the third part of the report, and certain aspects of the issue are also evaluated in other sections.

In assessing the competitive position of the Polish economy in 2011, we use a broad definition of competitiveness, taking as its main measure the level of prosperity of society, which consists of the following components:

– the current macroeconomic situation, described by key indicators of economic development such as GDP growth, inflation, unemployment, balance of public finances, and the ratio of the current-account balance to GDP;
– the standard of living, which is reflected by the size of national income per capita and indicators of socioeconomic development, such as life expectancy, infant

mortality, the rate of schooling, the scale of income inequality, and the scope of poverty;
– Poland's position in the international division of labor, defined as the ability to export goods and services to foreign markets and the ability to attract foreign direct investment and other factors of production and use them for development.

In the first two chapters, Poland's economic performance is compared with that of other countries (in particular fellow EU member states), using a broad spectrum of economic and social indicators. Sustainable economic development is the primary sign of competitiveness and therefore in Chapter 1 we examine the current development trends, including economic growth, the degree of convergence of GDP per capita, and income inequality. In Chapter 2, Poland's role in the international division of labor is evaluated. In particular, foreign trade performance and foreign investment flows are analyzed, with a special focus on economic ties with other European Union countries, which are Poland's main economic partners.

Chapters 3 and 4 provide a detailed analysis of the quantitative and qualitative factors that determine the competitive position of the Polish economy. They are grouped into two categories: (1) resources and their productivity, and (2) the effectiveness of economic policy and the quality of institutions. The first group includes human resources and changes in these over the past year, physical capital (including infrastructure), and technological factors, which are reflected in research and development, patents and innovations. The detailed analysis of these issues is supplemented by an assessment of the impact of labor, capital and technology on the competitive position using the growth accounting framework. The results can indicate to what extent economic growth and shifts in the competitive position of the Polish economy can be attributed to either changes in measurable factors of production (capital and labor) or changes in technology.

Chapter 4 discusses the main aspects of the second group of factors determining the competitiveness of the Polish economy, such as economic policies and institutions. The review of Poland's economic policy in 2011 is a starting point for this analysis. It is followed by an assessment of recent developments in the Polish financial system, in which efficiency is essential for competitiveness. The last section of Chapter 4 focuses on an evaluation of the business environment and the quality of national institutions.

Since education is the main topic of this year's report, the macroeconomic assessment of the competitiveness of the Polish economy has been expanded to include certain aspects related to the functioning of Poland's education system. For example, income inequality and differences in wage levels are examined in the context of the level of employee education; the role of education in attracting foreign direct investment to Poland has been evaluated, and the impact of human capital on economic growth in 2011 has been determined.

A broader analysis of education and its competitiveness is presented in the third part of the report. Education in Poland has been chosen as the focus of this year's

report because education systems play a crucial role in shaping modern and competitive economies today. Furthermore, ongoing discussion concerning the recent OECD findings about education system in Poland compared with other countries[1] requires additional research and assessment of this sensitive issue. Chapter 5 presents the transformation of Poland's education system at the primary, secondary and vocational levels from 1995 to 2011. As lifelong learning and acquiring new skills gain special importance, training activities conducted in Polish companies and their impact on competitiveness have been evaluated. Furthermore, Chapter 6 offers a detailed analysis of Poland's higher education system as it undergoes reform. The main pillar of the reform is a new law that has changed the rules of university governance and academic promotion criteria. Another issue examined in this chapter is the transformation of the higher education sector in terms of graduate profiles. The authors explore whether the number and profiles of Poland's higher education graduates are adapted to the needs of the labor market. The discussion wraps up with three different scenarios showing the possible development paths of Poland's higher education system.

The last section of the report includes a concise summary of research findings and some tentative conclusions for economic policy. The authors hope their assessments and opinions will stimulate further discussion about ways of shaping Poland's competitiveness.

Marzenna Anna Weresa

[1] For example controversial OECD findings indicating a relatively low number of teacher working hours in Poland compared with other countries, see: *Education at a Glance*, OECD, Paris 2011.

PART I

POLAND'S COMPARATIVE ECONOMIC PERFORMANCE AND COMPETITIVE POSITION IN 2011

Chapter 1

Economic Development and Real Convergence

1.1. Comparative Economic Perfomance in 2011

Zbigniew Metkowski, Ryszard Rapacki, Mariusz Próchniak

The international context: economic growth trends in the world economy

Before embarking on a comparative analysis of Poland's economic performance in 2011, we will first outline its global context, i.e. sketch a picture of the changing patterns in economic growth that occurred in the world economy over the 12-month period.

As can be seen from the preliminary, partly estimated data shown in Table 1, the global Gross Domestic Product grew by 2.8% in 2011 compared with the previous year, when the world economy rebounded sharply from the deepest contraction of output since World War II which occurred in 2009.

As in 2010, the continuing recovery of the global economy was mostly due to fast economic growth in developing economies; the GDP growth rate for these countries was 6.0%. The most remarkable growth indices in this group were recorded in Southeastern Asia (7.1%), in particular in China (9.3%) and India (7.6%). The improving macroeconomic performance of the world economy was also fueled by the relatively good growth performance of transition economies[1] and Latin America.

[1] Poland, like nine other new EU members from Central and Eastern Europe (CEE), has been classified by the United Nations as a developed economy. The group of transition economies comprises the remaining 18 former socialist countries in Europe and Central Asia.

Table 1
World economic growth in 2005–2011 (rates of growth in %)

Year	2005–2008 (annual averages)	2009	2010	2011[b]
World[a]	3.3	–2.4	4.0	2.8
Developed countries	1.9	–4.0	2.7	1.3
Euro zone	2.0	–4.3	1.9	1.5
USA	1.8	–3.5	3.0	1.7
Japan	1.3	–6.3	4.0	–0.5
Transition countries	7.1	–6.6	4.1	4.1
Russia	7.1	–7.8	4.0	4.0
Developing countries of which: least developed countries	6.9 7.8	2.4 5.2	7.5 5.6	6.0 4.9
Africa	5.4	0.8	3.9	2.7
Southeastern Asia	8.3	5.2	8.8	7.1
China	11.9	9.2	10.4	9.3
India	9.0	7.0	9.0	7.6
Latin America	5.0	–2.1	6.0	4.3

[a] calculated as a weighted average of individual country GDP growth rates, where weights are based on GDP in 2005 prices and exchange rates.
[b] preliminary data.

Source: United Nations (2012), *World Economic Situation and Prospects 2012*, New York.

On the other hand, global economic growth was adversely affected by a substantial deceleration in developed economies, including Japan (which reported a GDP contraction) and the United States. This trend was compounded by a mounting fiscal crisis in the euro area and protracted recession in some of its member countries, including those representing the so-called Mediterranean model of capitalism.

Size of the economy

We begin our analysis of the Polish economy in 2011 and its international competitive position with a brief assessment of Poland's economic potential and its role in the world economy as well as in the enlarged European Union.

Table 2, based on the latest IMF data, ranks the world's largest economies in 2011 according to GDP measured in US$ at current exchange rates (CER) and at

purchasing power parity (PPP).[2] The data on the GDP in 2011 given in the table are preliminary and may be subject to further revisions.

The ranking has been arranged according to the value of GDP calculated at CER. The places occupied by the listed countries in the alternative league table based on GDP values at PPP are given in parentheses. The full list of the 30 largest economies arranged according to the value of GDP at PPP would include (apart from the countries listed in the table): Thailand, Egypt, Pakistan, Malaysia, Nigeria, and the Philippines, while excluding Switzerland, Sweden, Belgium, Norway, Austria, and the United Arab Emirates.

The estimated values of GDP at PPP for developing countries are as a rule much higher than the alternative estimates of GDP at CER, while the relationship between the two estimates for developed countries is usually the opposite. The difference between the two estimates is mainly due to a difference in the price levels: GDP calculated at PPP reflects the value of output produced in a given country expressed in US$ at prices that exist in the United States.

According to these data, Poland, depending on the conversion rate, ranked 20th or 22nd among the world's largest economies in 2011. Poland's position in this ranking has not changed significantly during the last few years except that Poland has slightly outdistanced Belgium in terms of GDP measured at CER.

If we compare the changing position of individual countries over time in such international comparisons, we should bear in mind that changes in the GDP values expressed in US$ reflect not only the change in output volumes, but also changes in exchange rates. The rising position of some developing countries and the declining position of major advanced countries in this ranking during the last few years has been influenced by both differences in their growth rates and by a depreciation of the U.S. dollar and the euro against some other currencies. Poland's GDP converted into U.S. dollars was also influenced by fluctuations in exchange rates, and its changes do not adequately reflect the actual growth of output. a better basis for the assessment of the comparative position of a given country in the global economy is data for a longer period, which reveals the long-term trend in the relative economic potential of the country. In the case of Poland, this trend was positive until recently, meaning a gradual improvement in the international competitive position of the Polish economy. However, the last few years have brought some deterioration in this position despite Poland's relatively good growth record. This is because some other countries have grown more rapidly or benefited from more advantageous trends in exchange rates and relative price levels.

[2] Purchasing power parity (PPP) is a conversion factor that shows how many currency units of a given country would be needed to buy the same basket of goods and services that could be purchased for US$ 1 in the United States. The value of GDP at PPP is expressed in calculative units called "international dollars" that represent the purchasing power of US$ 1 in the U.S. market. The estimated PPP value of GDP of a given country corresponds to its value calculated at U.S. prices.

Table 2
The world's largest economies in 2011 (GDP in US$ billion)

Rank		Country	GDP at CER		GDP at PPP	
			billions of US$	% of world's total	billions of US$	% of world's total
1	(1)	United States	15,065	21.5	15,065	19.1
2	(2)	China	6,988	10.0	11,316	14.4
3	(4)	Japan	5,855	8.4	4,396	5.6
4	(5)	Germany	3,629	5.2	3,089	3.8
5	(9)	France	2,808	4.0	2,217	2.8
6	(7)	Brazil	2,518	3.6	2,309	2.9
7	(8)	Britain	2,481	3.5	2,254	2.9
8	(10)	Italy	2,246	3.2	1,829	2.2
9	(6)	Russia	1,885	2.7	2,376	3.0
10	(3)	India	1,843	2.6	4,470	5.7
11	(15)	Canada	1,759	2.5	1,391	1.8
12	(13)	Spain	1,536	2.2	1,413	1.8
13	(14)	Australia	1,507	2.2	919	1.2
14	(11)	Mexico	1,185	1.7	1,565	2.1
15	(12)	Korea (South)	1,164	1.7	1,556	2.0
16	(22)	Netherlands	858	1.2	707	0.9
17	(16)	Indonesia	834	1.2	1,223	1.4
18	(17)	Turkey	763	1.1	1,055	1.3
19	(28)	Switzerland	666	1.0	341	0.4
20	(26)	Sweden	572	0.8	380	0.5
21	(23)	Saudi Arabia	560	0.8	678	0.9
22	**(20)**	**Poland**	**532**	**0.8**	**767**	**1.0**
23	(25)	Belgium	529	0.8	414	0.5
24	(19)	Taiwan	505	0.7	886	1.1
25	(29)	Norway	479	0.7	265	0.3
26	(18)	Iran	475	0.7	930	1.2
27	(21)	Argentina	435	0.6	711	0.9
28	(27)	Austria	425	0.6	352	0.4
29	(24)	South Africa	422	0.6	555	0.7
30	(30)	United Arab Emirates	358	0.5	261	0.3

Note: All GDP data are IMF preliminary estimates. Positions in the first column correspond to GDP calculated at CER and GDP calculated at PPP (the latter in parenthesis).

Source: IMF, World Economic Outlook Database, 2 February 2012 (www.imf.org).

Of special note are some major changes that have occurred in the structure of the world's economy during the last few years as a result of rapid economic growth in developing countries in Asia and Latin America. In terms of the value of GDP at PPP, China has become the second-largest economy in the world, after the United States, outdistancing Japan and Germany, while India and Brazil have advanced to 3rd and 7th place respectively. Among the world's 30 largest economies in terms of GDP at PPP, more than half are developing countries. The five biggest economies in Asia now account for over 30% of global output, and the four largest economies of Latin America contribute a further 5%. The growing role of the emerging countries of Asia and Latin America in the world economy is reflected not only by their share in global output, but also by the increasing role they play in international trade and finance. The global financial and economic crisis has not stopped the rapid growth in the developing countries of the Far East and they have become the most dynamic part of the global economy in the last few years.

Before we go on to evaluate the position of the Polish economy in the enlarged European Union, let us first point to the role of the EU27 in the world economy. According to preliminary IMF estimates, the combined GDP of all EU27 countries in 2011 was US$ 17,960 billion at CER or US$ 15,786 billion at PPP. This represented 25.7% or 20.0% of global output respectively. These figures testify to the economic potential of the European Union. To compare, the GDP of the United States, the largest single economy in the world, was US$ 15,065 billion that same year. China, the second-largest economy, remained far behind the European Union in terms of GDP at CER (US$ 6,988 billion), but is rapidly bridging the gap in terms of GDP at PPP (US$ 11,316 billion).

Table 3 provides data on the size of EU economies. It includes preliminary data on the value of GDP in individual member countries in 2011, calculated in euros at current exchange rates (CER) and at the purchasing power standa[rd] (PPS).[3] It should be remembered that GDP data for 2011 are preliminary estimates that will be subject to revision.

As in the case of GDP estimates at PPP expressed in US$, the GDP value at PPP expressed in € depends on the purchasing power of the international currency (in this case, the euro) in a given country, i.e. on the relative price level (against the average price level in the EU). In countries where prices are relatively high, the GDP value calculated at PPS is lower than its value calculated at CER and, vice versa, in countries with relatively low prices, the GDP value at PPS is higher than its value at CER. For all the CEE countries, the GDP values at PPS are much higher than the values calculated at CER. For Poland, the difference in 2011 was 67%, for the Czech

[3] The purchasing power standard (PPS) for the member countries of the European Union, calculated by Eurostat, is based on the average price level in the EU27. The value of GDP at PPS is measured in calculative units (called PPS), which express the purchasing power of the euro in the given country.

Table 3
EU member countries: GDP in 2011

Rank		Country	GDP at CER		GDP at PPS	
			billions of €	%	billions of €	%
1	(1)	Germany	2,570.0	20.3	2,459.3	19.5
2	(2)	France	1,987.7	15.7	1,758.0	13.9
3	(3)	Britain	1,767.8	14.0	1,742.5	13.8
4	(4)	Italy	1,586.2	12.5	1,519.1	12.0
5	(5)	Spain	1,074.9	8.5	1,153.3	9.1
6	(7)	Netherlands	607.4	4.8	557.1	4.4
7	**(6)**	**Poland**	**381.0**	**3.0**	**616.4**	**4.9**
8	(8)	Belgium	370.4	2.9	327.1	2.6
9	(9)	Sweden	365.7	2.9	297.6	2.4
10	(10)	Austria	300.9	2.4	269.9	2.1
11	(15)	Denmark	241.3	1.9	176.4	1.4
12	(12)	Greece	217.8	1.7	237.6	1.9
13	(17)	Finland	189.7	1.5	157.7	1.2
14	(14)	Portugal	171.6	1.4	207.0	1.6
15	(13)	Czech Republic	153.2	1.2	211.2	1.7
16	(18)	Ireland	156.1	1.2	143.0	1.1
17	(11)	Romania	132.4	1.0	251.5	2.0
18	(16)	Hungary	100.7	0.8	162.7	1.3
19	(19)	Slovakia	69.9	0.6	101.8	0.8
20	(23)	Luxembourg	41.8	0.3	34.6	0.3
21	(20)	Bulgaria	39.0	0.3	83.7	0.7
22	(22)	Slovenia	35.4	0.3	43.6	0.3
23	(21)	Lithuania	30.4	0.2	49.6	0.4
24	(24)	Latvia	19.5	0.2	29.7	0.2
25	(26)	Cyprus	17.9	0.1	19.8	0.2
26	(25)	Estonia	16.0	0.1	23.0	0.2
27	(27)	Malta	6.4	0.1	8.7	0.1
		EU27	12,649.1[a]	100.0	12,649.1[a]	100.0

Note: All GDP data are preliminary Eurostat estimates. Positions in the first column refer to GDP calculated at CER and PPS (the latter given in parenthesis). Percentage shares in EU27 total were calculated by the author.
[a] The total sum of the GDP values shown in the table for individual countries differs slightly from the total GDP value for the EU27 given by Eurostat due to rounding.

Source: Eurostat database, Feb. 4, 2012. (ec.europa.eu/eurostat).

Republic it was 34%, and for Bulgaria 115%. The difference between the GDP value at PPP or PPS and its value at CER is usually the bigger the less developed the country concerned is, though this is not a strict rule since the difference is related to the relative price level, which may not be proportional to the development level. It cannot be ruled out that the GDP values at PPP or PPS for the CEE countries given by the World Bank, IMF and Eurostat may be overestimated. The conversion rates (parities) used in estimating GDP at PPP or PPS are highly favorable for most CEE countries. This should be taken into account when interpreting the comparative position of CEE economies in the EU and in assessing the distance between CEE and the EU15 in terms of GDP per capita. This is why we include both CER and PPP or PPS estimates of GDP in our comparisons.

Economic growth and real convergence

The 1990s and the subsequent decade saw a fast real convergence of the Polish economy vis-à-vis both EU countries and all transition economies. The improvement of Poland's relative development level was mostly the result of its economic growth, which was the second-fastest in the entire group of 28 transition economies and by far the fastest in the new CEE members of the European Union (EU10). The relevant data is shown in Table 4. The average annual growth rate of Poland's GDP in real terms during 1989–2011 totaled 3.1% including a deep contraction of output in 1990–1991 (by a combined 14.7%) due to the effects of the "transformation recession."

As a result of both the shallowest GDP decline in the early stage of the transition and the fastest economic growth during the 1990s, the GDP produced in Poland in 2011 represented 194% of the level recorded in 1989. This index favorably compares with similar indices for all the remaining former communist countries while also exceeding the corresponding indicator for the EU15.[4] As far as the former communist countries are concerned, however, one important point should be raised. At the beginning of the last decade, Poland lost its leading position as the fastest-growing economy in the region. In 2001–2008, it was outpaced by the Baltic states as well as Slovakia and Romania.

[4] It should be pointed out, however, that the economic growth rates in Poland during the last two decades are not among the most spectacular in the world economy. According to our calculations based on IMF data (IMF 2011), in terms of real GDP growth, Poland ranked 94th or 37th in the world respectively between 1990 and 2010 depending on whether or not the transformation recession of 1990–1991 was accounted for.

Table 4
Growth of Gross Domestic Product, 1990–2011

Country	Real GDP growth rate				Real GDP index in 2011	
	Average annual % growth	Annual % growth				
	1990–2011	2009	2010	2011	1989=100	2000=100
Poland	**3.1**	**1.6**	**3.9**	**4.0**	**194**	**152**
Czech Republic	1.6	–4.7	2.7	1.8	140	142
Slovakia	2.3	–4.9	4.2	2.9	166	164
Hungary	1.2	–6.8	1.3	1.4	130	123
Slovenia	1.8	–8.0	1.4	1.1	149	132
Estonia	1.6	–14.3	2.3	8.0	140	153
Lithuania	0.2	–14.8	1.4	6.1	105	162
Latvia	0.1	–17.7	–0.3	4.5	101	150
Bulgaria	0.4	–5.5	0.2	2.2	109	152
Romania	0.8	–6.6	–1.6	1.7	118	152
EU15	1.8	–4.3	2.0	1.5	148	115

Sources: Eurostat; World Bank, *World Development Indicators Database*; EBRD, *Transition Report Database*; UN Economic Commission for Europe (2005), *Economic Survey for Europe*, No. 2, Geneva; WIIW (2006), *Special Issue on Economic Prospects of Central, East and Southeast Europe* (Research Report 325), Vienna; own calculations.

The 2009–2011 period produced dramatic changes in economic growth trajectories. The global economic crisis, which began in the fall of 2008 in the United States, spread to most of the world's developed countries and triggered a deep recession in the European Union. It affected all new EU member countries in Eastern and Central Europe except Poland.

Seen against this background, Poland's macroeconomic performance looks particularly impressive. The Polish economy was the only one in the European Union to show real GDP growth in 2009; in 2010–2011, it ranked among the fastest-growing in Europe. These results may indicate its strong resistance to negative external shocks connected with the global financial crunch. Furthermore, if we combine this growth trend with the performance of the Polish economy during the "transformation recession" in the early 1990s, we come to the conclusion that the rising international competitiveness of Poland is not only a function of its fast economic growth but also a result of its exceptionally strong resistance to both external and internal negative

shocks. This last salient feature makes long-run economic growth in Poland not only relatively fast but also sustainable and relatively stable.

Table 5

Relative development levels in Poland and selected EU countries, 1989–2011 (GDP per capita at PPP, Poland = 100)

Country	1989	2000	2005	2006	2007	2008	2009	2010	2011[a]
Poland	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Germany	279	246	227	221	215	207	190	187	186
France	268	240	216	208	200	191	177	171	167
Italy	274	246	206	202	193	186	170	160	155
Britain	256	248	239	231	215	200	182	178	173
Spain	199	202	200	202	194	186	169	159	155
Ireland	195	275	284	281	274	238	210	203	198
Portugal	159	169	155	152	146	139	131	127	121
Greece	178	175	178	177	167	164	154	143	130
EU15 average	262	240	222	215	206	198	180	175	171
Czech Republic	197	148	155	154	154	145	134	127	124
Hungary	146	113	124	121	115	114	107	103	101
Slovakia	155	104	118	121	126	130	120	117	116
Slovenia	194	167	171	169	163	163	143	135	132
Estonia	142	94	122	127	130	123	105	102	107
Lithuania	145	83	104	108	109	109	90	90	95
Latvia	137	75	94	98	104	100	84	81	83
Bulgaria	122	58	73	73	74	79	72	70	69
Romania	89	54	69	73	78	84	77	73	73

[a] preliminary estimates.

Source: IMF, *World Economic Outlook Database, September 2005* (for 1989); Eurostat (for 2000–2011); own calculations.

Such a growth pattern during the transition period resulted in a substantial narrowing of Poland's development gap with regard to both EU15 countries and all transition economies. This is confirmed by the results of our calculations regarding the relative economic development level in Poland and selected EU countries listed in Table 5. These results are supplemented by data showing changes in the development gap in the new CEE members of the European Union relative to the EU15 average, given in Table 6.

As can be seen from the data in Table 6, in 2011 Poland's GDP per capita in PPP terms stood at 58% of the EU15 average. This was equivalent to a gain by 20 percentage points between 1989 and 2011, of which 15 points have been gained since Poland's entry to the European Union in May 2004.[5] The catching-up process has been particularly fast toward the largest EU economies including Germany, France, Britain and Italy.

Table 6

Development gap in new EU member countries vis-à-vis the EU15 average, 1989–2011 (GDP per capita in PPP, EU15 = 100)

Country	1989	2003	2009	2010	2011[a]
Poland	**38**	**43**	**55**	**57**	**58**
Czech Republic	75	68	75	73	73
Slovakia	59	48	66	67	68
Slovenia	74	74	79	77	77
Hungary	56	55	59	59	59
Estonia	54	48	58	58	62
Lithuania	52	43	50	52	55
Latvia	52	38	46	46	48
Bulgaria	46	30	40	40	40
Romania	34	27	43	42	42

[a] preliminary estimates.

Source: Rapacki R., Próchniak M. (2009), *The EU Enlargement and Economic Growth in the CEE New Member Countries*, European Economy, Economic Papers No. 367, March; Eurostat; own calculations.

The performance of the Polish economy also looks impressive against the background of other new EU members in Central and Eastern Europe. Only Slovakia and Romania managed to significantly narrow their development gaps toward EU15 countries (by 9 and 8 percentage points respectively); in case of the remaining CEE economies, the gap remained essentially unchanged or even widened (in Bulgaria, Latvia and the Czech Republic) since 1989.

5 Diverging demographic trends provide another explanation of the catching-up process in Poland with the target development level in the EU. While the Polish population increased only slightly between 1989 and 2011 (to 38.215 million from 38.173 million), EU15 countries experienced more sizeable demographic growth. Their overall population increased by 8.3%, from 369 million to nearly 400 million. These demographic trends are reflected in larger GDP growth rate differentials in per capita terms. While the rate for Poland was 3.1% annually, the EU15 average for GDP per capita growth was 1.2% per annum.

This general cumulative outcome of the real convergence process in CEE countries was largely due to changes in the economic growth performance of these countries in the last three years. The contraction of output triggered by the global crisis in all new EU member countries except Poland was deeper than in "old" EU economies (Table 4). As far as Poland is concerned, the huge diversification of GDP growth rates among EU countries was conducive to a spectacular improvement of its competitive position. Poland not only narrowed its development gap toward the EU15 by 7 percentage points, but also outpaced Latvia and Lithuania in terms of the relative development level and nearly caught up with another CEE economy, namely Hungary (Table 6).

Socioeconomic development and standard of living

The aim of this section is to assess the level of socioeconomic development and the standard of living in Poland compared with other countries of the European Union.

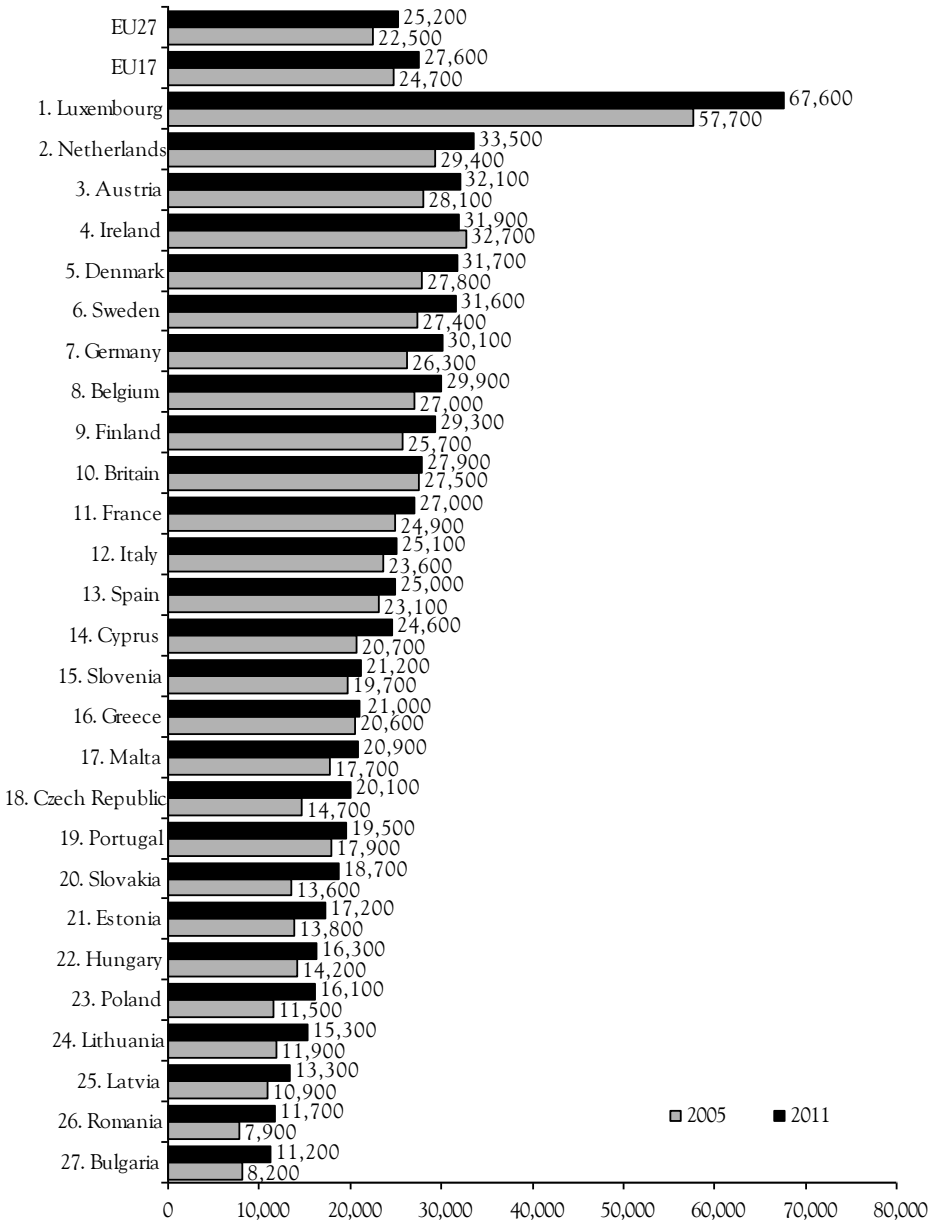
The basic measure of socioeconomic development and standard of living is national income per inhabitant. Figure 1 shows GDP per capita measured at PPS in EU27 countries in 2005 and 2011. The chart enables us to compare the value of GDP per capita and to evaluate the growth of real income in individual countries between 2005 and 2011, the period after the main EU enlargement. The GDP per capita data for 2011 are preliminary. It should be remembered that both the total GDP of CEE countries and their per capita GDP estimated at PPS are much higher than the corresponding values calculated at CER. As previously noted, the GDP figures at PPS for CEE countries are imprecise and may be overestimated.

According to our calculations based on the most recent Eurostat data, the average GDP per capita in the enlarged EU (EU27), converted at PPS, was € 25,200 in 2011. In the euro area (EU17), the figure was € 27,600.

Luxembourg leads the EU in terms of per capita GDP, with € 67,600.[6] a high per capita income (around € 30,000 or more) is also recorded in the Netherlands, Austria, Ireland, Denmark, Sweden, Germany, Belgium, and Finland. The largest EU countries except Germany, namely France, Britain, Italy, and Spain, have lower per capita GDP (ranging between € 25,000 and € 28,000). Less advanced Western European countries such as Greece, Portugal, Cyprus, and Malta have much lower incomes (ranging from € 20,000 to € 25,000). In CEE countries, GDP per capita ranges from € 11,200 in Bulgaria to € 21,200 in Slovenia.

[6] Luxembourg's high GDP per capita does not adequately reflect the difference in the standard of living compared with other countries in Western Europe. The figure is mainly the result of high incomes generated and earned by international banks, financial institutions, and big multinational corporations based in Luxembourg.

Figure 1
EU27 member countries by GDP per capita in PPS (€)



Note: Ranking based on preliminary PPS GDP estimates for 2011. Reference data for 2005 illustrate the change in the period after EU enlargement. GDP per capita was calculated by dividing total GDP by total population.

Source: Presentation based on data taken from the Eurostat database on Feb. 2, 2012 (ec.europa.eu/eurostat).

Against this background, Poland's position in the EU in terms of per capita GDP is unimpressive. With a GDP per capita of € 16,100 in 2011, Poland ranked in the bottom part of the list of the enlarged EU. Only four other EU member countries, Lithuania, Latvia, Romania, and Bulgaria, have lower income per inhabitant. In the last three years, the league table has undergone substantial reshuffling due to different responses in individual countries to the global crisis. As a result, Poland has again outdistanced Lithuania and Latvia, and narrowed the gap toward Estonia and Hungary, but the distance to Slovakia, the Czech Republic, and Slovenia remains substantial.

A concise measure of social development and living standard is the Human Development Index (HDI), published by the UNDP. It is the geometric mean of three component indices reflecting GNI per capita, life expectancy and the education level, which are assumed to represent three basic dimensions of human development: a long and healthy life, thorough knowledge, and a decent standard of living. The index ranges from 0 to 1 (higher values mean a higher development level).

The values of this indicator and its component parts for EU27 countries are given in Table 7. The first column shows the rank of a given country in the latest worldwide HDI league table based on 2011 data, covering 187 countries. The next columns provide information on the three component parts taken into account in compiling the HDI.

Table 7

Human Development Index (HDI) for EU member countries, 2011

HDI rank[a]	Country	GNI per capita (at 2005 prices)	Life expectancy at birth	Mean years of schooling	Expected years of schooling	Human Development Index (HDI)
		PPP $	years	years	years	value
3	Netherlands	36,402	80.7	11.6	16.8	0.910
7	Ireland	29,322	80.6	11.6	18.0	0.908
9	Germany	34,854	80.4	12.2	15.9	0.905
10	Sweden	35,837	81.4	11.7	15.7	0.904
16	Denmark	34,347	78.8	11.4	16.9	0.895
18	Belgium	33,357	80.0	10.9	16.1	0.886
19	Austria	35,719	80.9	10.8	15.3	0.885
20	France	30,462	81.5	10.6	16.1	0.884
21	Slovenia	24,914	79.3	11.6	16.9	0.884
22	Finland	32,438	80.0	10.3	16.8	0.882
23	Spain	26,508	81.4	10.4	16.6	0.878
24	Italy	26,484	81.9	10.1	16.3	0.874
25	Luxembourg	50,557	80.0	10.1	13.3	0.867
27	Czech Republic	21,405	77.7	12.3	15.6	0.865

HDI rank[a]	Country	GNI per capita (at 2005 prices)	Life expectancy at birth	Mean years of schooling	Expected years of schooling	Human Development Index (HDI)
		PPP $	years	years	years	value
28	Britain	33,296	80.2	9.3	16.1	0.863
29	Greece	23,747	79.9	10.1	16.5	0.861
30	Cyprus	24,841	79.6	9.8	14.7	0.840
34	Estonia	16,799	74.8	12.0	15.7	0.835
35	Slovakia	19,998	75.4	11.6	14.9	0.834
36	Malta	21,460	79.6	9.9	14.4	0.832
38	Hungary	16,581	74.4	11.1	15.3	0.816
39	**Poland**	**17,451**	**76.1**	**10.0**	**15.3**	**0.813**
40	Lithuania	16,234	72.2	10.9	16.1	0.810
41	Portugal	20,573	79.5	7.7	15.9	0.809
43	Latvia	14,293	73.3	11.5	15.0	0.805
50	Romania	11,046	74.0	10.4	14.9	0.781
55	Bulgaria	11,412	73.4	10.6	13.7	0.771

[a] The HDI index for 2011 has been calculated for 187 countries.
PPP GNI is the aggregate income of an economy generated by its production and its ownership of factors of production (equal GDP plus net factor income from abroad), converted to international dollars using purchasing power parity (PPP) rates; PPP GNI per capita is obtained by dividing total PPP GNI by midyear population.
Life expectancy at birth is the number of years a newborn infant could expect to live if age-specific patterns of mortality rates prevailing at the time of birth remain the same throughout his/her life.
Mean years of schooling is the average number of years of education received by people aged 25 and older. Expected years of schooling is the number of years that a child of school entrance age can expect to receive if patterns of age-specific enrollment rates prevailing now persist throughout his/her life.
The Human Development Index (HDI) is a composite index measuring a country's average achievement in three basic dimensions of human development—a long and healthy life, thorough knowledge, and a decent standard of living. It is calculated as a geometric mean of the three component indices expressing per capita GNI, life expectancy, and years of schooling (mean and expected years).

Source: UNDP, *Human Development Report 2011*, Oxford 2011.

The following countries lead the way in the global HDI classification: Norway, Australia, the Netherlands, the United States, and New Zealand. Among the new EU member countries in CEE, Slovenia ranks the highest, 21st, followed by the Czech Republic (27), Estonia (34), Slovakia (35), Hungary (38), Poland (39), Lithuania (40), and Latvia (43). All these countries, along with Cyprus and Malta, were classified in the first category, labeled as "very high human development." The two newer EU entrants, Romania (50) and Bulgaria (55), were placed in the second category, called "high human development."

In EU15 countries, the HDI ranges from 0.809 in Portugal to 0.910 in the Netherlands. In the new EU member states in CEE, the indicator ranges from 0.771 in

Bulgaria to 0.884 in Slovenia. Three CEE countries, Slovenia, the Czech Republic, and Slovakia, outdistance two Western European countries, Portugal and Malta, in terms of the HDI. The Czech Republic is classified higher than Greece, while Hungary, Poland, and Lithuania outdistance Portugal. Poland, with an HDI of 0.813, is close to the CEE average, but behind most other countries of the enlarged EU and ahead of only Lithuania, Latvia, Romania, and Bulgaria. Poland ranks 39th worldwide in terms of the HDI.

Poland's HDI has increased consistently since 1995, which testifies to the continuity of the country's socioeconomic development. Compared with the previous year, Poland advanced in the HDI ranking by two notches, leaving Portugal behind. However, Poland's HDI rank worldwide is still remote, close to developing countries such as Qatar, Brunei, and Barbados. Despite the change in the methodology of HDI computation and the resulting change in the numerical values of the index, Poland's rank remains almost unchanged. At the same time, some other CEE countries, namely the Czech Republic, Slovakia, Hungary, and Romania, improved their HDI ranks by seven to 13 notches as a result of the new methodology.

Of course, the very concept of the HDI and the computation method used in compiling this index are disputable. Certainly, the index does not cover all the dimensions of social development. For example, it does not consider human values such as freedom, democracy, justice, and social cohesion. The component indices used to reflect material wealth, the health status and education also have many shortcomings. The resulting placement of individual countries in the ranking is sometimes controversial. For example, in the newest HDI ranking, Britain is placed between the Czech Republic and Greece, and Belarus is ahead of Russia. Nevertheless, the HDI is the most popular general indicator of living standards, widely used in international comparisons.

One important aspect of social wealth and living standards that is not directly considered in the HDI is the availability of jobs and the existing employment opportunities. This factor directly influences income and wealth as well as the extent to which education and human capital may be transformed into higher living standards. Undoubtedly, high unemployment is in sharp conflict with people's sense of well-being and wealth. Meanwhile, high unemployment has become one of the main economic problems in Europe and elsewhere; its acuteness increased in the last few years due to the global economic and financial crisis. Despite the continuing recovery, joblessness in most EU countries has remained high because a large part of it is long-term structural unemployment, and because changes in employment and unemployment levels lag behind changes in output. In 2011, the highest unemployment rates in Western Europe were recorded in Spain (21.6%), Greece (17.0%), Ireland (14.3%), and Portugal (12.7%). Among the CEE countries, Latvia (15.7%), Lithuania (15.8%), and Slovakia (13.4%) were the most affected. Poland, with an annual unemployment rate of 9.6% noted in labor market surveys, was roughly on the EU average, but in many regions and cities registered unemployment was much higher. a special problem is high unemployment among young people. On average in the EU27, the unemployment rate among young

people is two or three times higher than that among adults. In Poland, the unemployment rate among those aged under 25 was almost 26% in 2011 (Eurostat, 2012).

The global crisis of 2008–2009 has strongly affected the economic well-being of people across Europe, reducing real incomes, adding to unemployment, and compounding social problems related to living standards. The impact of the crisis on living standards in CEE and other transition countries is scrutinized in a recent study by the EBRD (EBRD, 2011). The research shows that the adverse effect of the crisis on household incomes and consumption in transition countries was much stronger than that seen in Western Europe. The study offers three explanations for this difference. First, households in the transition region suffered more job losses, wage reductions, and declines in social remittances. Second, social safety nets were less effective in absorbing the adverse effect of the crisis on living standards. Third, extensive borrowing for pre-crisis mortgages and consumer purchases left many households more vulnerable to the fall in incomes. About 20% of all the households in the transition region reported a job loss by a household member, almost 30% of the households saw their wages or remittances fall, and almost 40% of the households had to reduce staple food consumption. In all, the negative impact of the crisis on people's well-being and wealth was much stronger and more persistent than in Western Europe.

The impact of the crisis on household welfare in CEE and other transition countries was also analyzed in a special study published by the World Bank (World Bank, 2011). The social impact of the crisis on household welfare can be traced through four main transmission channels: (a) financial markets (reduced access to credit, eroding saving and sinking asset values); (b) labor markets (falling employment, wage cuts, and reductions in social remittances); (c) product markets (declining growth or fall in output and relative price changes); (d) government services (reduced spending on education and health, and limitations imposed on social benefits and social protection services). The study confirms that labor market deterioration was the main transmission channel of the crisis to households. The adverse effect of the crisis on employment and real worker incomes in CEE and other transition countries was found to be much stronger than in any other group of countries usually distinguished in international comparisons, and the negative effects of the crisis on people's wealth are still seen as reflected by high unemployment, a fall or very slow growth of real wages, reduced pensions and social benefits, and accelerating inflation.

Comparative assessment of macroeconomic performance

The following overall assessment of the current condition of the Polish economy will be based on a comparative analysis of five macroeconomic indicators: (a) the rate of economic growth, (b) unemployment rate, (c) inflation rate, (d) general government balance, and (e) current-account balance. These are the main macroeconomic

indicators taken into account in comparative assessments of current economic conditions in a given country.

Obviously, this set of criteria is selective. Moreover, there are interrelationships between individual indicators. For example, the unemployment rate is often negatively correlated with the inflation rate, and a budget deficit can positively influence the rate of output growth. A modest current-account deficit may not be a problem if it is compensated by an inflow of foreign investment.

The tool used in this analysis is the pentagon of macroeconomic performance.[7] It illustrates the degree of meeting five macroeconomic goals: (a) economic growth, (b) full employment, (c) internal equilibrium (no inflation), (d) public finance equilibrium, and (e) external payments equilibrium. The degree of fulfilling these goals is expressed by the variables marked on the axes of the pentagon.

The tips of the pentagon, representing maximum or minimum values of the indicators, are considered to be desirable (positive) targets, although in some cases this can be disputable. For example, a high current-account surplus or a surplus in the state budget, as well as zero inflation or zero unemployment may not be an optimal result. Another problem is interrelations (notably conflicts) between individual macroeconomic goals, e.g. the fact that low unemployment (according to the Phillips curve) is often accompanied by high inflation, and vice versa. A separate issue is the relative significance of each criterion (e.g. whether low inflation is as important as low unemployment). All these reservations should be taken into account when interpreting such charts.

When comparing the pentagons drawn for a given year among individual countries or when comparing them over time for any single country, we take into consideration both their surface and their shape. A larger surface of the pentagon is assumed to mean a better general economic performance while a more harmonious shape indicates more balanced growth. Of course, such an assessment is confined to the five aforementioned parameters of current macroeconomic performance. It tells nothing about the size of the given economy, its economic potential, and development prospects. It does not even tell much about its possible performance in the next year, though a good current condition of the economy raises the chance of good future performance. Nevertheless, any analysis based on this method must be made with caution.

We compare the overall performance of Poland's economy in 2011 with the situation in three other CEE countries, Hungary, the Czech Republic and Slovakia, and in four Western European countries, Germany, France, Spain and Sweden. The choice of the countries included in this comparison is not accidental. Among the CEE countries, Hungary, the Czech Republic and Slovakia are the most similar to Poland in the development level, structure of the economy, advancement of the transition process, and the progress of

7 This refers to the concept used in the analysis of the general condition of Poland's economy and in the comparative analysis of the economic situation in post-socialist countries (Kołodko, 1993; Misala, Bukowski, 2003; Matkowski, 2003, 2004, 2007a, 2007b).

integration with the European Union. In Western Europe, Germany and France (along with Italy) are Poland's main trade partners and major sources of FDI inflows. On the other hand, Spain is a country more similar to Poland in terms of its size and structure of the economy; moreover, it faces now a number of similar macroeconomic problems, including a sizeable public finance deficit, large foreign debt, and high unemployment. Sweden has been included in this comparison because of its similar value of GDP at CER and because of its good economic performance in the last two years, which was achieved despite (or thanks to) its non-participation in the European Monetary Union.

Table 8
Key macroeconomic indicators for Poland and some other EU countries in 2011

Country	GDP growth	CPI inflation	Unemployment rate	General government balance	Current-account balance
	%	%	%	% of GDP	% of GDP
Czech Republic	1.8	2.1	6.8	–3.8	–3.3
France	1.6	2.2	9.7	–5.9	–2.7
Germany	3.0	2.5	5.9	–1.7	5.0
Hungary	1.4	3.9	10.9	2.0	2.0
Poland	**4.0**	**3.9**	**9.6**	**–5.5**	**–4.8**
Slovakia	2.9	4.1	13.4	–4.9	–1.3
Spain	0.7	3.1	21.6	–6.1	–3.8
Sweden	4.0	1.4	7.5	0.8	5.8

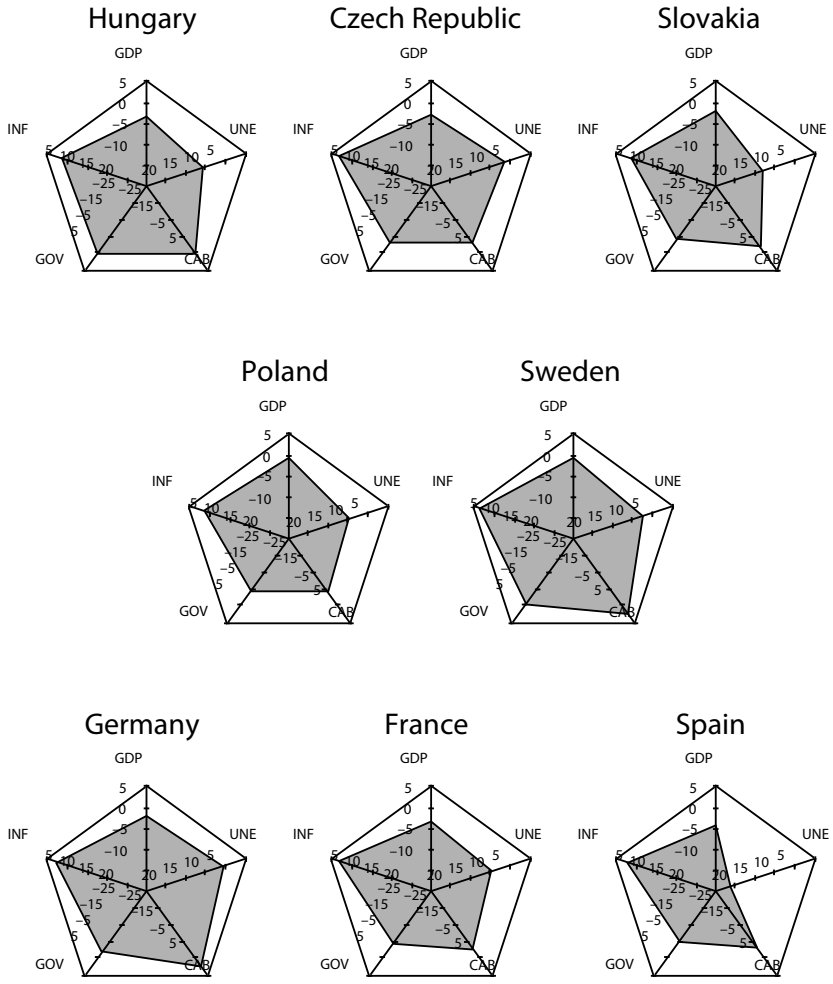
Note: All the data are preliminary estimates.

Source: GDP growth rate, CPI inflation, and unemployment rate (harmonized unemployment rate based on survey data, yearly average) according to Eurostat Database (ec.europa.eu/eurostat); general government balance and current-account balance according to IMF World Economic Outlook Database (www.imf.org), Feb. 2, 2012.

Table 8 shows the five indicators describing the general performance of the economy in Poland and seven other EU countries in 2011. These are the most recent data currently available from international sources (IMF and Eurostat). All the data given in the table are preliminary estimates, which may be subject to further corrections and revisions. In the case of Poland, the data are more or less in line with the official preliminary data published by the government's Central Statistical Office (GUS).[8]

[8] According to the most recent GUS data (GUS, 2012a, b, c), Poland's real GDP grew 4.3% in 2011, the inflation rate was 4.3% as well, and the average unemployment rate calculated on the basis of survey data for the first three quarters was 9.6% (the average yearly rate of registered unemployment calculated from monthly

Figure 2
Macroeconomic performance in Poland and some other EU countries in 2011



GDP – GDP growth rate (%)
UNE – unemployment (%)
INF – CPI inflation (%)
GOV – general government balance (% of GDP)
CAB – current-account balance (% of GDP)

Source: Author's elaboration based on the data in Table 8.

data stood at 12.5%). The current-account deficit amounted to 4.1% of the GDP, according to NBP estimates (NBP, 2012).

Figure 2 presents the data in the form of pentagons, more convenient for a comparative analysis. Figure 2 is entirely based on the preliminary international data given in Table 8, but in interpreting the data we shall consider some newer, revised estimates. Minor differences between the GUS data for Poland and preliminary estimates by Eurostat and the IMF do not significantly affect the assessments and conclusions made in this analysis.

The year 2011 was the second year of recovery after the global economic crisis, but the recovery in the European Union was still quite fragile due to a financial crisis in the euro area. According to preliminary data, in 2011 the total real GDP of EU27 countries grew by 1.6%, slightly less than in the previous year. Among the countries analyzed here, Poland and Sweden saw quite a high growth in output, each about 4%; in Germany and Slovakia, aggregate output grew by about 3%. France, Hungary, and the Czech Republic saw less marked output growth, ranging between 1.5% and 2%, while Spain continued to stagnate, with a slight growth of around 0.5%. Compared with the previous year, Germany, Sweden, Slovakia, and the Czech Republic saw some deceleration in economic growth, while Poland and Hungary, as well as France and Spain, continued to develop at about the same or slightly higher rates.

In most countries in the group, as well as in the European Union as a whole, the recovery was accompanied by some acceleration in inflation. The surge in inflation was the result of rising demand and cost pressures, changing exchange rates, and depreciation of local currencies, and sometimes it was also due to indirect tax increases and excessive government spending. For the EU27 as a whole, the average CPI inflation rate in 2011 was 3%, a rise from 2% the previous year. Nevertheless, in most EU countries inflation was kept under control by restrained fiscal and monetary policies. In the analyzed sample, all countries except Sweden and Hungary reported higher inflation than in the previous year. In Germany, France, and the Czech Republic, inflation was kept within a safe range of 1.5% and 2.5%. In Spain, it was about 3%. In Poland and Slovakia inflation jumped to 4% or more, while in Hungary it remained at about the same level. In these last three countries, governments and central banks must be quite alert to the risk of an accelerated price rise, trying to tamp down inflation in a way that would not jeopardize further output growth.

Cyclical changes in employment and unemployment are usually delayed and less pronounced than changes in output levels. This is one reason that in spite of the recovery, unemployment levels in most EU countries have remained high (another reason is the persistent long-term structural unemployment). The average unemployment rate in the EU27 stayed at the same level as in the previous year (about 10%). In the analyzed sample, unemployment rates decreased somewhat in Germany, Slovakia and Sweden, but did not change significantly in any other country except Spain, where unemployment increased despite the phase-out of recession. The highest unemployment in the analyzed group was recorded in Spain (almost 22%)

and Slovakia (14%), while the lowest rate was noted in Germany (6%). Poland, with a constant unemployment rate of 9.6%, kept on the average EU27 level.[9]

The financial crisis in the euro area and growing concerns over the state of public finances have brought about some public finance consolidation in almost all EU member countries, both in the euro area and outside it. The average budget deficit level in the EU27 was reduced from 6.5% of the GDP in 2010 to 4.6% in 2011. In the analyzed group, all the countries reported an improvement in their general government balance (relative to GDP). If the IMF preliminary estimates are correct, Germany has reduced its deficit to 1.7% of the GDP, the Czech Republic to 3.8%, Slovakia to 4.9%, Poland to 5.5%, France and Spain to about 6%, whereas Sweden closed its state budget with a zero balance.[10] Despite this progress, the road toward meeting the 3% budget deficit limit imposed by the Maastricht Treaty is still quite long for many EU countries. a closely related problem is a rise in public debt, both in terms of its absolute level and relative to GDP. In the analyzed group, the ratio of public debt to GDP at the end of 2010 ranged from about 40% in the Czech Republic, Sweden and Slovenia to 55% in Poland, 60% in Spain, and 80% or more in Germany, France and Hungary (Eurostat, 2012). The public debt burden is growing due to continuous state budget deficits and rising interest payments.

The current-account balances in individual countries are not directly comparable because they depend on a variety of factors that determine the volume of exports and imports, terms of trade, and current international payments and capital flows. The current-account deficits or surpluses reported by individual countries are to a large extent structural in nature. At the same time, cyclical changes in current-account balances do not follow a uniform, regular pattern and are difficult to forecast. Three countries in the analyzed group, Germany, Sweden, and Hungary, have noted current-account surpluses in the last few years, while four other countries, including Poland, have continuously reported deficits. In 2011, there was no significant change in the relative size of the current-account balance in the analyzed group of countries. The largest current-account deficit (around 5% of the GDP) was recorded in Poland, while a sizeable surplus (around 5% of the GDP as well) was reported by Germany and Sweden.

Comparing the changes in the five macroeconomic performance indicators over the last few years, we arrive at the following conclusion: While the impact of the global crisis on the economies concerned in 2008–2009 was reflected in a deterioration in the three basic parameters of macroeconomic performance—the GDP growth rate, the unemployment rate, and the general government balance—the recovery that began in 2010 and continued throughout 2011 has brought no tangible improvement

[9] It should be noted that the unemployment rates given in Table 8 refer to yearly averages recorded in labor market surveys. They are usually lower than the registered unemployment rates.

[10] Hungary was expected to achieve a small budget surplus in 2011, but it only managed to reduce its deficit to 2.8% of the GDP, according to the latest reports.

in key economic indicators except the GDP growth rate and the general government balance. Inflation has generally increased, unemployment remains high, and the changes in the current-account balance are diverse and mostly insignificant. This implies that the process of overcoming the adverse effects of the crisis may take longer than expected. It cannot be ruled out that recessionary trends will return to some EU economies, especially in view of the public finance crisis in the euro area.

Let us now turn to a general assessment of the current performance of the Polish economy in terms of the five macroeconomic performance indicators considered here, as compared with the results reported by other economies in the analyzed group.

Both the surface and the shape of the pentagon reflecting the overall condition of the Polish economy in 2011, in the context of five basic macroeconomic performance indicators, are similar to those shown by the economies of the Czech Republic and France. This means that in terms of the five macroeconomic indicators considered here, the overall performance of these economies was more or less comparable. Poland had a much higher GDP growth rate than the Czech Republic and France, but at the same time its inflation rate was twice as high. Poland's unemployment rate and budget deficit are comparable to those in France, but considerably higher than the Czech Republic's. All three countries report a current-account deficit, though Poland's figure is slightly higher than those in France and the Czech Republic.

Poland's economy is also doing well compared with Slovakia and Hungary. It is growing faster than these two economies, especially Hungary, but all three countries (Slovakia in particular) have to cope with high unemployment and resurgent inflation. As regards public finance, all three countries have significantly reduced their budget deficits. The biggest progress in this respect has been made by Hungary, yet it has somewhat been dimmed by a high public debt burden and problems related to international financing.

The shape of the pentagon drawn for Poland is also similar to those of Germany and Sweden, but its surface is smaller. This indicates that, in terms of the five macroeconomic criteria analyzed here, the results achieved by the Polish economy in 2011 are generally not as good as those reported by Germany and Sweden, though the difference is insubstantial. Poland's GDP growth rate was higher than Germany's and roughly the same as Sweden's. However, in all the other respects, Germany and Sweden have better scores. Inflation and unemployment in Sweden and Germany are considerably lower; both countries have a sizeable current-account surplus; and both of them have achieved better results in improving the general government balance. At the same time, Poland's economy continued to perform much better than Spain's, which has stagnated after the recession and is plagued by a record-high unemployment level. Inflation in Spain is slightly lower than in Poland, but the relative size of the budget deficit and public debt in Spain is higher.

Compared with the preceding year, the overall performance of the Polish economy in 2011 did not change significantly. Output grew at a slightly faster rate

despite a slowdown in some of the countries that are Poland's key export markets, but inflation accelerated as well. The unemployment rate remained roughly the same. The budget deficit was reduced, but is still twice as high as required by the EU.

Overall, in terms of the five basic macroeconomic performance indicators, the results achieved by the Polish economy in 2011, as in the previous year, were relatively good, especially if assessed in the light of the current economic conditions in Europe and worldwide. However, one should not overlook the existing problems and threats to further development. Poland has maintained a relatively high rate of economic growth, though it no longer leads the way for Europe in this respect. High unemployment and renewed inflation are undoubtedly serious problems. There are also many other problems that need to be solved when it comes to the consolidation of public finances.

The Polish economy in 2011 and the outlook for 2012

Poland was the only European Union country to avoid a recession during the global economic and financial crisis of 2008–2009. Even though this was mainly the result of a somewhat artificial improvement in Poland's foreign trade balance (a deeper fall in imports than in exports), the very fact that Poland was able to avoid a drop in real GDP during the crisis was undoubtedly a success, proving both its relative resistance to external shocks and its good general economic condition. Despite the adverse effects of the current financial crisis in the euro area, the Polish economy continues to do well. With GDP growth rates of 3.9% in 2010 and 4.3% in 2011, Poland is still among the economic growth leaders in Europe.

The data in Table 9 illustrate the impact of individual components of final demand on the growth of real GDP in the consecutive quarters of the 2010–2011 period. The table shows the direct contribution of individual demand components to the observed GDP growth rate (without multiplier effects). This contribution is calculated by multiplying the growth rate of a given demand component by its share in the absorption of GDP. The analysis makes it possible to identify the demand components that helped maintain or speed up GDP growth and those that hampered this growth. It also enables us to state whether the observed GDP growth is firmly supported by an increase in internal and external demand, which is essential for a further rise in output.

While in 2009 a positive foreign trade balance was the most important factor that sustained the growth of real GDP, mainly due to a deep reduction of imports, in 2010 the main driver of output growth was an increase in domestic demand, mainly caused by a rise in individual consumption. The direct effect of foreign trade on GDP growth was basically negative since exports grew less markedly than imports, due to slow growth in demand on major export markets and the need to restore the flow of imports after a deep reduction the previous year. a small increase in public spending

contributed insignificantly to GDP growth. a new and positive growth factor was an increase in gross capital formation. However, this increase was almost exclusively caused by the buildup of stocks, after their deep reduction in 2008–2009. On the other hand, fixed investment, which, alongside exports, constitutes the main driver of economic growth (both on the demand and supply side), continued to play a minor role in the acceleration of economic growth since the total investment volume, covering both private and public outlays, remained almost unchanged. In fact, the total investment volume in Poland did not increase in either 2009 or 2010 in annual terms. The inflow of foreign direct investment, meanwhile, decreased from € 17.2 billion in 2007 to € 10.1 billion in 2008, € 9.9 billion in 2009, and € 8.7 billion in 2010. It probably increased again to € 10.0 billion or more in 2011.[11] At the same time, the increase in exports in 2010 was high (12.1%), but insufficient to make up for growing imports (13.9%).

Table 9

Contribution of final demand components to changes in real GDP in Poland, 2010–2011 (%)

	QI 2010	QII 2010	QIII 2010	QIV 2010	QI 2011	QII 2011	QIII 2011	QIV 2011
GDP[a]	3.0	3.5	4.3	4.6	4.5	4.2	4.2	4.4
Domestic demand	2.0	4.4	5.0	6.2	4.3	4.2	2.9	3.4
Consumption	1.9	2.3	3.3	3.2	2.7	1.9	1.0	1.0
private	1.5	1.9	2.1	2.1	2.4	2.2	1.8	1.1
public	0.4	0.4	1.2	1.1	0.3	–0.3	–0.8	–0.1
Gross capital formation	0.1	2.1	1.7	3.0	1.6	2.3	1.9	2.4
fixed investment	– 1.9	0.1	0.5	0.6	0.7	1.3	1.6	2.7
change in stocks[b]	2.0	2.0	1.2	2.4	0.9	1.0	0.3	–0.3
Net exports	1.0	–0.9	–0.7	–1.6	0.2	0.0	1.3	1.0

[a] The GDP growth rate calculated against the corresponding period of the preceding year without seasonal adjustment.
[b] Difference between the contribution of gross capital formation and gross fixed investment.

Source: GUS data (www.stat.gov.pl), supplemented by author's own calculations.

In 2011, rising consumer spending remained the main driver of total demand that was responsible for the growth of output, but public consumption stalled due to budget cuts. Gross capital formation continued to grow and significantly contributed to the increase in total domestic demand (its contribution was comparable to that of private consumption). Moreover, for the first time since 2008, fixed investment also began to grow vigorously (at a year-to-year rate of 8% or more). However, the rise in

[11] In the first 10 months of 2011, the FDI inflow amounted to € 9.7 billion (PAIIZ, 2012).

the investment volume was mainly due to the completion of some large-scale public construction projects and big infrastructure undertakings (including soccer stadiums built for the Euro 2012 tournament and some expressways), partly financed from EU funds, while private investment projects continued to stagnate at a low level. Net exports were rather positive in terms of output growth.

In order to maintain and accelerate economic growth in Poland, a strong impulse is needed on the part of autonomous demand components, investment and exports. Private consumption, which is a major component of total demand, is the most important factor in maintaining the growth of output, but it cannot stimulate it all the time because an increase in consumer spending ultimately depends on the growth of output and income. In the case of Poland, both investment outlays and exports represent a smaller part of total demand than private consumption. Therefore, their direct effect on the GDP growth rate (as shown in Table 9) may not be sizeable. But both investment and exports must grow significantly in order to stimulate economic growth. The same is true of public spending, at least the autonomous part of it, but in times of the utmost concern about the state of public finances, this growth factor must be left aside.

However, the growth of Poland's exports and the increase in total investment in the country strongly, if not predominantly, depend on further economic developments in Western Europe, i.e. in the countries that are Poland's key export markets and a major source of FDI inflows. Meanwhile, the recovery in Western Europe remains relatively weak, and its continuation is uncertain.

Short-run growth forecasts for the Polish economy have been recently reduced in the connection with the overall downward revisions of global economic prospects. The European Commission has lowered its GDP growth forecast for Poland to 2.5% in 2012 and 2.8% in 2013 (Eurostat, 2012). The OECD has lowered its growth forecast for Poland to 2.5% in both 2012 and 2013 (OECD, 2011). The World Bank revised downward its 2012 forecast from 4.2% to 2.9% (World Bank, 2012a). Considering the downward revision of most growth forecasts for both the European Union and the global economy, the IMF's projection from October 2011, which envisaged 3.0% real GDP growth in Poland in 2012, may not be fully reliable.

The OECD forecast for Poland's 2012 GDP includes a projected breakdown of GDP growth by key demand components. According to the forecast, private consumption will grow 2.2% in real terms and public consumption will rise by 0.6%, but the GDP growth rate will reach 2.5% thanks to faster expansion of fixed investment and exports, which are projected to grow by 4.7% and 5.4% respectively. Nevertheless, the growth of both investment and exports will be lower than in the previous year, and net exports will contribute little to GDP growth because of the parallel increase in imports.

A medium-term forecast by the IMF (IMF, 2011a) assumes that, after the current slowdown, both the world economy and the European economy will return to their 2010 growth rates by 2016. For Poland, the IMF predicts a GDP growth rate of 3.6% in 2016.

Beyond a doubt, the actual growth of the Polish economy will strongly depend on economic trends in Europe and worldwide. A big challenge for Poland in the years to come is public finance consolidation: cutting the budget deficit to the required limit of 3% of the GDP and stopping public debt from rising and approaching its statutory limit. Other serious threats are posed by the aging of the population and a growing burden imposed on the economy by the costs of retirement payments. The basic condition of sustained economic growth is a revival in investment, in terms of both physical and human capital.

SWOT analysis of Poland's competitive position in 2011

Based on conclusions earlier in this chapter, we now summarize the main findings underlying Poland's competitive position in 2011. They are presented in a tabular format as major strengths and weaknesses. To provide greater clarity, both strengths and weaknesses have been divided into two broad categories. The first is based on Poland's macroeconomic performance in a comparative perspective, mostly against the benchmark of other EU countries (*performance-based*). The second category comprises the regulatory framework, the economic policy pursued, and the institutional infrastructure of economic development. Together, they determine Poland's macroeconomic performance and, by the same token, they influence the country's international competitive position (*institution-based*).

In the final part of this section, we will outline major challenges that may endanger Poland's competitive position in the years to come.

The quantitative proportions between strengths and weaknesses, as shown in the table, are not necessarily the same as their potential or actual impact on Poland's international competitiveness and macroeconomic performance. As the weights ascribed to individual items in the table may differ, the ultimate outcome or balance between the strengths and weaknesses should be interpreted as a weighted average rather than in terms of a simple arithmetic average.

The strengths and weaknesses summarized in the table do show that Poland made far more remarkable progress in macroeconomic performance than in terms of the quality of institutional endowment or market infrastructure. Over time, the pace of structural reforms decelerated and mounting institutional barriers started to adversely affect the country's macroeconomic performance and endanger the sustainability of its fast economic growth.

Table 10
Major strengths and weaknesses of the Polish economy in 2011

Strengths	Weaknesses
• Performance-based	
• Fastest economic growth in the CEE region in 1990–2011;	• Loss of its top growth performer status in the CEE region since 2000; Poland's GDP growth rate in 2001–2011 was below that of three other CEE countries;
• Fast real economic convergence toward the EU15 – from 38% of the average EU15 development level (GDP per capita in PPP) in 1989 to 58% in 2011;	• Persisting large development gap vis-à-vis the EU15; by end-2011 Poland was ranked among the least developed members of the EU27 (23rd place);
• Improving comparative position within the EU in terms of broader measures of socioeconomic development, such as the Human Development Index (22nd place in 2011);	• Deceleration in the growth of potential output by some 1.5 percentage points in recent years (down from 5.5%);
• Steady improvement of Poland's competitive position within the European Union in terms of the size of its economy; by 2011 it was ranked 6th in the EU27, compared with 9th place in 2007;	• High income disparities despite some improvement since 2004;
• In more general terms, resistance of the Polish economy to both internal and external negative shocks, which as a rule adversely affect economic growth;	• Low propensity to save and one of the lowest investment-GDP ratios among EU10 countries; large investment-domestic savings gap;
• High, consistent growth of labor productivity and high total factor productivity contribution to overall GDP growth;	• Dramatic rise in the level of the budget deficit in 2009–2011 and a further deepening of structural fiscal imbalances;
• Return to a long-run downward trend in real unit labor costs;	• Failure to meet the "golden rule" of public finance, i.e. using the fiscal deficit to finance public investment;
• Increasing stock of human capital due to rising educational level and large-scale training activities;	• Persistent inflationary pressure, as a result of which the inflation target in monetary policy was overshot in 2007–2011 and additionally in 2010–2011 the inflation criterion of nominal convergence was not met for the first time in years;
• Large and rising stock of entrepreneurial talent;	• Rising unemployment and a deteriorating situation on the labor market. Moreover, the natural rate of unemployment in Poland has run close to double-digit levels;
• Relatively strong foreign financial position including manageable trade and current-account deficits and rising level of international reserves;	• Low innovative capability and insufficient technological progress in the private sector;
• Reasonably positive assessments of the country's development prospects by international rating agencies; relatively low perceived country risk and steady inflow of FDI;	• Relatively low (though improving) technological competitiveness of Polish exports: low share of hi-tech goods (5% of total manufacturing exports);

• Technological development of the Polish economy and improvement of its international competitiveness due to increased FDI inflow;	• Underdevelopment of physical infrastructure (roads in particular);
• Changing pattern of FDI – deployment of R&D and support activities to Poland (e.g. business services, accounting and software development centers)	• Growing strains in Poland's power supply balance due to delayed investment in the development and modernization of the country's energy generation facilities;
	• Widening gap between Poland (despite its fast progress) and other EU10 countries, except Bulgaria and Romania, in the use of modern information and communications technology and internet access;
	• In the most general terms, despite its fast economic growth, Poland suffered from a lack of a clear vision and development strategy; as a result the Polish economy drifted along for most of the transition period;
• Institution-based	
• Relatively broad range of ownership changes, not confined to formal transfer of property rights, unlike in most other transition economies;	• Delayed "top-down" privatization of several core sectors including network industries; slow restructuring of sunset industries;
• Advanced microeconomic restructuring, progress in corporate governance and growing responsiveness to market signals of former SOEs;	• Unsettled problem of allocation of some property rights (restitution);
• Important role of grassroots privatization and expansion of SMEs, making the Polish economy more resistant to political turmoil;	• Strong equity bias in public expenditure programs (high priority of redistributive objective) at the expense of efficiency and negligence of important developmental goals;
• High quality of prudential regulations on the Warsaw Stock Exchange;	• Low transparency of public finance; soft budget constraint and strong rigidities in fiscal policy;
	• Insufficient government funding of domestic R&D and investment in human capital;
	• Overregulated labor market displaying many structural and institutional rigidities; high (though decreasing) tax wedge on labor costs;
	• Low (or even declining) level of social capital (or trust). Main symptoms include symmetrical distrust of Poles toward the government and vice versa; as a result, the government creates multiple bureaucratic barriers and hurdles that constrain economic freedom;
	• Mounting bureaucratic barriers for private enterprises and deteriorating business climate, which may be held responsible for Poland's declining scores in international league tables of economic freedom and competitiveness; these trends are due to a general government failure to create positive externalities for private business and economic development;

	• Low quality of the political process in Poland and strong bias toward rent-seeking at the expense of efficiency;
	• Mounting symptoms of government inefficiency in providing public and merit goods (low effectiveness of the judiciary, low enforcement of the law and government regulations, low quality of public administration, dysfunctional healthcare system, declining educational standards, etc.);
	• In most general terms, increased idle capacity of the institutional system in Poland necessary to overcome mounting tensions, inner contradictions and entropy inherent to its functioning;

Source: Author's elaboration.

Looking ahead, Poland is likely to face many macroeconomic and institutional challenges that may endanger the improvement and/or sustainability of its competitive position in the global environment. They include in particular the following:

I. Macroeconomic challenges

1. Likely slowdown of the Polish economy in the coming years, as a result of a fiscal crunch in the euro area and deteriorating global environment. The slowdown may result both from a downward departure of the actual GDP growth rate from the long-run trend line of potential output as well as from a deceleration of potential output itself. This may be conducive to double-digit unemployment in this period and persistent imbalances on the labor market.
2. The risk of diminishing price competitiveness of Polish exports, due to (i) the return of the Polish economy onto its long-term path of real appreciation of the zloty, and (ii) persistent inflationary pressure; the risk in question will only partly be offset by a downward trend in unit labor costs.
3. Likely fall in the propensity to save and a subsequent widening gap between domestic savings and investment. This adverse trend may in turn endanger the sustainability of long-term economic growth in Poland.
4. Inadequate quality of most Polish export commodities (at low levels of processing) and low technological competitiveness of Polish products.
5. Stronger competitive pressure on domestic producers (stemming from FDI and the opening of most markets).
6. Deployment of labor-intensive and energy-intensive production to Poland.
7. Large-scale emigration and a potential brain drain affecting the most dynamic, entrepreneurial-minded and highly skilled section of the labor force.
8. Unfavorable demographic trends, including the imminent decline in Poland's population (among the most severe in the EU), changing age structure and a con-

tinued decrease in the dependency ratio, or the number of economically active people per one retired person.

II. Institutional challenges

1. The most fundamental deficiencies of Poland's transition included a failure to define an even approximate end point on the country's road from central planning to a market economy.
2. Similarly, in the course of transition, it was difficult to trace a long-term vision or development strategy setting clear-cut priorities, methods of their implementation and the pace of moving along a pre-designed development trajectory.
3. There was no clear-cut definition of Poland's present and future role in the EU, other than as a beneficiary of EU funds.
4. As a result, Poland may become a "periphery" state to more advanced "core" EU members and be relegated to specializing in simpler, low-value-added activities.

III. Challenges for government policy

1. Mobilization of domestic savings is needed through slashing the budget deficit and increasing the propensity to save in the private sector.
2. Allocation of EU funds and increased budget revenues should go to investment rather than consumption; special emphasis should be placed on projects in physical and IT infrastructure and investment in human capital.
3. Focus is needed on the most efficient use of EU funds.
4. Greater government support is required for domestic R&D activities aimed at enhancing the low innovative capability of the Polish economy.
5. Comprehensive structural reforms must be launched, in particular including public finance, privatization of "problem" and network sectors and industries, development of financial markets, downsizing and reform of the public sector.
6. In this context, challenges posed by the low participation rate and high "natural" unemployment in Poland should be tackled. To this end, an appropriate policy toward the labor market should be designed and implemented. The prevailing patterns in core EU countries (except Britain) do not appear to be best suited to transition economies including Poland.
7. Heavy investment in expansion and modernization projects is badly needed in the electricity and power generation industries, aimed at upgrading their quality and increasing Poland's self-sufficiency in energy supply.
8. Policymakers should carefully examine the desirability of importing certain institutions from other EU countries, as some institutions are not necessarily suited to Poland's needs and conditions. One example is a trend to over-regulate some markets and/or activities (such as the labor market).

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1.2. Real Income Convergence

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This chapter intends to assess income convergence among the 10 Central and Eastern European (CEE) countries that joined the EU in 2004 and 2007: Poland, Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Slovakia, and Slovenia (EU10). We analyze convergence inside this group as well as convergence between the EU10 and the old EU members (EU15). The analysis covers the 1993–2011 period, but the calculations were also made for two shorter subperiods, 1993–2004 and 2004–2011. The inclusion of these subperiods allows us to assess the pace of the catching-up process before and after EU enlargement.[12] The convergence analysis is important for the assessment of Poland's competitiveness, defined here as the capacity to increase the real incomes of society faster than in other countries.

Our analysis is based on the two most popular concepts of income convergence: absolute β-convergence and σ-convergence. Absolute β-convergence exists when less developed economies (with lower GDP per capita) grow faster than more developed economies (with higher GDP per capita). σ-convergence appears when income differentiation between economies decreases over time. Income differentiation can be measured by standard deviation, variance, or a coefficient of variation of GDP per capita levels.

The analysis is based on the time series of real GDP per capita at purchasing power parity (in US$), calculated by the author using International Monetary Fund data (IMF, 2012). When converting nominal GDP per capita at PPP (in current prices) into real GDP per capita at PPP (in constant prices), we used the GDP deflator for the United States.

To verify the absolute β-convergence hypothesis, we estimate the following regression equation:

$$\frac{1}{T}\ln\frac{y_T}{y_0} = \alpha_0 + \alpha_1 \ln y_0 + \varepsilon_t . \tag{1}$$

The explained variable is the average annual growth rate of real GDP per capita between period T and 0; the explanatory variable is the log of the GDP per capita level in the initial period, while ε_t is the random factor. If parameter α_1 is negative and

[12] This paper is a follow-up study to previous analyses on the subject, published in earlier editions of the report (see e.g.: Matkowski and Próchniak, 2011). The methodology of the analysis is described in detail in the 2008 edition of the report (Próchniak, 2008).

statistically significant, β-convergence exists. In such a case we can calculate the value of coefficient β, which measures the speed of convergence, from:

$$\beta = -\frac{1}{T}\ln\left(1+\alpha_1 T\right). \tag{2}$$

In order to verify the σ-convergence hypothesis, we estimate the trend line of dispersion in income levels between countries:

$$\mathrm{sd}\left(\ln y_t\right) = \alpha_0 + \alpha_1 t + \varepsilon_t. \tag{3}$$

The explained variable is the standard deviation of log GDP per capita levels between the economies, the explanatory variable is the time variable (t = 1,…,19 for the 1993–2011 period), while ε_t – as before – is a random factor. If parameter α_1 is negative and statistically significant, σ-convergence exists.

We can expect EU10 countries to reveal some income convergence during 1993–2011, mainly due to their similar development level and economic structures, their identical course of economic reforms, and their regional cooperation and common policies aimed at EU accession. The convergence should be strengthened by EU structural and regional policies aimed at reducing development differences. Financial aid was mainly addressed to less developed regions and countries to stimulate their economic growth.

Despite the assessment of the pace of convergence in the whole analyzed period, we also try to indicate how the catching-up process evolved over time. To do this, the period under study is divided into two subperiods: 1993–2004, i.e. the years before EU enlargement, and 2004–2011, i.e. the membership period of the EU8 economies in the European Union (Bulgaria and Romania joined the EU in 2007). If convergence before EU enlargement turned out to be faster, it would mean that many benefits from EU accession (including the significant improvement in the competitiveness of the economies) were gained in the years before the official date of EU entry. This would show that the integration anchor started to work before the enlargement took place and that the countries managed to take advantage of many of the enlargement-related benefits in the first decade of transition. However, if it turned out that convergence accelerated in 2004 or later, this would mean that it was official EU membership that allowed the Central and Eastern European countries to catch up with Western Europe more rapidly and to significantly increase their competitiveness.

Convergence among EU10 countries

β-convergence

Table 11 and Figure 3 show the results of estimating *β*-convergence among the EU10 countries. The first column in Table 11 indicates the period. The next columns give the estimated values of parameters α_0 and α_1, *t*-statistics, *p*-values and R^2. The last two columns provide information about the existence of *β*-convergence (the answer is "yes" if the GDP growth rate is negatively and significantly correlated with the initial income level), giving the estimated value of coefficient *β*.

The results confirm the existence of weak *β*-convergence during 1993–2011. This means that less developed countries within the group grew faster on average than more developed ones, but this is not sufficiently confirmed by statistical data. Although the slope of the regression line can be considered significant (*t*-statistics in absolute value greater than 1 and *p*-value less than 0.15), the R^2 coefficient equals only 24%.

Figure 3 shows a negative correlation between the average annual GDP per capita growth rate over the 1993–2011 period and the initial GDP per capita level. Although the trend is negative, the points indicating the position of individual countries do not fit very well with the regression line, testifying to weak income convergence.

The Baltic states, the poor CEE economies in 1993 with GDP per capita (in current prices) between US$ 4,653 in Latvia and US$ 6,054 in Lithuania, grew the most dynamically during 1993–2011, with the average growth rate at 4.2% in Lithuania, 4.6% in Latvia, and 4.9% in Estonia. Apart from the Baltic states, the group of the fastest-growing economies also includes Poland and Slovakia. In 1993–2011, Poland recorded a GDP growth rate of 4.5% per annum given the initial income per capita level of US$ 6,214; the latter number is only slightly higher than Lithuania. a growth rate exceeding 4% during 1993–2011 was noted also by Slovakia but its initial income level (US$ 7,453) was significantly higher than in the Baltic states or Poland. The outcomes achieved by the Baltics and Poland are in line with the convergence hypothesis: these are the initially low-income countries that reported high rates of economic growth.

Table 11

Regression results for *β*-convergence

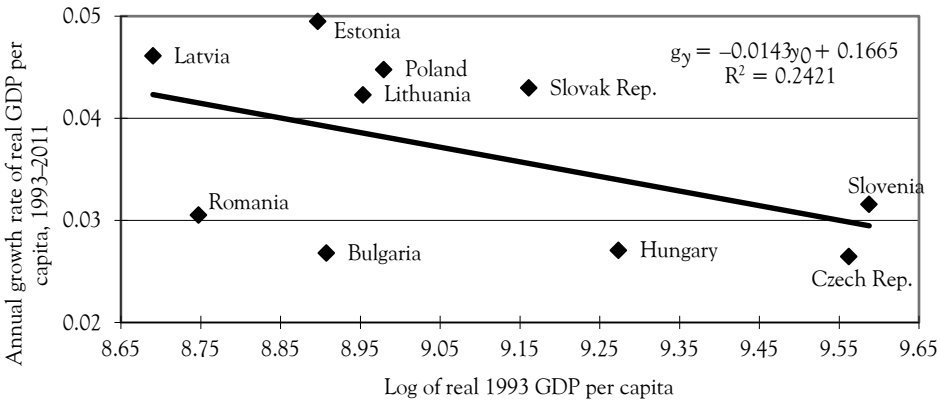
Period	α_0	α_1	t-stat. (α_0)	t-stat. (α_1)	p-value (α_0)	p-value (α_1)	R^2	*β*-convergence	*β*
1993–2011	0.1665	–0.0143	2.05	–1.60	0.074	0.149	0.2421	yes	0.0165
1993–2004	0.1994	–0.0173	1.40	–1.10	0.199	0.302	0.1321	yes	0.0192
2004–2011	0.1868	–0.0166	1.48	–1.26	0.178	0.244	0.1650	yes	0.0177

Source: Own calculations.

As shown in Figure 3, the convergence hypothesis is also supported by Slovenia and the Czech Republic, relatively rich countries with an income level exceeding US$ 11,000 in 1993. Both these countries noted a relatively slow pace of economic growth during 1993–2011: 3.2% and 2.6% per annum respectively. The economic growth paths of Slovenia and the Czech Republic are in line with the real convergence hypothesis because more developed countries should achieve a slower pace of economic growth.

Figure 3

GDP per capita growth rate over the 1993–2011 period and the initial GDP per capita level



Source: Own calculations.

The two newest EU members, Bulgaria and Romania, did not follow the pattern of the catching-up process. Although the 1993 GDP per capita levels of these two countries (US$ 4,927 in Romania and US$ 5,783 in Bulgaria) were comparable to those of the Baltic states, their growth rates during 1993–2011 were low (3.1% in Romania and 2.7% in Bulgaria), comparable to those reported by the Czech Republic and Slovenia, initially the richest economies. Hungary also lies far from the trend line; Hungary's GDP growth rate (2.7%) was similar to those in the wealthiest EU10 countries, while the initial income level was considerably lower (US$ 8,339).

Since convergence was slow, differences in income levels between EU10 countries are still considerable. Romania and Bulgaria are much poorer than Slovenia and the Czech Republic. In 2011, per capita income in Romania and Bulgaria was US$ 12,358 and US$ 13,563 respectively, while Estonia reported US$ 20,182, Slovakia US$ 23,384, the Czech Republic US$ 25,934, and Slovenia, the richest of these countries, US$ 29,179. In Poland, GDP per capita at PPP was US$ 20,137 in 2011.

A detailed analysis of the results leads to the conclusion that Poland's competitiveness during 1993–2011 did not change in relative terms compared with the remaining EU10 countries, assuming that a country's competitiveness is measured by its income level relative to those of other countries in the group (of course, Poland's competitiveness in absolute terms, measured by the absolute per capita income level, undoubtedly improved). In 1993, Poland was in fifth place in terms of GDP per capita; higher income levels were recorded in Slovenia, the Czech Republic, Hungary, and Slovakia. Poland also ranked fifth in 2011 (behind Slovenia, the Czech Republic, Slovakia and Estonia, but ahead of Hungary, Lithuania, Latvia, Bulgaria and Romania). In the per capita income ranking, the permanent leader was Slovenia, followed by the Czech Republic.

Figure 3 shows that economic growth in Poland was quite fast, at 4.5% per annum in the 1993–2011 period on average. Comparing these data with the results obtained in earlier rounds of research that covered a shorter period, we may conclude that Poland came closer to the Baltic states in terms of the pace of economic growth. This largely results from the fact that Poland was the only country in the European Union that went through the crisis with GDP growth, whereas the remaining countries of the region, especially the Baltic states, fell into a deep recession. Hence, Poland's competitive position during the last few years has improved significantly compared with other new EU member countries.

It is worth analyzing in greater detail the chronology of that "positive impact" of the global economic and financial crisis on Poland's relative competitive position, measured by the level of per capita income. In 2006–2007, Poland was in eighth place among EU10 countries in terms of GDP per capita, just ahead of Romania and Bulgaria. In 2008, Poland moved to seventh place, outperforming Latvia, while a year later it climbed to fifth place, ahead of Estonia and Lithuania. In 2010, after outdistancing Hungary, Poland ranked fourth among the EU10 countries in terms of the per capita income level. In 2011, however, Poland was outdone by Estonia and slipped back to fifth place, the same rank as in 1993 and 2000.

The estimated value of coefficient β for the entire period is 1.65%. This indicates a slow income convergence among the EU10 countries. If the average growth patterns observed in 1993–2011 are maintained, the EU10 countries will need more than 40 years to reduce the gap by half to their common hypothetical steady state. The global economic crisis has hampered the speed of the catching-up process in average terms for the whole group. This stems from the fact that the crisis led to a deep recession in the Baltic states, which reported low 1993 income levels and rapid growth rates, especially in 2000–2007, in a trend that stimulated the convergence of the whole group.

A more precise analysis shows that the catching-up process of the EU10 countries was observed both before and after EU enlargement (i.e. in 1993–2004 and 2004–2011). For these two subperiods we obtain a negative slope of the regression line, yet accompanied by moderate statistical properties of the estimated models. The results suggest that the

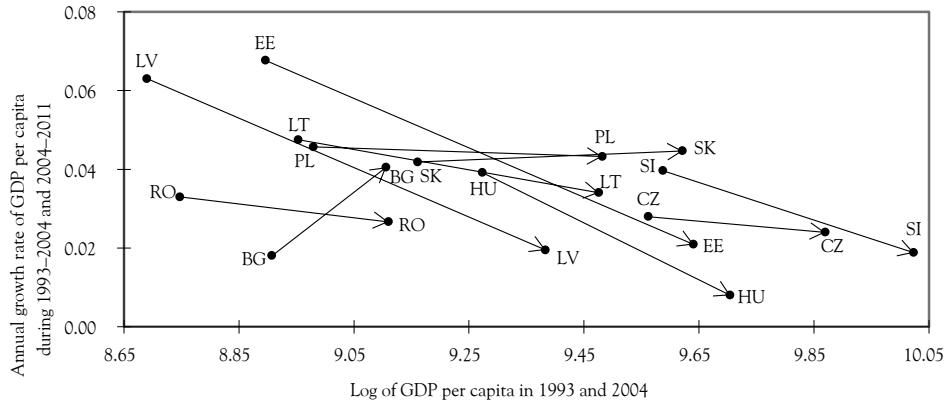
pace of convergence in both subperiods was more or less the same and quite similar to that observed for the whole period. The β-coefficient in 1993–2004 amounted to 1.92% and was only slightly higher than in the analyzed period as a whole (1.65%). In 2004–2011, the β-coefficient was 1.77%, more than in the whole analyzed period.

As we can see, our results do not confirm a clear-cut turning point in the pace of convergence among the EU10 countries at the time of EU enlargement. After EU enlargement, the real economic convergence of the new EU member countries took place at the same pace on average (though it is necessary to keep in mind that the results presented in the tables are aggregated calculations for the whole population; the economic growth paths of the individual countries could differ in the periods before and after EU enlargement). Such results need not be spurious because EU accession could have accelerated convergence towards the income level recorded in Western Europe and not among individual Central and Eastern European countries. The convergence towards the EU15 will be verified in the next section.

Figure 4 provides a dynamic illustration of the catching-up process among the EU10 countries in both analyzed subperiods. In the figure, each country is represented by two points representing the initial income level and the economic growth rate in 1993–2004 and 2004–2011. The arrows in the figure begin at the point representing the earlier period (1993–2004) and are directed to the point representing the later period (2004–2011). The horizontal size of the arrow shows the change in the log GDP per capita level between 1993 and 2004, while the vertical size shows the change of the rate of economic growth between the two analyzed subperiods. An upward direction of the arrow means that a given country grew faster after EU enlargement than in the 1993–2004 period, while a downward direction indicates the opposite trend.

Figure 4

Dynamic illustration of β convergence in the EU10 countries: the 1993–2004 and 2004–2011 periods



Source: Own calculations.

The figure yields several conclusions. First, the two Baltic states, Latvia and Estonia, showed similar changes in growth patterns between the two subperiods. Before EU enlargement, these countries achieved high economic growth rates, the highest in the EU10 group; but in the 2004–2011 period, due to the global crisis, their economic growth rates fell dramatically to one of the lowest levels in the EU10. This is represented by long arrows directed strongly downwards. Second, Bulgaria and Romania, EU members since 2007, displayed different changes in their development paths. In 2004–2011, Bulgaria increased its economic growth rate compared with the 1993–2004 period; in the case of Romania the opposite trend was recorded: its average growth rate after 2004 was lower than in the previous years. Third, almost all EU10 countries (except Bulgaria and, to a smaller extent, Slovakia) recorded a reduction in their economic growth rates in the period after EU enlargement compared with the period before EU enlargement. However, the deceleration of economic growth did not result from EU accession but was caused by the global crisis, which provoked recessions of one or two years in all EU10 countries except Poland, which avoided a recession. The fall in average GDP growth was smaller in Poland than in other countries in the region. Fourth, if we estimate separate trend lines for the initial and final points of the arrows, it will turn out that both of them are downward sloping, which testifies to the existence of convergence in the periods before and after EU enlargement (this is also confirmed by data in Table 11). We have to point out, however, that after 2004 the countries' convergence trends changed, as shown in Figure 4. For example, Bulgaria initially hampered the catching-up process, but later started supporting it, while Latvia turned from a country stimulating convergence into one negatively affecting convergence trends.

σ-convergence

Table 12 and Figure 5 show the results of estimating σ-convergence between the EU10 countries. Table 12 is analogous to Table 11. The last column of Table 12 provides information about the existence of σ-convergence, giving the "yes" answer if the slope of the trend line is negative and statistically significant.

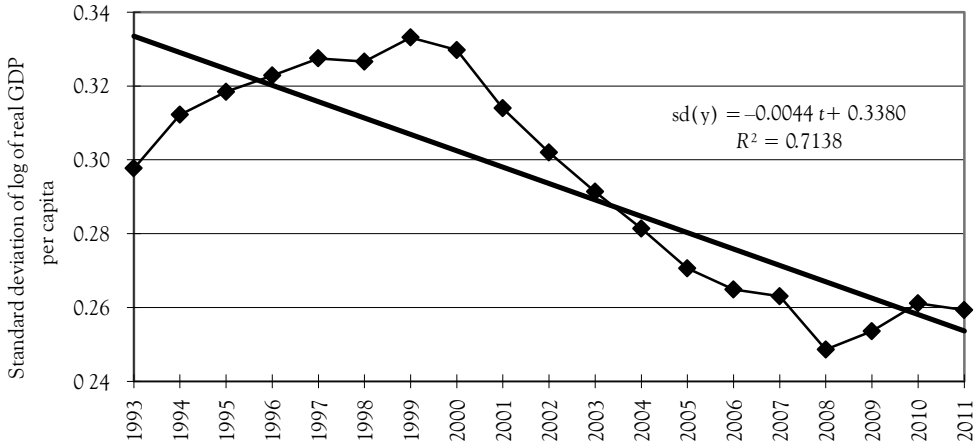
Table 12
Regression results for σ-convergence

Period	α_0	α_1	t-stat. (α_0)	t-stat. (α_1)	p-value (α_0)	p-value (α_1)	R^2	σ-convergence
1993–2011	0.3380	–0.0044	43.49	–6.51	0.000	0.000	0.7138	yes
1993–2004	0.3247	–0.0018	32.90	–1.34	0.000	0.211	0.1517	yes
2004–2011	0.2762	–0.0030	47.11	–2.57	0.000	0.043	0.5234	yes

Source: Own calculations.

The results in Table 12 confirm the existence of σ-convergence in the entire period of 1993–2011 (as well as in both shorter analyzed subperiods, at least in statistical terms). The dynamics of decreasing differences in income levels was not regular over time, which is clearly shown in Figure 5. At the beginning of the analyzed period, during 1993–1999, differences in GDP per capita levels increased. Then, between 2000 and 2008, they showed a consistent and rapid decline. However, in 2009–2010, income differences increased again, at an extremely rapid pace, driven by the global economic and financial crisis. This confirms our previous findings that the economic crisis has negatively affected the process of convergence of the EU10 countries, implying even divergence trends. Admittedly, with the economic recovery in 2011, income differences among EU10 countries narrowed again.

Figure 5
Standard deviation of GDP per capita, 1993–2011



Source: Own calculations.

In general, we conclude that EU enlargement had a positive impact on the equalization of income levels among EU10 countries. Despite the increase in income differences in recent years, we may expect that the next few years will see a further decline in income differences and an accelerated convergence among EU10 countries.

Convergence between EU10 and EU15

β-convergence

Our analysis confirms the existence of β-convergence between the EU10 countries and the EU15. β-convergence has been evidenced for 25 individual countries as well as two regions (the average for the 15 old EU members and the average for the 10 new EU entrants). The results are given in Table 12 and Figure 6.

Table 13 shows that all the member countries of the enlarged EU, except Malta and Cyprus, developed in line with the convergence hypothesis during 1993–2011. Less developed countries in this group recorded faster economic growth than more developed ones.

Figure 6 shows that the average annual growth rate of the 25 current EU members during 1993–2011 was inversely related to their initial GDP per capita level. In the figure, the position of individual countries is marked by dark rhombuses (EU10 countries) and triangles (EU15 members). The estimated trend line for the 25 countries has a slope –0.0163, which implies that the β-coefficient is 1.93%. The value of R^2 is 58%, being negatively affected by the fact that several countries (mainly Luxembourg, Romania, and Bulgaria) diverge considerably from the common experience.

Table 13
Regression results for β-convergence

Period	α_0	α_1	t-stat. (α_0)	t-stat. (α_1)	p-value (α_0)	p-value (α_1)	R^2	β-convergence	β
25 countries of the enlarged EU									
1993–2011	0.1827	–0.0163	6.57	–5.67	0.000	0.000	0.5830	yes	0.0193
1993–2004	0.1850	–0.0158	4.36	–3.61	0.000	0.001	0.3612	yes	0.0173
2004–2011	0.2189	–0.0204	4.39	–4.11	0.000	0.000	0.4236	yes	0.0220
2 regions (EU10 and EU15)									
1993–2011	0.2377	–0.0222	.	.	.	.	1.0000	yes	0.0283
1993–2004	0.2090	–0.0187	.	.	.	.	1.0000	yes	0.0210
2004–2011	0.3628	–0.0348	.	.	.	.	1.0000	yes	0.0399

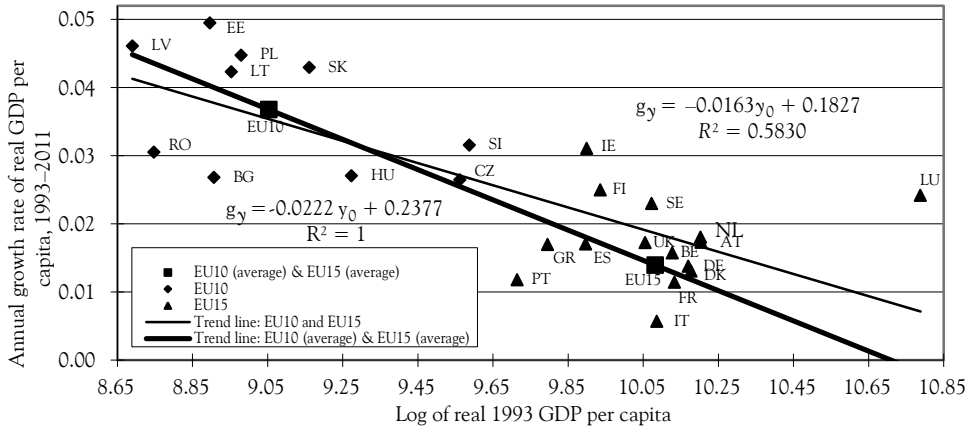
Source: Own calculations.

The convergence is also seen in a regional approach. The big squares in Figure 6 show the initial average GDP per capita level and the average GDP growth rate in the EU10 and the EU15 area. The average growth rate in the EU10 was higher than in the

EU15, while the initial GDP per capita was lower. The trend line for these two regions has a slope –0.0222 with the β-coefficient equal to 2.83%.

Figure 6

GDP per capita growth rate over the 1993–2011 period and the initial GDP per capita level



Source: Own calculations.

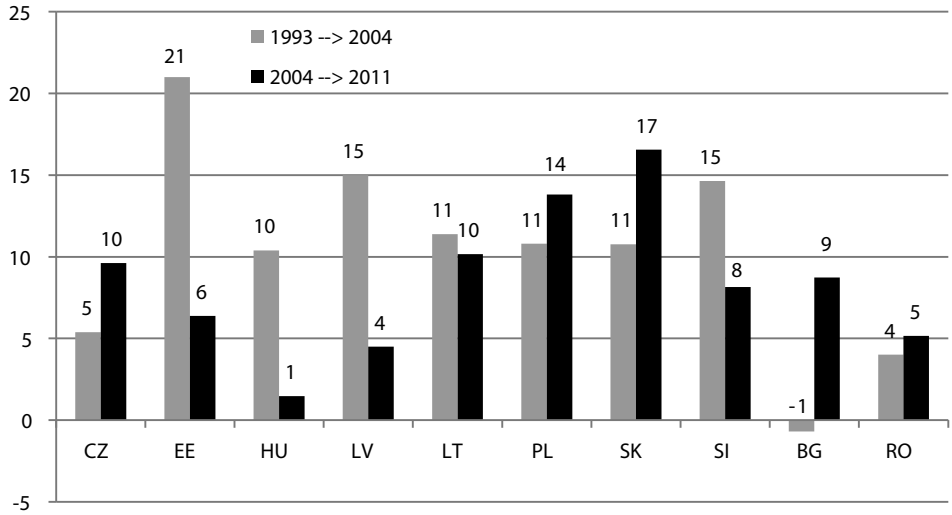
The β catching-up process accelerated after EU enlargement, i.e. in the 2004–2011 period. In 2004–2011, the β coefficient for the 25 countries amounted to 2.20%, while that for the two regions was 3.99%. The corresponding coefficients for the 1993–2004 period were 1.73% and 2.10% respectively. Faster convergence in the Central and Eastern European countries towards Western Europe was partly caused by further trade liberalization, including significant tariff cuts, combined with liberalization (at least partial) on labor markets in a trend that led to labor force migration from regions and countries where wages are low to those with high wages. Moreover, the EU10 countries also adapted better to EU technical standards, which was conducive to the development of international trade. FDI inflows to these countries also peaked in this period.

For the entire period, however, our analysis indicates a relatively slow income convergence between Poland and other new EU entrants on the one hand, and the old EU members on the other. We should not expect a rapid equalization of income levels between the EU10 and EU15. The β coefficient of 1.93% or 2.83% indicates that, if the average economic growth patterns observed in 1993–2011 are maintained, the countries of the enlarged EU will need between 24 and 36 years to decrease by half the distance to their common hypothetical steady state.

The results of β-convergence presented here are the average results for the whole region. The individual EU10 countries displayed a different degree of convergence. Thus,

it is worth taking a look at the nature of the catching-up process of the individual EU10 countries towards the EU15 in the period before and after EU enlargement. This will be done by referring to Figure 7, which shows by how many percentage points the income gap of a given EU10 country to the EU15 area decreased in the 1993–2004 and 2004–2011 periods. For example, the figures for Poland, 11 and 14, mean that Poland increased its per capita income level by 11 percentage points in 1993–2004, while in 2004–2011 Poland's income per capita increased by 14 percentage points (EU15 = 100). The statistics for Poland show that its GDP per capita at PPP stood at 33% of the EU15 average in 1993, followed by 44% in 2004, and 58% in 2011; the differences between these figures are 11 and 14 respectively and are expressed in percentage points. The data in Figure 7 were calculated by the author based on IMF figures and differ slightly from Eurostat estimates.

Figure 7
The reduction in individual EU10 countries' income gap toward the EU15 in the period before and after EU enlargement[a]



[a] The changes are expressed in percentage points; in each year the GDP per capita at PPP for the EU15 is taken as a base equal to 100.

Source: Own calculations.

The results in Figure 7, where individual EU10 countries are treated separately, indicate that the catching-up process accelerated after EU enlargement in only half the countries. In all the Baltic states as well as Slovenia and Hungary, on the other hand, the income gap toward the EU15 narrowed faster in the period before EU enlargement (although it is necessary to take into account that this period is longer). Even if we exclude from this group Lithuania, for which the differences between both

periods are not large, four countries evidently converged faster before EU enlargement. For example, Estonia, Latvia and Hungary in 1993–2004 decreased their income gap toward Western Europe by 21, 15 and 10 percentage points respectively (taking the average per capita income level in the EU15 as a base equal to 100), while in 2004–2011 these figures were only 6, 4 and 1 points respectively. On the other hand, in Bulgaria, Slovakia, the Czech Republic, Poland and Romania, the reduction in the income gap toward Western Europe was more rapid after EU enlargement (although one should remember that Bulgaria and Romania joined the EU in 2007, so their 2004–2011 convergence also includes a part of the pre-accession period). Based on this analysis we may conclude that the paths differed along which individual EU10 countries reduced their income gaps. Some countries took advantage of the predominant part of the benefits from European integration before EU enlargement, while others benefited in terms of income level equalization mostly after EU accession.

The results of our analysis indicate that, in the short run, one cannot expect any major changes between Poland and other EU10 countries, on the one hand, and the old EU members, on the other, as regards competitiveness measured by real GDP per capita. Moreover, the economic performance of the EU10 countries may deteriorate unless the implications of the crisis are overcome quickly and the fiscal stance improves soon. The period of time it takes to return to the pre-crisis economic growth path will be a key determinant of the future competitive position of EU10 countries compared with the EU15 area.

σ-convergence

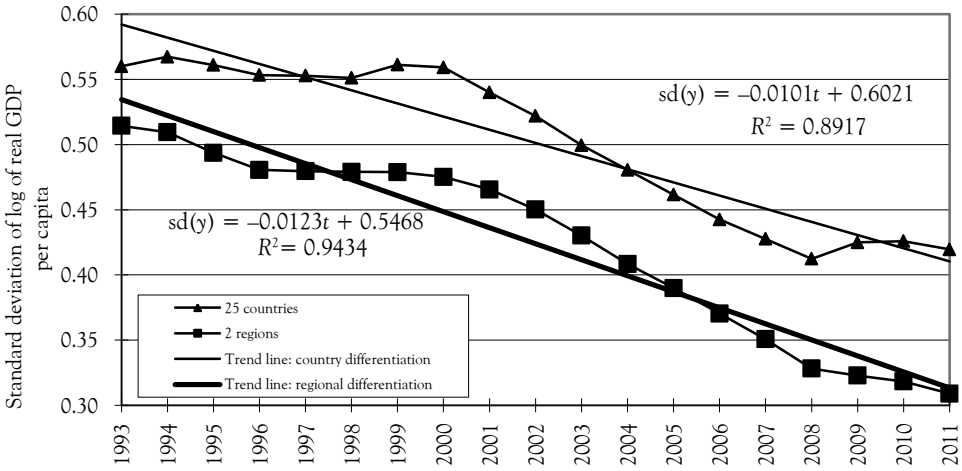
Poland and other EU10 countries also display σ-convergence toward the EU15. The results are given in Table 14 and Figure 8.

Table 14
Regression results for σ-convergence

Period	α_0	α_1	t-stat. (α_0)	t-stat. (α_1)	p-value (α_0)	p-value (α_1)	R^2	σ-convergence
25 countries of the enlarged EU								
1993–2011	0.6021	–0.0101	61.91	–11.83	0.000	0.000	0.8917	yes
1993–2004	0.5832	–0.0063	58.01	–4.60	0.000	0.001	0.6790	yes
2004–2011	0.4730	–0.0080	44.82	–3.84	0.000	0.009	0.7105	yes
2 regions (EU10 and EU15)								
1993–2011	0.5468	–0.0123	65.73	–16.84	0.000	0.000	0.9434	yes
1993–2004	0.5238	–0.0079	77.97	–8.71	0.000	0.000	0.8834	yes
2004–2011	0.4151	–0.0145	60.08	–10.62	0.000	0.000	0.9495	yes

Source: Own calculations.

Figure 8
Standard deviation of GDP per capita, 1993–2011



Source: Own calculations.

Table 14 shows that income differences diminished among the 25 current EU members and between the EU10 region and the EU15 area in the 1993–2011 period. For this period, the slope of the estimated regression equations is negative (–0.0101 for the 25 countries and –0.0123 for the two regions), accompanied by high *R*-squares (89% and 94% respectively).

Figure 8 shows the standard deviation of log GDP per capita levels. As we can see, income differences between the EU10 countries and the old EU members generally displayed a downward trend. Income differences decreased the most evidently and consistently in the second half of the analyzed period, which means in 2000–2008. In 2009–2010, due to the economic crisis and decelerated economic growth in many rapidly developing countries, income differences among the 25 countries of the analyzed group increased, although the average data for the two regions do not support this evidence.

Closing the income gap—a forecast

In the preceding sections, the issue of convergence was analyzed within the framework of growth models. This section offers a simulative forecast of the catching-up process between the countries of Central and Eastern Europe (EU10) and the countries of Western Europe (EU15). We shall calculate how many years must pass (beginning in 2010) before individual EU10 countries, while maintaining their advantage over Western Europe in the rate of economic growth, can reach the average per capita GDP level recorded in the EU15.

The calculations will be made using the following formula:

$$X\left(1+g\right)^{t}=100\left(1+h\right)^{t}, \tag{4}$$

where: X – initial level of GDP per capita in a given EU10 country in 2010 (measured against the EU15 average taken as 100), g – the assumed average annual growth rate of GDP per capita in the given EU10 country, h – the assumed average annual growth rate of GDP per capita in the EU15 area, t – number of years that the given EU10 country will take to attain the average level of GDP per capita in the EU15 area. The aim of our calculation is to determine the value of variable t, according to the formula:

$$t=\frac{\ln\left(X\right)-\ln\left(100\right)}{\ln\left(1+h\right)-\ln\left(1+g\right)}. \tag{5}$$

It should be noted that, according to the convergence algorithm, the speed of the catching-up process and the length of the period required to equalize the income levels depends on the growth rates of both groups of countries, yet the relationship is not directly proportional, but is determined by formula (5). If the future growth rate of both groups, the EU10 and EU15, decreased by half compared with the past, then the period necessary for income equalization would lengthen significantly. In order to accelerate the catching-up process, it is not sufficient to speed up economic growth in the less developed countries (unless the more developed countries grow at their previous rate). One has to increase the relationship between the growth rates of both groups.

The reference point in our forecast is the relative level of GDP per capita in 2010. The reason we chose 2010 rather than 2011 as the starting point for our analysis is simple: 2010 is the last year for which reliable data on PPS GDP per capita is available at this writing. The period necessary to bridge the income gap depends on the assumptions made about the future growth of per capita GDP, i.e., on the assumed growth rate of total GDP and the expected change in population numbers.

Our forecast (or, more precisely, simulation) will be made according to two hypothetical scenarios. The first scenario assumes that in the future, individual EU10 countries and the EU15 group as a whole will maintain the average yearly growth rates of per capita GDP noted in the 1994-2010 period. For most EU10 countries, and particularly for Poland, this is an extremely optimistic scenario from the point of view of the period needed to close the income gap between the two groups of countries.

The second scenario assumes that in 2011–2013 both EU10 and EU15 countries will grow in line with a forecast of GDP growth rates by the European Commission (Eurostat, 2012). The scenario also assumes that from 2015 onward EU10, and EU15 countries will show GDP growth rates commensurate with the IMF's forecast for

2016 (IMF, 2011), with one minor correction,[13] while taking into account expected changes in population numbers mentioned in Eurostat demographic forecasts until 2060 (Eurostat, 2012).[14] For one missing year (2014), the GDP growth rates have been interpolated. The assumed growth rates of total GDP were subsequently transformed into per capita terms using demographic projections. This scenario seems to be more realistic, though the assumptions about the future GDP growth rates in EU10 countries are also relatively optimistic.[15]

Table 15
Closing the income gap-scenario 1

Country	GDP per capita growth rate (%)	GDP per capita in 2010 (EU15 = 100)		Number of years necessary to reach the average level of GDP per capita in the EU15	
		PPS	CER	PPS	CER
Bulgaria	2.6	40	17	78	151
Czech Republic	2.7	73	51	25	53
Estonia	4.9	58	38	16	29
Hungary	2.9	59	35	36	71
Latvia	4.6	46	29	25	40
Lithuania	4.0	52	30	26	48
Poland	**4.5**	**57**	**33**	**19**	**37**
Romania	3.3	42	21	47	84
Slovakia	4.3	67	43	14	30
Slovenia	3.3	77	62	14	26
EU15	1.4	100	100	–	–

Source: Author's calculation based on data from the Eurostat database (ec.europa.eu/eurostat), Feb. 3, 2012.

[13] For Slovenia, we assume a target GDP growth rate of 3.0% after 2015 instead of the 2.0% projected by the IMF; in our opinion, there are no reasons that Slovenia should slide into such a slow growth path, especially if compared with future growth rates of about 4% assumed for Slovakia and Estonia.

[14] Due to a lack of comparable demographic data, we have assumed no further change in population numbers after 2060. a long-term demographic forecast by the UN Department of Economic and Social Affairs (UN, 2007) gives a projection until 2300, but with 50-year spans.

[15] The reader should be warned that both variants of our forecast differ from those offered in last year's edition of the report (Weresa (ed.), 2011) in at least three respects: (a) the GDP per capita levels in the starting year (2010) have been corrected using the latest national accounts statistics; (b) the assumed future GDP growth rates in scenario 2 differ from those assumed last year; (c) the demographic forecast used in scenario 2 differs from that used previously. This is why the numerical results of the forecast are different, though the difference in most cases is insignificant.

Table 16
Closing the income gap-scenario 2

Country	GDP growth rate		GDP per capita in 2010 (EU15 = 100)		Number of years necessary to reach the average level of GDP per capita in the EU15	
	2011–2014	2015–	PPS	OER	PPS	OER
Bulgaria	3.0	4.0	40	17	32	66
Czech Republic	2.0	3.2	73	51	23	47
Estonia	4.6	3.8	58	38	21	39
Hungary	1.8	3.2	59	35	32	66
Latvia	3.8	4.0	46	29	27	43
Lithuania	4.2	3.8	52	30	24	47
Poland	**3.2**	**3.6**	**57**	**33**	**27**	**51**
Romania	3.0	4.1	42	21	33	59
Slovakia	2.9	4.2	67	43	18	35
Slovenia	1.5	3.0	77	62	25	42
EU15	1.3	1.7	100	100	–	–

Source: Author's calculation based on data from the Eurostat database (ec.europa.eu/eurostat) and the IMF World Economic Outlook Database (www.imf.org), Feb. 3, 2012.

In our calculations, we take no account of the effect of future changes in prices and exchange rates on the catching-up process. All the calculations have been made at 2009 prices and exchange rates. We also pass over the question of the adequacy of the GDP per capita estimates given by Eurostat for 2010, taken as a starting point. In this part of the analysis (unlike in the preceding sections where β- and σ-convergence was verified), the average annual growth rates of GDP refer to the growth of real GDP measured in national currencies, not to the growth of GDP per capita at PPS.

Our calculations have been made in two versions as regards the estimation of the initial income gap. In the first version, the income gap is measured by the relative level of per capita GDP calculated at the purchasing power standard (PPS). In the second version, the income gap is measured by the relative level of per capita GDP calculated at current exchange rates (CER). Although such calculations are usually made with respect to per capita income calculated at PPS, in this analysis we will consider both alternative ways of measuring the income gap (at PPS and CER) because it is still uncertain if the data on GDP per capita at PPS for the EU10 countries are adequate and not overestimated.

The assumptions made in this analysis and the results of the calculations for the two forecasting variants are given in Table 15 and Table 16. The first column in both tables shows the assumed growth rates of total GDP or per capita GDP; the next two columns give the initial levels of GDP per capita at PPS and CER relative to the average level in the EU15; and the last two columns indicate the number of years necessary to reach the average level of GDP per capita in the EU15 if the initial GDP per capita level is measured at PPS or at CER.

In 2010, GDP per capita in all the EU10 countries was much lower than the EU15 average. The lowest level of GDP per capita was noted in Bulgaria (40% of the EU15 average at PPS and 17% at CER) and Romania (42% and 21% respectively), while the highest level was recorded in Slovenia (77% at PPS and 62% at CER) and in the Czech Republic (73% and 51%). In Poland, GDP per capita in 2010 accounted for 57% of the EU15 average when calculated at PPS and 33% when calculated at CER. For all the EU10 countries the per capita GDP values calculated at PPS are much higher than those converted at CER.

Scenario 1 is a simple extrapolation of the past trend of GDP per capita, assuming that the EU10 countries and the EU15 group will maintain the average yearly growth rates of GDP per capita noted in the 1994–2010 period. Under this assumption, individual EU10 countries will take anywhere from 14 to 78 years to reach the average GDP per capita level recorded in the EU15 group if the initial income gap is calculated at PPS, and 26 to 151 years if it is calculated at CER.

Slovenia has the best position in the catching-up process; it needs 14 years at PPS or 26 years at CER to reach the average income level in the EU15. Under the same assumptions, Slovakia would take 14 and 30 years respectively to catch up with the EU15, and Estonia could do that in 16 and 29 years. Poland would need 19 years if the initial income gap is calculated at PPS or 37 years if it is calculated at CER. For the Czech Republic, the convergence period is 25 and 53 years respectively, and for Hungary it is 36 and 71 years. For Latvia and Lithuania, the convergence periods are 25 and 40, and 26 and 48 years, respectively. Romania and Bulgaria are in the worst position. Assuming that it grows at the same rate as in the 1994–2010 period, Romania would take 47 years to achieve the average EU15 income level at PPS or 84 years at CER. Bulgaria would take 78 and 151 years respectively.

Our calculations in this scenario are not fully comparable with the results of the extrapolation based on 1997–2008 growth rates (Rapacki and Próchniak, 2009), though the catching-up periods for Poland, Czech Republic, Slovakia, Hungary, and Slovenia are similar.

Scenario 2 assumes the same estimation of the initial income gap in 2010, but the calculation of the catching-up period is based on the assumption that in the first three years all the EU10 countries and the EU15 group as a whole will follow the growth pattern projected by the European Commission, and that from 2015 onward, they will develop more or less in accordance with the IMF's GDP growth forecast for

2016. The assumed GDP growth rates have been transformed into per capita terms using the demographic forecasts. As regards the scope and complexity of calculations, this is undoubtedly a far more sophisticated forecasting variant. It may also be more realistic because it is no longer a simple extrapolation of past trends, but an analytical calculation based on certain explicit assumptions as to future GDP growth, with an allowance made for long-term changes in population numbers. However, the future GDP growth rates assumed in this scenario, for both the EU10 and EU15, are probably in the upper conceivable range.[16] Therefore, this scenario is also relatively optimistic.

Under the second scenario, the time required for some of the EU10 countries to reach the average EU15 income level turns to be longer than in the first scenario, while for some other countries it appears to be shorter. The convergence period becomes much shorter for Bulgaria (32 years at PPS and 66 years at CER) and Romania (33 or 59 years), but longer for Estonia (21 or 39 years), Slovakia (18 or 35 years), and Slovenia (25 or 42 years). For Poland the catching-up period is 27 years if the calculation is based on PPS, and 51 years if it is based on CER. For the remaining countries, the period needed to close the income gap does not differ much from that estimated in the first scenario. For Hungary, this period is 32 or 66 years, and for Latvia and Lithuania it is 25 or 40 years and 26 or 48 years respectively.

The above estimates of the catching-up period in terms of per capita GDP measured at PPS should be treated as minimal because they have been made with the assumption that current price differentials between the EU10 and EU15 will not change. In fact, due to the gradual equalization of price levels within the EU27 and changing exchange rates (which are largely unpredictable), in subsequent years it may turn out that the actual purchasing power of income earned in any of the EU10 countries will be lower than suggested by the current income gap taken as the basis for our calculations, especially compared with the average real income in the EU15.

We have also analyzed some other scenarios of the convergence process, including an alternative extrapolation variant that assumes future development will follow the per capita GDP growth pattern observed in the 2000–2010 period (Matkowski, 2010a). In this period, Poland noted a lower average GDP per capita growth rate than in the longer period starting in 1994, but the EU15 reference group also developed at a slower rate. As a result, the time Poland needs to catch up with the EU15 group in terms of GDP per capita remains basically the same as in the extrapolative variant discussed above. We also analyzed some other variants of the analytical forecast, with different assumptions as to future growth rates in EU10 countries and in the EU15. In all the analyzed forecast variants, the period necessary for Poland to reach the average EU15 income level calculated at PPS ranges from 20 to 30 years. One

[16] Although the future GDP growth rates based on the IMF medium-term projection are generally lower than those assumed in our forecast last year, they nevertheless translate into quite high per-capita GDP growth rates after allowing for the expected decline in population numbers.

can therefore conclude that, under all realistic assumptions about future growth, the period necessary for Poland to catch up with the EU15 in the PPS income level is at least 20 years (Matkowski, 2010b).

Thus, expectations that Poland could take no more than 10 years to catch up with Western Europe in terms of the income level are entirely unrealistic. This could only happen if the Polish economy began to grow at a rate of 5% per year while EU15 countries would stop growing altogether. Such a scenario should be discarded because such a long stagnation in Western Europe is improbable, and also because the Polish economy, which is highly dependent on exports to Western markets and on the inflow of foreign investment, would be unable to grow under such conditions. Also impossible is another highly optimistic scenario under which the Polish economy would begin to grow at a rate of 7–8% per year once the necessary reforms are completed. Under this scenario, Poland could catch up with the EU15 within 10 years, provided that EU15 economies decelerated to just 1% a year. It is improbable that the Polish economy could suddenly muster such rapid growth and maintain it for a longer time if Western European economies slowed down so dramatically.

Overall, one must be prepared for a situation in which Poland will take longer than expected to close the income gap separating it from Western Europe.

Conclusions

1. There has been a weak income convergence among the 10 new EU member states. Generally, the GDP growth rates in the 1993–2011 period were negatively correlated with the initial GDP per capita level. Income differences between individual countries diminished, especially from 2000 to 2008, but in 2009 they increased again. Poland's relative competitiveness in the EU10 group, measured by real per capita income levels, improved during the last few years.
2. Poland, similar to other new EU countries, displays income convergence toward the old EU members. EU10 countries grew faster than old EU members but their initial GDP per capita level was much lower. As a result, the income gap between Poland as well as other new EU countries and the EU15 generally decreased, although it remains considerable.
3. The global economic and financial crisis undermined the process of convergence among the EU10 countries and toward the EU15, leading to some divergence trends. Therefore, the competitiveness gaps in the living standards of the societies involved cannot be reduced in the short term. An acceleration in the convergence process will depend on how soon EU10 countries return to the economic growth path before the crisis.
4. If the Central and Eastern European countries maintain their advantage in the rate of economic growth over Western Europe, they will gradually approach the

Western European income level. However, under realistic assumptions about future growth, most countries in the region will take a long time to catch up with the EU15 in terms of income levels. In the case of Poland, the probable convergence period is at least 20 years if the existing income gap is measured at the purchasing power standard.

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1.3. Income Inequality and Poverty in Poland

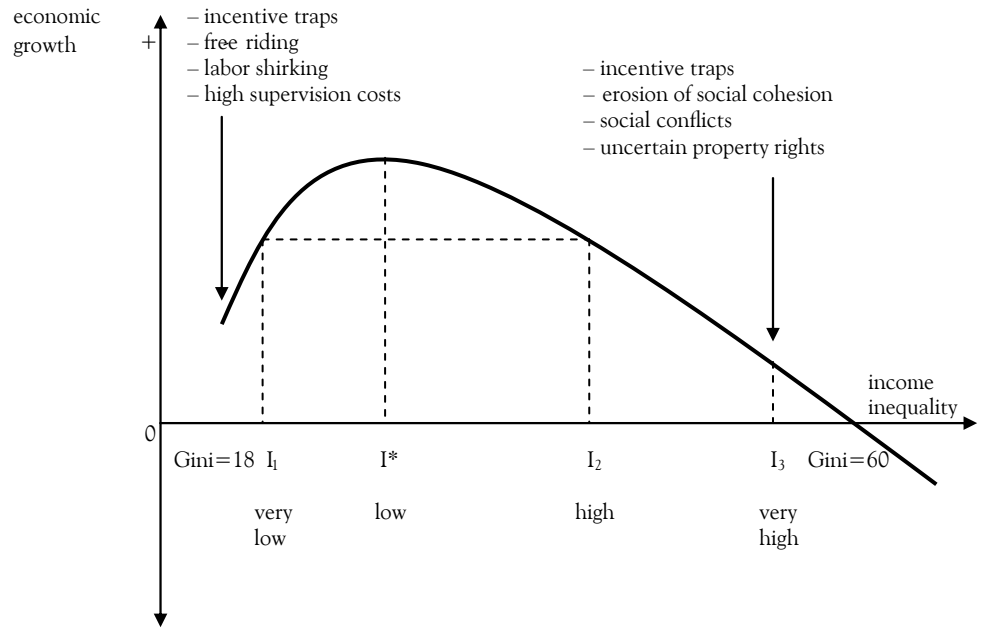
Patrycja Graca-Gelert

This subchapter outlines the main income inequality and poverty trends in Poland compared with other European Union countries. This edition of the report, which focuses on education as a factor influencing competitiveness, contains a general analysis of income inequality and poverty in the context of education.

Research publications cite education as one of the most fundamental income inequality determinants. From the point of view of competitiveness, a higher level of education boosts human capital growth, economic growth and the competitiveness of an economy. On the other hand, income inequality is one of the factors determining economic and social welfare, which results from 1) a society's perception and acceptance of income inequality and 2) the relationship between income inequality

and economic growth. As numerous studies show, both high income inequality and an equal income distribution may have a negative impact on an economy (Figure 9), which means that income inequality affects a country's competitiveness.

Figure 9
The nonlinear relationship between income inequality and economic growth



Source: Addison, Cornia, 2001, Figure 2, p. 11.

Poverty and income inequality are complex issues. We will only mention the main issues related to income inequality and poverty definitions and its measurement in this subchapter.

First, we refer to disposable income throughout the subchapter unless specified otherwise. Second, where income refers to equivalent income, the modified OECD scale is used. Third, as regards income inequality, three basic inequality measures are used in this survey: the Gini coefficient, the S80/S20 income quintile share ratio, and other kinds of quintile share ratios. The Gini coefficient is one of the most popular income inequality measures. It ranges from 0 (or 0%, for perfect equity) to 1 (or 100%, for extreme inequality). The S80/S20 income quintile share ratio is the ratio of total income received by the 20% of the population with the highest income to that received by the 20% of the population with the lowest income. Quintile share ratios show how many times the average income of one quintile group is higher than the average

income of another quintile group. Fourth, in this survey a relative approach to poverty has been adopted, which means that someone is considered poor if his income is below some relative poverty threshold. The poverty line is defined as 60% of the median of the equivalent disposable income (after social transfers), unless specified otherwise.

Due to the procedure for collecting and processing data, the findings of household surveys are published with a delay. For this reason, a detailed analysis of poverty and income inequality in 2012 or even 2011 is not possible; data is only available for 2010.

Education and income inequality

As shown by numerous studies on this issue, education may influence income inequality in different ways, which means that education may lead to a decrease or increase in income inequality. Thus the related changes in education and income inequality may have different effects on the competitiveness of an economy.

Education as a determinant of income inequality can be defined in various ways. Education usually means the average level of education, but other popular meanings are: the relative size of educational groups, secondary school enrollment, government expenditure on education as a percentage of GDP, the expected duration of women's education, the average number of years of education, or various measures of education inequality. It turns out that the relationship between education and income inequality depends on the variable chosen; in general, studies on the impact of education on income inequality do not provide an unambiguous answer about the nature of this relationship.

The effects of education on income distribution can be analyzed through a static or dynamic approach. The first approach is based on estimating how education and/or its distribution influences earnings and income inequality at a given moment and consequently the level of the education premium.[17] The dynamic approach is related to the question of how income inequality is affected by changes in education, the level of education, the schooling system and similar variables in the short and long run. Research on this topic yields diverse, and often contradictory, results. Most of the studies in this field indicate that the relationship between education defined as the average number of years of schooling and income inequality is nonlinear, or concave.

There are many explanations of the nonlinear—concave—relationship between education and income inequality, but the most popular one involves a reference to the Kuznets theory on the concave relationship between the level of economic development—or the average level of income—and income inequality. In the early phase of educational expansion, the growth in the number of educated workers is slower than the growth in demand for such workers, which results in an increase of

[17] A general static approach has been applied in the consecutive parts of this subchapter.

earnings and income inequality. Next, along with the increase in the proportion of educated workers, the ratio of the earnings of educated workers to the earnings of non-educated workers decreases, leading to a reduction in earnings and income inequality. In the literature (Knight, Sabot, 1983) the first effect is called the composition effect and the second the wage compression effect.

The impact of education on income inequality is usually more complex, and also depends on other variables. For example, assuming that total income is proportional to labor income, improved access to education decreases income inequality because of the rise in income in low-income groups. In fact, income inequality may increase despite the growing share of educated workers if it results from an exogenous rise in the education premium caused by an increase in the demand for educated workers related to technological change (*skill-specific technological change* or *skill-biased technological change*) (Cornia, Kiiski, 2001; Checchi, 2001).

Education inequality plays an important role in determining how education influences income inequality. If the increase in the level of education is accompanied by its equal distribution then, *ceteris paribus*, a reduction in income inequality is highly probable. The opposite effects of educational expansion should be expected if the distribution of education is very unequal. High education inequality may have numerous causes. Educational choices depend to a great extent on the disposable income of individuals or households, the public provision of schools, the prohibition of child labor and the structure of employment on the labor market[18] (Checchi, 2001).

The way in which education influences income inequality may also depend on where educational expansion occurs. An expansion of secondary education will promote a reduction in income inequality, while boosting tertiary education along with a decrease in financing primary and secondary schooling, will have a disequalizing impact on income distribution (Cornia, Kiiski, 2001). An important factor determining the impact of education on income distribution is whether the educational expansion concerns public or private schooling. Devoting more resources to public education will usually lead to a reduction in income inequality, while increased financing of private education is likely to make the distribution more unequal since in such a situation, only more affluent citizens are able to invest in education. However, studies indicate that an increase in government expenditure on education, even public education, may lower income inequality only if the distribution of income is sufficiently equal and the average income sufficiently high (Sylwester, 2000). High income inequality may prevent the poor from investing in education; moreover, the poor are taxed for government revenue.

[18] In countries where child labor is common, educational choices are less popular than in countries with regulations prohibiting child labor. Similarly, in rural economies the average level of education and schooling among children is lower than in more developed countries.

Causality between education and income inequality can work in opposite directions. As indicated earlier, high income inequality may prevent the poor from investing in education or improving their qualifications. In such a situation, an unequal distribution of income leads to an unequal distribution of education, a low average level of education and human capital and, in consequence, slow economic growth and development. These effects may strengthen if income inequality tends to fix in an intertemporal dimension.

Similarly, it is not clear if high income inequality causes greater government expenditures on education or an increase in these expenditures leads to a more unequal income distribution. Research indicates that countries with higher education financing, measured as a percentage of GDP, benefit from lower income inequality in subsequent years, although these effects are slow in coming (Sylwester, 2000).

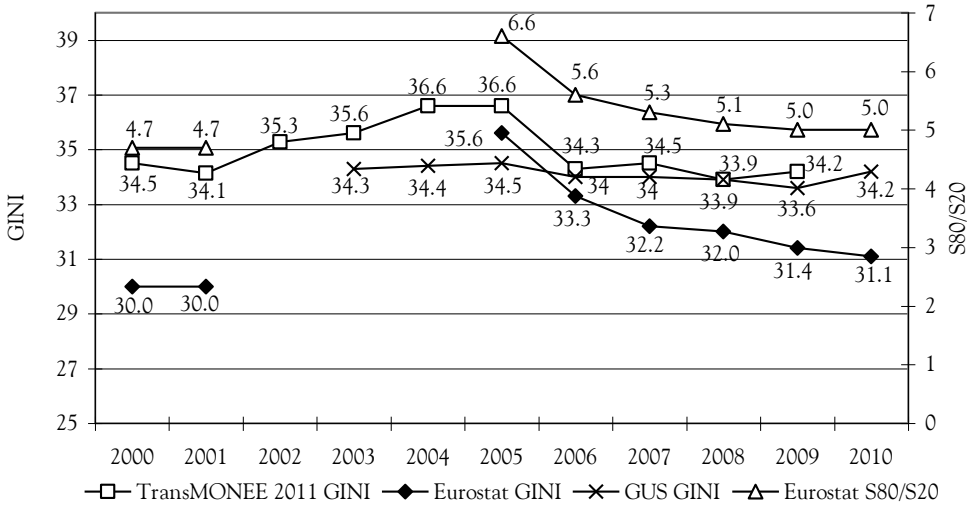
Income inequality and poverty trends in Poland

In general, in the first decade of the 21st century, income inequality increased continually in Poland until 2005, only to decrease later (Figure 10 and Table 17). However, a more detailed analysis shows that the conclusions about the trends in the distribution of income are not clear-cut. GUS and TransMONEE data indicate that income inequality increased in 2009–2010, a trend not revealed by Eurostat data. The reason for such a divergence of results is the application of different income definitions and methods of data adjustment. In any event, income inequality did not change significantly at the end of the first decade of the 21st century.

Figure 10 and Table 17 illustrate income inequality measured by popular inequality measures—the Gini coefficient, the S80/S20 income quintile share ratio and other kinds of quintile share ratios. The Gini coefficient measures changes in the whole income distribution, whereas the quintile share ratios make it possible to evaluate changes between the lowest, medium and highest income groups. The data in Table 17 indicate that in 2010, income inequality between the medium and the lowest quintiles decreased; on the other hand, it rose between the high and medium income groups compared with 2009.

Some changes have also occurred in intragroup income inequality in recent years (Table 18). In the 2003–2010 period, the most spectacular changes were observed among farmers, where the Gini coefficient rose from 47.3% to 53.3%. However, it has to be noted that at the end of the 21st century, income inequality decreased consistently in this group, which showed the most unequal income distribution of all socioeconomic groups. Less significant changes in income inequality were observed among pensioners, the group with the most equal income distribution. Urban and rural income inequality levels were almost the same, although income inequality in urban areas was slightly higher in recent years.

Figure 10
Income[a] inequality[b] in Poland, 2000–2010



Note: [a] Disposable income in the case of TransMONEE and Eurostat data; available income for GUS data. Per capita income in the case of TransMONEE and GUS data; equivalent income for Eurostat data. [b] The graph shows two inequality measures, the Gini coefficient and the S80/S20 ratio.

Source: Eurostat; TransMONEE 2011 Database, UNICEF Regional Office for CEE/CIS, Geneva; GUS, 2011, Table 5, p. 271.

Table 17
Average disposable monthly per capita income (in zlotys) in Poland by quintile groups, 2006–2010

Measure	2006	2007	2008	2009	2010
Total	802.43	894.53	1006.57	1071.67	1147.18
I quintile	268.07	308.39	343.15	359.95	398.95
II quintile	490.16	552.41	631.11	671.72	710.69
III quintile	674.65	749.40	853.36	911.55	964.34
IV quintile	915.88	1004.19	1140.19	1224.31	1293.95
V quintile	1667.26	1862.22	2068.89	2196.16	2373.77
V quintile / I quintile	6.22	6.04	6.03	6.10	5.95
III quintile / I quintile	2.52	2.43	2.49	2.53	2.42
V quintile / III quintile	2.47	2.48	2.42	2.41	2.46

Source: Calculated from GUS, (2007–2011), *Budżety Gospodarstw Domowych*.

Table 18
Income inequality[a] in individual socioeconomic groups in Poland, 2003–2010

Households	2003	2004	2005	2006	2007	2008	2009	2010
Employees	36.4	37.1	37.1	35.8	35.2	34.0	34.3	34.7
Farmers	47.3	49.1	49.7	49.6	54.8	57.2	53.6	53.3
Self-employed	40.8	40.3	39.7	41.5	41.3	38.7	37.8	37.5
Retirees	25.2	24.3	24.1	24.5	23.6	24.2	24.1	24.9
Pensioners	28.2	29.0	28.1	28.3	28.9	29.4	28.7	29.1
Urban	33.0	33.1	33.3	32.9	32.5	31.5	31.2	32.3
Rural	32.6	33.0	33.6	33.1	34.1	34.3	33.8	33.9

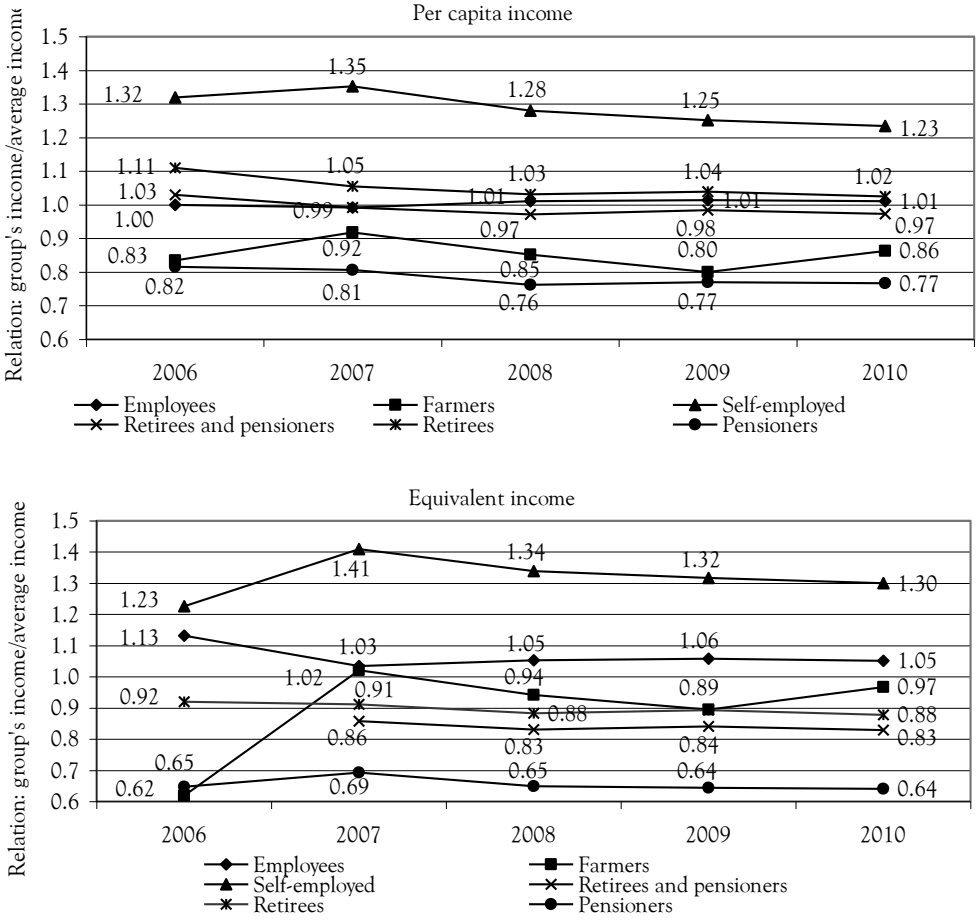
Note: [a] Gini coefficient, available per capita income.

Source: GUS, 2011, Table 5, p. 271.

Important conclusions about income inequality between socioeconomic groups can be drawn from an analysis of trends in their relative income positions (Figure 11). If we take into consideration the average per capita income, it turns out that pensioners were the group with the lowest income position between 2006 and 2010; the self-employed, on the other hand, were the group with the highest income position during this period. The second-highest average per capita income was recorded among retirees, while the second-lowest was among farmers. However, if we take into account the average equivalent income, the situation changes significantly, with the exception of the positions at the extreme ends of the scale. It turns out that the relative income position of farmers is somewhat better and that it improved considerably in comparison with 2006. Unlike in the case of per capita income, retirees' income situation was worse than the income position of employees. The comparison of equivalent incomes provides better information about income inequality because, in contrast to per capita income, equivalent income takes into account the economies of scale effect resulting from the characteristics of households, which in this case concerns the number of household members and the age structure.

Figure 11

Average monthly disposable income in individual socioeconomic groups in Poland, 2006–2010—main trends

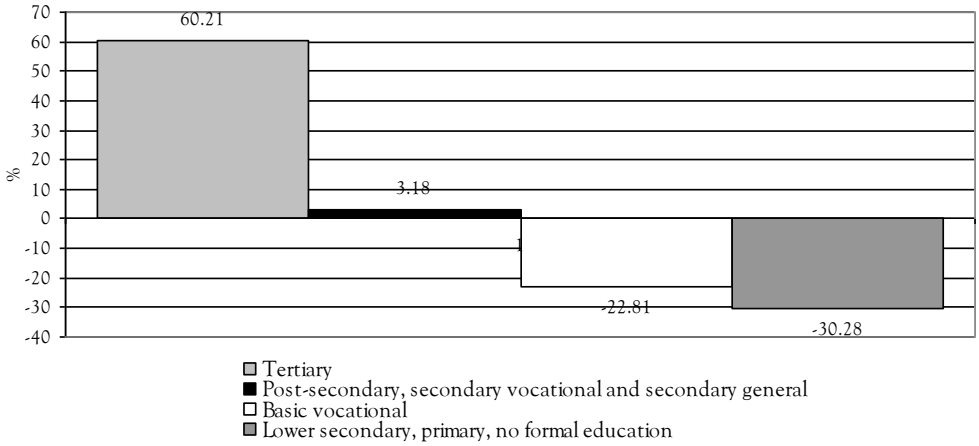


Source: Calculated from GUS, (2007–2011), *Budżety Gospodarstw Domowych*.

Income in Poland depends significantly on the education level of the head of the household. As illustrated by the data in Figure 12, the average income of households headed by a person with a tertiary education was more than 60% higher than the average income of all households in 2010. The income of households headed by a person with an education not exceeding the university level was around the average in total. In households with basic vocational education as well as households with lower secondary, primary or no education the average income was more than 22% and 30% lower respectively than the average income for all households.

Figure 12

Average disposable income in individual education groups and overall average disposable income in Poland, 2010



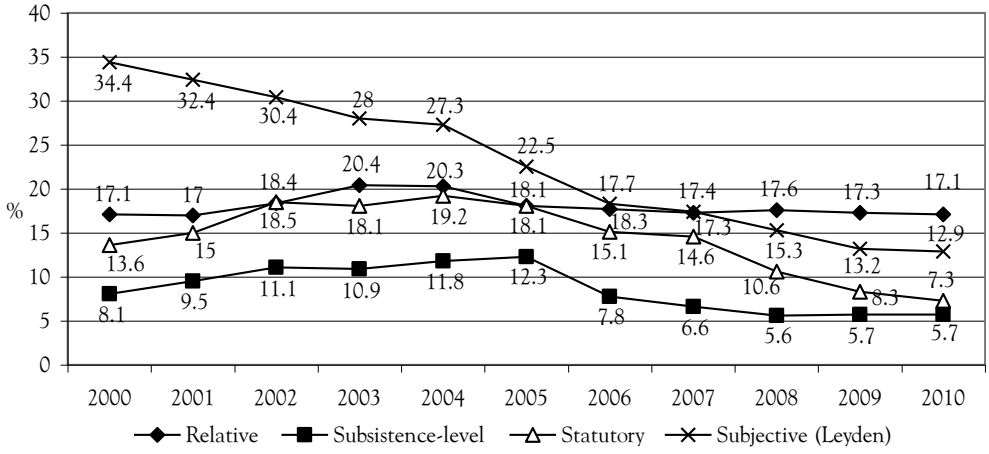
Source: Calculated from GUS, 2011a, Table 22, p. 92.

Poverty, like income inequality, can be expressed by different measures. Poland's Central Statistical Office regularly releases data on poverty considering four poverty lines: the relative poverty line, the statutory poverty threshold, the Leyden poverty line, and the subsistence-level poverty threshold. The relative poverty line is defined as 50% of the average monthly household expenditures; the statutory poverty threshold entitles one to social benefits; the Leyden poverty line is one of the subjective poverty thresholds, based on the perceptions of the population surveyed, and the subsistence-level poverty threshold determines the extreme poverty line (calculated by the Institute of Labor and Social Studies).

As shown in Figure 13, poverty in Poland decreased again in 2010. In recent years, the relative poverty rate has shown the highest poverty level, followed by the subjective poverty rate, the statutory poverty threshold and the subsistence-level poverty threshold. The greatest decline occurred in the case of subjective and statutory poverty. Interestingly, subjective poverty decreased continually, while "objective" poverty increased on the whole in the first half of the first decade of the 21st century.

It bears emphasizing that statutory poverty in Poland is understated, which mainly results from the fact that the nominal statutory threshold was last adjusted on Oct. 1, 2006. According to the Central Statistical Office (GUS, 2001b, p. 3), "taking into consideration the statutory threshold from the fourth quarter of 2006 but adjusting it to the CPI, poverty in 2010 stood at 10.8%, not 7.3%."

Figure 13
Poverty in Poland at different poverty thresholds, 2000–2010



Source: GUS, (2007–2011), *Budżety Gospodarstw Domowych*.

In recent years some positive trends in the risk of poverty have been observed among farmers. The year 2010 was another consecutive year when poverty decreased in this group because farmers' real incomes increased to the greatest extent among all socioeconomic groups. However, farmers remain one of the groups with the highest at-risk-of-poverty rate, which is above the average. In 2010, poverty increased in the case of households supporting themselves from non-earned sources other than allowances and retirement pensions.

Similar to income inequality, the education level significantly determines the at-risk-of-poverty rate in Poland, regardless of the poverty measure used. According to the Central Statistical Office (GUS, 2011b, p. 5), "[P]ractically speaking, if the head of a household has a tertiary education, this household can expect to avoid extreme poverty (about 0.5% of the population) as well as statutory poverty (about 1%)." Households headed by individuals with an education not exceeding the lower secondary level were subject to a risk of poverty that was far above the average: 17% and 15% in the case of statutory and extreme poverty respectively. The at-risk-of-poverty rate in the case of households headed by individuals with a basic vocational education was also higher than average and stood at 10% for statutory poverty and 7.5% for extreme poverty in 2010.

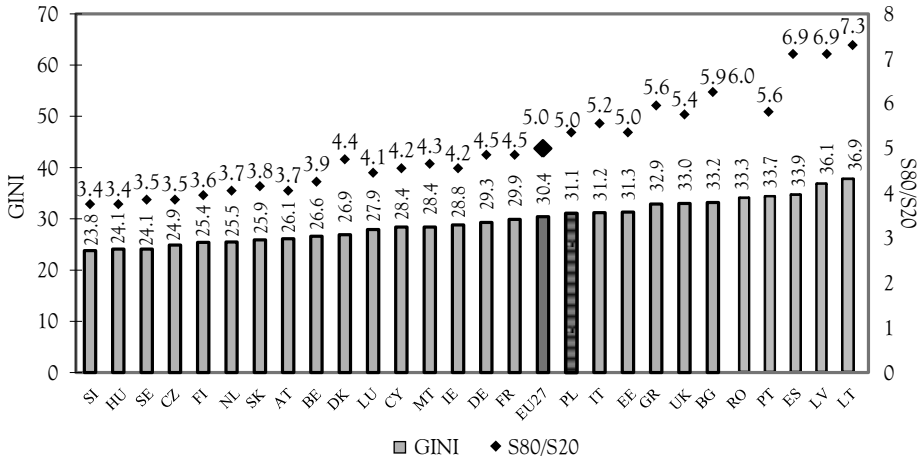
Income inequality and poverty in Poland compared with other EU countries

Income inequality in the European Union (27 countries) measured by the Gini coefficient ranged from 30.2% to 30.7% in the second half of the first decade of the 21st century and did not change in 2010 compared with 2009 (30.4%). Income inequality measured by the S80/S20 income quintile share ratio increased slightly from 4.9 to 5.0 during the same period. It is worth noting that, as mentioned earlier, the Gini coefficient measures changes across the income distribution spectrum, while the S80/S20 ratio only takes into account changes at the extremes of the distribution. In addition, the S80/S20 income quintile share ratio for the European Union as a whole is not the ratio of 20% of the population with the highest income and 20% of the population with the lowest income in the European Union, but the average for the 27 countries weighted with the population size of each EU member. This means that income inequality in the EU measured by the S80/S20 ratio is somewhat understated.

In 2010, the highest income inequality was recorded in four EU10 countries (Lithuania, Latvia, Romania, and Bulgaria) and in two countries from outside this group that were strongly affected by the economic crisis in recent years (Spain and Portugal). The lowest income inequality was observed in Sweden and Finland and some of the EU10 countries (Slovenia, Hungary, and the Czech Republic) (Figure 14).

Figure 14

Income inequality (disposable income; Gini coefficient, S80/S20) in 2010; Poland compared with other EU countries



Source: Eurostat.

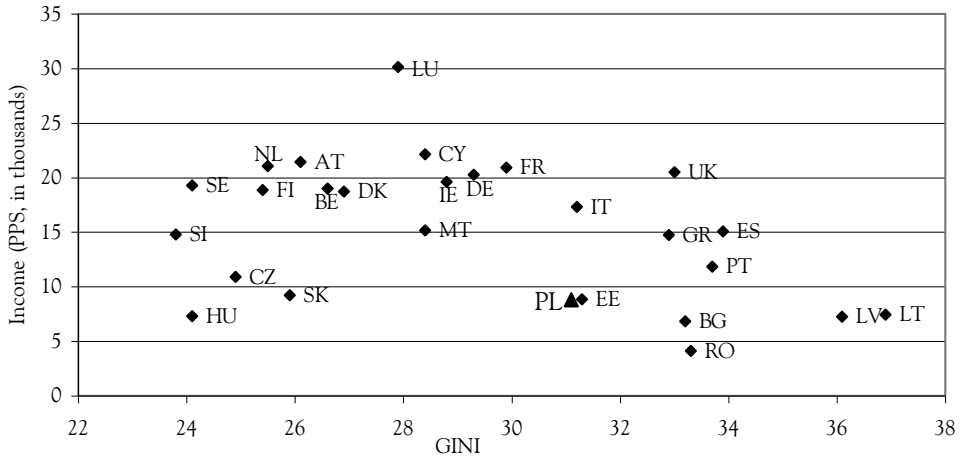
Compared with 2009, the greatest changes in income inequality in 2010—in both absolute and relative terms—occurred in Spain, Lithuania, Malta, Slovenia, and Slovakia (absolute and relative increase in the range of 1.1–1.6 p. p. and 3.95–4.95% respectively) and Luxemburg, Portugal, and Romania (absolute and relative decline in the range of 1.3–1.7 p. p. and 4.45–4.80% respectively). Eurostat data indicate that income inequality in Poland decreased from 31.4% to 31.1%. It is also worth noting that Poland recorded a significant decrease in income inequality between 2005 and 2010 compared with other EU countries. Poland had the second-highest income inequality in 2005, but by 2010 its position had improved considerably: income inequality in Poland was just above the EU average.

Income inequality is especially harmful for poor populations: its negative impact is proportional to the population's wealth. Figure 15 shows the relationship between the average disposable income expressed as equivalent income and using the Purchasing Power Standard as well as income inequality in European Union countries. As can be seen, the relationship is generally negative, which means that countries with a lower average income record higher income inequality. The coefficient of correlation is –0.39 and is statistically significant at $p<0.05$.

As noted earlier, Poland significantly improved its relative income inequality position between 2005 and 2010. Poland also enjoyed a decline in income disparities in absolute terms. While the average income showed a positive trend, Poland did not manage to improve its relative position compared with other EU countries.

Figure 15

Income inequality and average equivalent disposable income in 2010; Poland compared with other EU countries



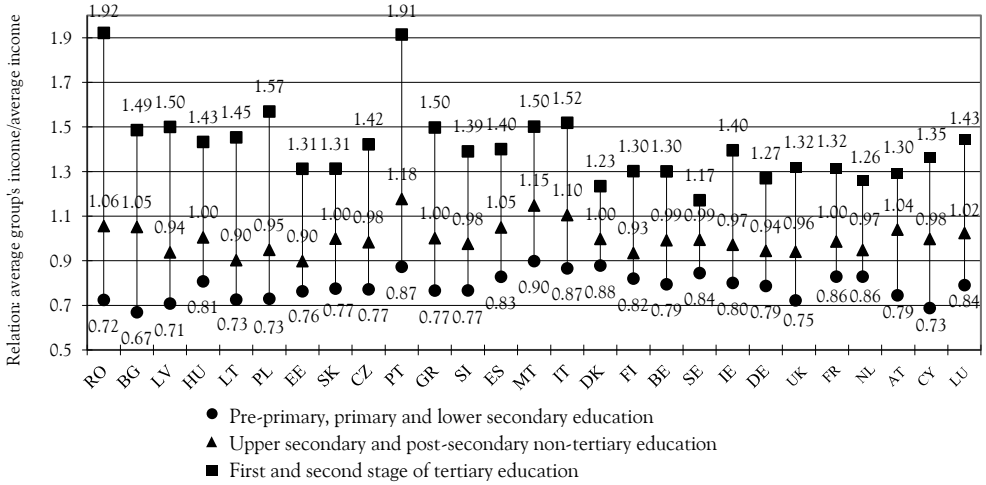
Source: Eurostat.

The level of education significantly influences the level of income in both Poland and other EU countries, and some trends can be observed. Generally, in countries with higher income inequality, income disparities according to the level of education are also substantial. But this is only natural because education is one of the main income inequality determinants (Figure 16). The coefficient of correlation for the 27 EU countries between income inequality measured by the Gini coefficient and the ratio of the average income of people with a tertiary education to the average income of people with a primary, lower secondary education or no education at all is 0.61 and is statistically significant at $p<0.05$.

It is also worth noting that income inequality according to the level of education is considerably higher in the case of Romania and Portugal, while being significantly lower in the case of Sweden and Denmark. The Eurostat data seem to confirm the conclusions resulting from the GUS data; however, the data from the two sources are not directly comparable. In any case, Poland has one of the highest income inequalities by level of education among EU countries.

Figure 16

Income inequality[a] according to the level of education in 2010; Poland compared with other EU countries



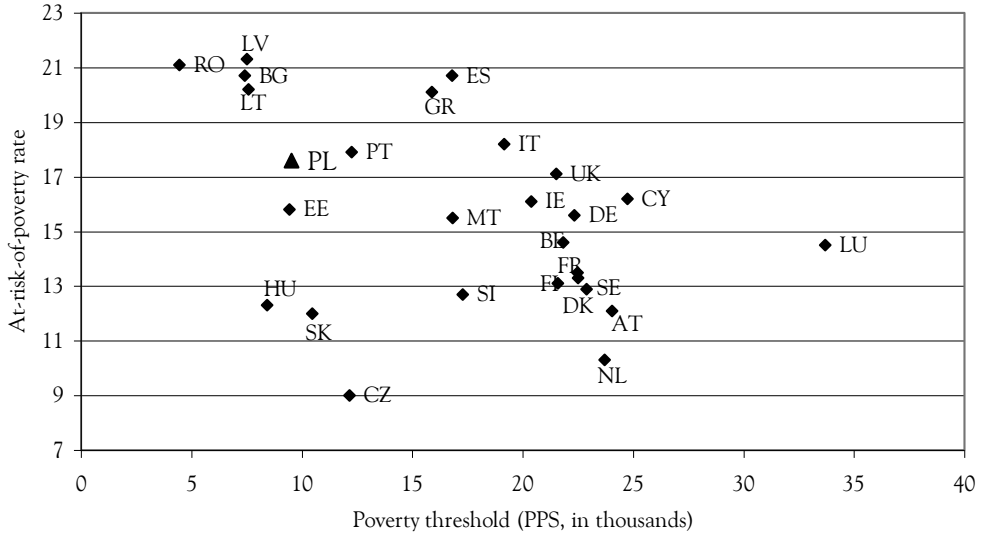
Source: Calculated from Eurostat data.

The at-risk-of-poverty rate for the European Union increased slightly from 16.3% to 16.4% in 2010 compared with 2009. The main indicator used to monitor the scope of poverty in the European Union is the at-risk-of-poverty rate, which is defined as the proportion of the population living in households with an income below 60% of the median equivalent disposable income. The extent of poverty was the largest in

four EU10 countries, Latvia, Romania, Bulgaria, and Lithuania, ranging from 20.2 to 21.3%, as well as in other countries strongly affected by the economic crisis (including Spain and Greece). The lowest at-risk-of-poverty rate was observed in some EU10 countries (the Czech Republic, Hungary, Slovenia, and Slovakia) as well as in Sweden, Finland, the Netherlands, and Austria. Poland is among countries with a relatively high level of poverty. Eurostat data show that Poland's poverty rate was 17.6% in 2010, contrary to what is suggested by GUS data.

Figure 17

At-risk-of-poverty rates and poverty thresholds in 2010; Poland compared with other EU countries



Source: Eurostat.

Figure 17 also provides information on the absolute poverty thresholds expressed in terms of the Purchasing Power Standard. The poverty threshold is given for a household consisting of two adults and two children below age 14. As shown by the data, a clear negative relationship can be seen between the extent of poverty and the absolute poverty thresholds; the coefficient of correlation is –0.43 and is statistically significant at $p<0.05$. This means that poverty in countries with a low absolute poverty threshold accompanied by a high at-risk-of-poverty rate could be considered far higher than suggested by statistics.

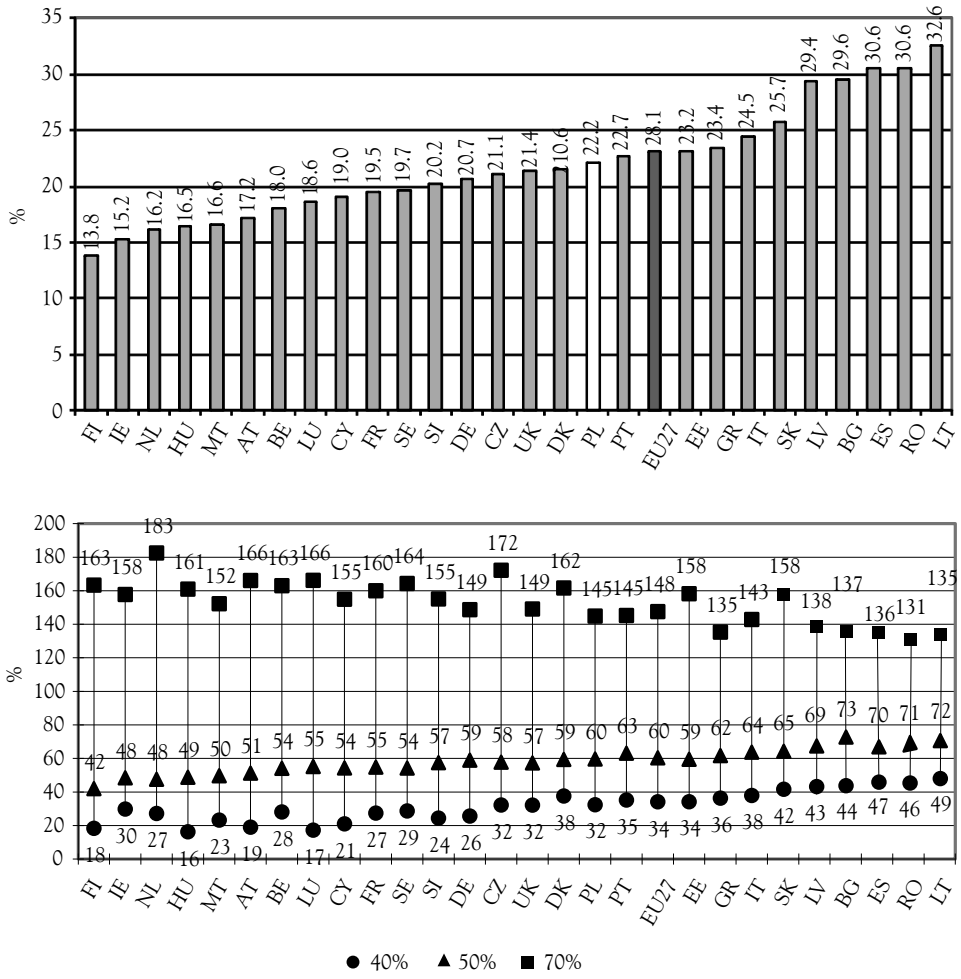
Another important feature of poverty, apart from its extent, is its depth, which can by defined as "how poor the poor are" (Dennis, Guio, 2003, p. 2). The poverty depth index, or the relative median at-risk-of poverty gap, is defined as the difference between the median equivalized disposable income of people below the at-risk-of-

poverty threshold and the at-risk-of-poverty threshold, expressed as a percentage of this threshold; here, 60% of the median equivalized disposable income. It turns out that a low level of poverty does not directly indicate a smaller extent of poverty depth. As shown by the upper graph in Figure 18, many countries with a relatively low at-risk-of-poverty rate (for example, the Czech Republic, Slovenia, and Slovakia) record a relatively large relative median at-risk-of-poverty gap. However, poverty depth is large in countries with high poverty rates (for example, Latvia, Romania, Spain, and Bulgaria). a positive conclusion that can be drawn from the data is that Poland's poverty is not particularly deep, although its extent is relatively large compared with other EU countries.

Some information about the depth of poverty is also given by the distribution of income around the poverty threshold, i.e. 60% of the equivalent median income. The lower graph in Figure 18 shows the ratios of the 40%, 50%, 70% thresholds and the 60% threshold, which are to be interpreted as follows. In general, the lower the values of the ratios of the at-risk-of-poverty rates at lower-than-60% poverty thresholds or—on the graph—the longer the line between the points, the lesser the depth of poverty in a given country. For example, in the case of Poland, the figure 60% at the 50% poverty threshold ratio means that 60% of those who are at risk of poverty at the 60% threshold are also at risk of poverty at the 50% threshold. In other words, 40% of people in Poland have an equivalized disposable income between 50% and 60% of the median equivalized income. Similarly, 32% of people are at risk of poverty at the 60% as well as the 40% poverty threshold, that is, 68% of people have an equivalent disposable income between 40% and 60% of the median equivalent disposable income.

The depth of poverty is not the only important poverty indicator. It is also worth comparing the efficiency of redistribution in decreasing poverty in EU countries. Figure 19 shows three at-risk-of-poverty rates: before social transfers (pensions included), before social transfers (pensions excluded), and after social transfers. As many as 43.5% of people in the European Union would live in households at risk of poverty if we did not consider any social transfers, while after adding pensions, the poverty rate would decrease to 25.9%. Taking into consideration all social transfers causes poverty to fall to 16.4%. It turns out that in many countries, even those with an at-risk-of-poverty rate below the EU average, the extent of poverty would be much larger if we took into account incomes without social transfers. These countries include Ireland, Luxemburg, and Hungary. Latvia, Spain, and Bulgaria are the least efficient in reducing poverty through social transfers. Poland's efficiency in lowering poverty is similar to the EU average.

Figure 18
Depth of poverty[a] in 2010; Poland compared with other EU countries

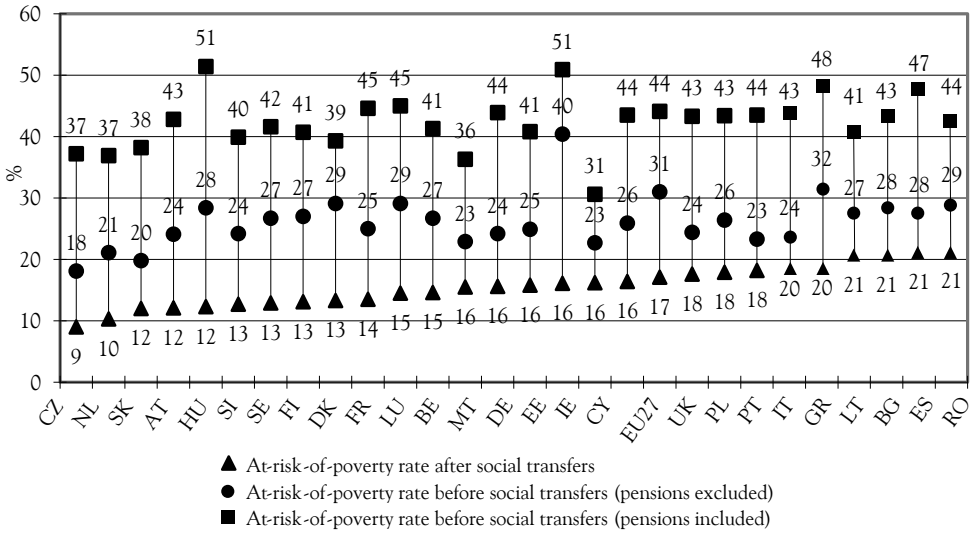


Note: [a] The upper graph shows relative median at-risk-of-poverty gaps, which are measures of poverty depth. The lower graph shows the ratios of the at-risk-of-poverty rates at 40%, 50% and 70% poverty thresholds and the at-risk-of-poverty rates at the 60% of the median equivalent disposable income poverty threshold.

Source: Calculated from Eurostat data.

Figure 19

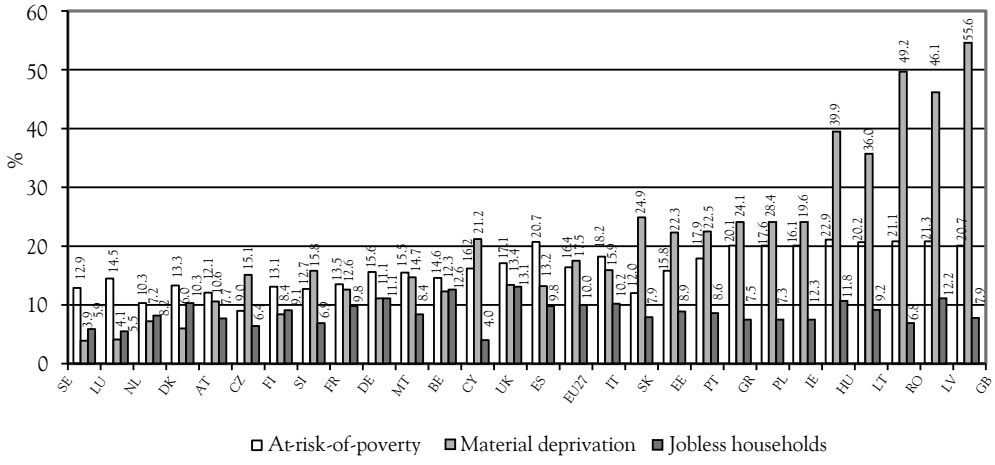
The impact of social transfers on poverty in 2010; Poland compared with other EU countries



Source: Eurostat.

Figure 20

Three main indicators of the Europe 2020 strategy for promoting social inclusion in 2010; Poland compared with other EU countries

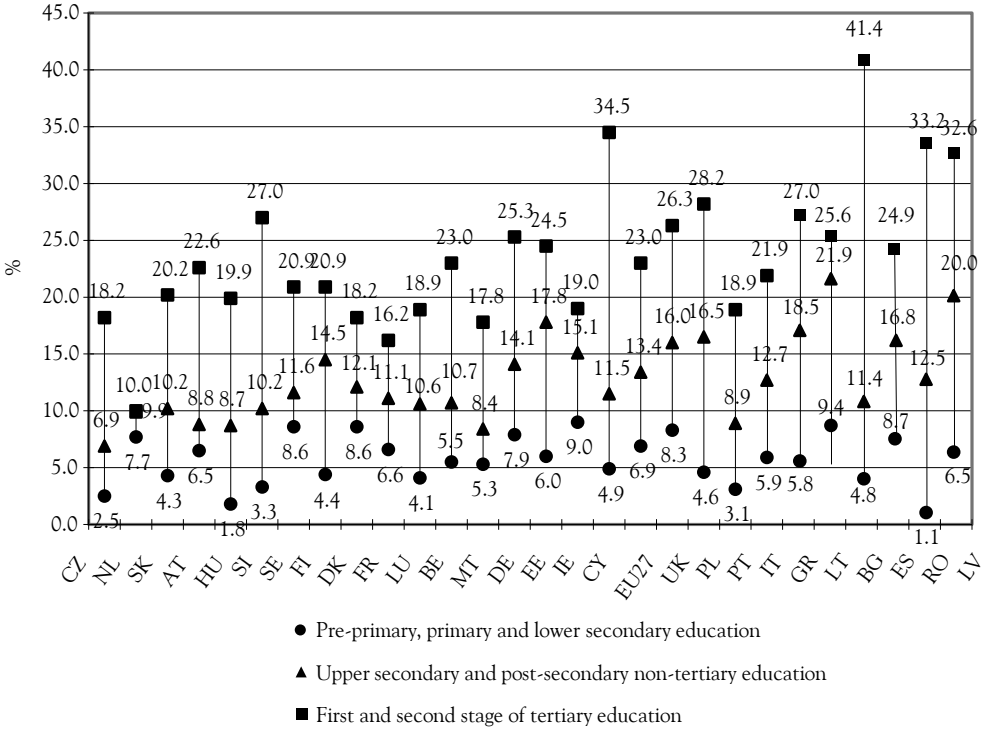


Source: Eurostat.

In the Europe 2020 strategy, the EU uses three indicators to monitor efforts to combat poverty and social exclusion: the at-risk-of-poverty rate, the material deprivation rate, and the percentage of "jobless" households. Figure 19 shows the values of these indicators for each EU member. The countries have been ranked according to the increasing sum of the three indicators. However, such a ranking is only an approximation in showing the growing level of social exclusion since we do not add up separate sets of persons (their share in the population). In 2010, Poland swapped places with Ireland and improved its position compared with 2009. While the proportion of jobless households in Poland is not large compared with other EU countries, the material deprivation and extent of poverty rates are one of the highest in the European Union. Social exclusion still constitutes a serious problem in post-socialist countries such as Bulgaria, Latvia, Romania, and Lithuania, whereas it is the lowest in the Nordic countries, Luxemburg, the Netherlands, and Austria.

Figure 21

At-risk-of-poverty rates according to the level of education in 2010; Poland compared with other EU countries



Source: Eurostat.

Figure 21 contains data on poverty, at a threshold of 60% of the median equivalent income, according to the education level of the household head. The countries have been ranked according to the at-risk-of-poverty rate in ascending order. As shown in the graph, the education level significantly influences the poverty rate, though with a few exceptions. For example, education seems to have a slight impact on poverty in the Netherlands. a relatively small influence is also observed in countries such as Sweden, Denmark, France, and Ireland. On the other hand, education is a significant determinant of income inequality in Romania, Bulgaria, Latvia, and Cyprus. With the exception of countries such as Hungary, Slovenia, Cyprus, and Spain, in general education to a greater extent determines poverty in countries with higher at-risk-of-poverty rates.

To conclude, on the basis of available data it is difficult to assess the changes in income inequality and poverty that occurred in Poland in 2010 compared with the previous year. On the one hand, GUS data indicate a slight increase in income inequality measured by the Gini coefficient (from 33.6% to 34.2%) and a decline in poverty expressed by all four poverty measures published by GUS. On the other hand, Eurostat data show that income inequality declined (from 31.4% to 31.1%) and poverty—at a poverty threshold set at 60% of the median equivalent income—rose in 2010 (from 17.1% to 17.6%). However, it has to be noted that first, both the changes in income inequality and poverty cited by GUS and Eurostat were insignificant, which means that we should perhaps conclude that income inequality as well as poverty have stabilized in the case of Poland; and, second, the two statistical institutions use different poverty measures.

Both GUS and Eurostat data show that the level of education strongly influences income inequality as well as poverty in Poland compared with other EU countries. One of the possible reasons for such a strong impact is technological change and increased demand for highly qualified and educated workers (*skill-biased technological change*)—trends that have been visible since the 1990s and have been related to an inflow of foreign direct investment and changes in the structure of international trade.

The available data reveal that European Union countries particularly strongly affected by the economic crisis recorded the highest income inequality in 2010, although those countries in general already had a relative highly unequal income distribution. In this group, only Portugal and Romania recorded a decline in income inequality and Greece reported a slight increase. The situation was similar in the case of poverty. In 2010, poverty increased considerably in countries that were the strongest affected by the economic crisis, with the exception of Portugal, Latvia, and Romania.

Given the economic situation in Poland, no significant changes should be expected in either income inequality or poverty in the near future. However, it has to be emphasized that even though GUS data show that poverty has declined in recent years, adjusting the poverty threshold set at the subsistence level would reveal that the extent of poverty is in fact greater than suggested by available data.

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Chapter 2

Poland's Competitive Position in External Economic Relations

Various economic agents increasingly compete with one another within the world economy today, on both domestic markets and on the international market in the broad sense. The most important forms of international economic exchange include foreign trade (inter- and intra-industry) and foreign direct investment (FDI). This chapter focuses on Poland's position in international trade in 2011, including shifts in competitive advantages in foreign trade and changes in the country's attractiveness to FDI. This will make it possible to assess Poland's competitive position compared with that of other countries.

2.1. Poland's Trade of Goods with Foreign Countries

Elżbieta Czarny, Katarzyna Śledziewska, Patryk Toporowski

Poland's foreign trade has intensified since the country's transition to a market economy in the early 1990s. After its entry to the European Union on May 1, 2004, Poland not only entered the customs union, but is also became part of the Single European Market (SEM),[1] in which there are no non-tariff or fiscal barriers. The absence of non-tariff barriers means that there are no physical barriers, especially in

[1] The European Commission came up with the idea of establishing the Single European Market in a White Paper in 1985. The plan was carried out together with a reform of the EU founding treaties and the drafting of the Single European Act, which took effect on July 1, 1987 (see Unia Europejska, 1997, p. 11).

the form of border controls, or technical barriers. In addition, uniform quality and technical standards are used in the areas of safety, health, sanitary requirements, and environmental protection, along with the principle of mutual recognition of national standards and certificates. The lack of fiscal barriers means that member countries use a uniform system of indirect taxes. In trade with non-EU countries, Poland is bound by the principles of the customs union, in particular the common external tariff, [2] and by common commercial policy (CCP) rules. Admittedly, Polish companies have incurred the costs of the necessary adjustments, but these have been more than offset by an increase in sales.

The development of trade was impeded by the global economic crisis, which began in 2008. One of the main aspects of this crisis is that international trade declined more dramatically than the overall level of economic activity.[3] The slump in trade was sudden and sharp, and it took place all over the world. Between October and December 2008, monthly trade flows in the United States declined by 23%; China reported a 32% drop, and Turkey recorded a 41% slump (Comtrade data quoted after: Baldwin, Evenett, 2009), although in the full year 2008 global trade not only increased, but reached record values. The decline in global trade was only visible in statistics for 2009. In an obvious way, the slump has reduced the prosperity of trading countries, as a result of factors including the multiplier effect in the economy. The crisis has also hit trade through international production ties. The decline affected not only final goods markets, but also markets for intermediate products manufactured in many countries.

The economic crisis—combined with the previous liberalization of Poland's foreign trade, the signing of agreements on various forms of discriminatory trade liberalization, Poland's accession to the World Trade Organization (WTO), and the country's participation in the SEM—has led to changes in the volume, commodity pattern and destinations of Poland's trade in goods.

In this section we present the changes in both the volume of Poland's trade and its commodity pattern and geographic structure from 2008 to 2011. We pay special attention to Poland's trade with the European Union as a whole and with individual member states, because they are Poland's most important trading partners.[4] We also examine Poland's trade in goods with non-EU countries. We are concerned not only about overall trade, but also about intra-industry trade, which represents an

[2] The common customs tariff is part of the common commercial policy. Apart from common tariffs, uniform rules for signing customs and trade agreements were introduced as part of this policy. This was accompanied by liberalized access to the EU market and the introduction of uniform instruments for protecting this market, as well as uniform export policy tools (see Unia Europejska, 1997, p. 85).

[3] See http://unctadstat.unctad.org, accessed Nov. 15, 2011.

[4] Throughout the study, we define the European Union (EU) as a group of 27 member states (in accordance with the actual situation throughout the studied period). At the same time, whenever we make comparisons of Poland's (or the EU's) trade volume with that of the eurozone, we treat this last group in accordance with the actual situation in individual years covered by the analysis, and therefore the size of the eurozone is variable due to the entry of Slovakia in 2009 and Estonia in 2011.

increasingly important part of global exchange in goods. Due to the lack of more recent data, we examine intra-industry trade in the 2004–2010 period.

In empirical studies of both overall trade and intra-industry trade, we use statistical data from Eurostat's (or Comext's) database.[5] In assessing the position of the Polish economy in global trade, our point of reference is 2008 because this makes it easier to analyze the impact of the crisis on the competitiveness of the economy. We analyze Poland's trade in the 2008–2011 period, focusing on the changes during the economic crisis. We believe that 2008 is well worth examining because the value of global trade that year was a record, at US$ 32.6 trillion, compared with US$ 30.5 trillion in 2010.[6] This is despite the fact that 2008 was the start of the economic crisis.

Due to Poland's participation in the SEM, we distinguish between the country's trade with EU27 countries (the EU in tables and figures) and non-EU countries. This allows to trace how trade changed within the European Union and beyond.

Polish goods on the global market and in the EU

For several reasons, while examining Poland's trade, we separately analyze exports and imports. First, this is because these two types of trade flows have changed at different rates. Second, exports and imports provide information on different aspects of economic activity. Exports make it possible to draw indirect conclusions about the international competitiveness of goods from the analyzed country, while imports prompt conclusions about the dependence of a given economy on other economies.

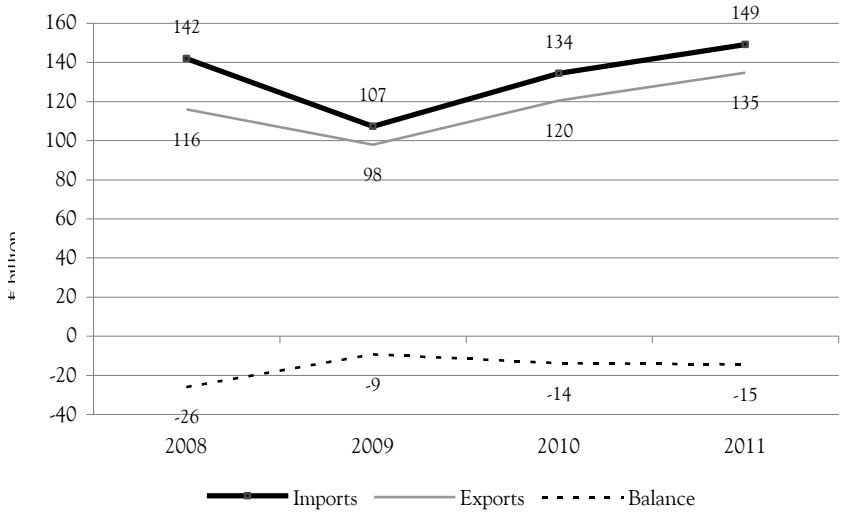
In Poland's trade, both exports and imports were higher in 2011 than three years earlier (Figure 1). Exports grew over 2.5 times more than imports (€18.7 billion vs. €7.2 billion). Also, the decline in trade in 2009 more strongly affected imports (which fell by €34 billion) than exports (a drop by €18 billion). Poland's exports consequently proved to be relatively resilient to the crisis, which testifies to the competitiveness of Polish goods. The main reasons were probably the relatively good quality of Polish products, mainly due to their adaptation to EU norms and standards, and modernization resulting from the inflow of foreign capital. Also significant was a depreciation of the Polish zloty during the crisis, which further enhanced the competitiveness of Polish products.

The smaller decline of exports in 2009 and their relatively faster growth in the 2008–2011 period led to a significant reduction in Poland's foreign trade deficit. While in 2008 the deficit was €26.1 billion, in 2011 it stood at €14.6 billion. However, the bad news is that the deficit has climbed since 2009.

5 http://epp.eurostat.ec.europa.eu/newxtweb/.

6 See http://unctadstat.unctad.org, accessed Nov. 15, 2011.

Figure 1
Poland's foreign trade, 2008–2011 (€ bn)



Source: Own calculation based on: http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do, accessed March 22, 2012.

Because Poland's trade of goods takes place according to different rules within the EU (due to factors such as the existence of the SEM) than outside it (the presence of various trade barriers, some of which may have become more acute during the crisis), it is worth examining it separately for each group of partners (see Figure 2). This is because such a study makes it possible to show the importance of the country's participation in the SEM from the perspective of Poland's exports and imports, considering that trade within this group of countries is not restricted by barriers.

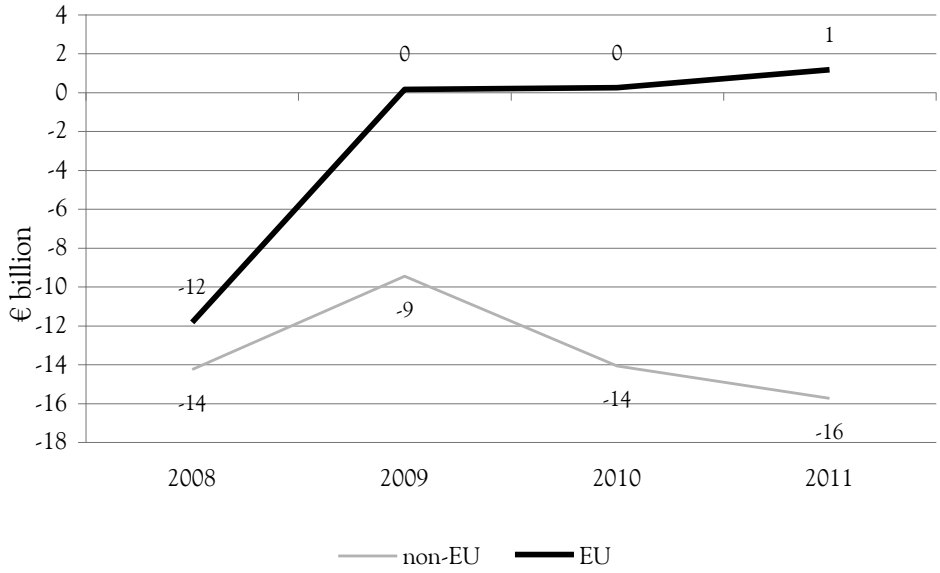
The data in Figure 2 show that Poland's negative trade balance is mainly due to a growing deficit in trade with non-EU countries. In 2011, this deficit was €1.5 billion higher than in 2008, and, after a drop in 2009, it increased again in 2010. This is indirect proof of the importance of the absence of trade barriers to the competitiveness of Poland's exports. Poland has reported a growing surplus in trade with EU countries since 2009; in 2011 the surplus was €1.2 billion. The growing deficit in trade with non-EU countries may also stem from the fact that Poland's trade with non-EU countries is mainly inter-industry in nature, but to find out if this is really so, it is necessary to examine the commodity pattern of Poland's exports and imports, which is analyzed later in this section.

Such a large deficit in trade with non-EU countries emerged despite the fact that these partners account for a relatively small part of Poland's trade compared with EU countries. In 2008, exports to non-EU countries accounted for only 22.2% of Poland's

total exports, while imports constituted 28.1%. In 2011, the share of exports did not change, while the share of imports increased to 30.6%.[7]

Figure 2

Poland's balance of trade with EU countries and the rest of the world in billions of euros



Source: Own calculation based on: http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do, accessed March 22, 2012.

Table 1

Share of intra-EU imports in Poland's total imports compared with the EU average (%)

	2008	2009	2010	2011
Poland	**71.9**	**72.6**	**70.8**	**69.4**
EU	62.8	63.8	62.1	61.7

Source: Own calculation based on: http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do/, accessed March 22, 2012.

Trade with other EU member states makes up a major part of Poland's overall trade (see Tables 1 and 2). Poland has recorded a surplus in trade with EU member states since 2009, and EU partners dominate in both Poland's exports and imports. This should come as no surprise given the expected impact of economic integration

[7] See http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do, accessed March 22, 2012.

on trade, resulting from trade creation and diversion effects as well as dynamic effects that appeared before the country's EU entry (Poland's agreements with the EU on preferential trade were already in force at the time). Another factor is the big economic potential and proximity of Germany, Poland's main trading partner. Of special importance, however, is the considerable dependence of Poland's trade in goods on intra-EU ties. Over the entire analyzed period, the proportion of imports from other EU countries in Poland's total imports is about 9 percentage points (p.p.) higher than the proportion of intra-EU imports in the total imports of the EU as a whole. The only exception is 2011, when the difference between Poland and the EU average narrowed by over 1 p.p. In exports, this difference is even larger and permanently exceeds 10 p.p. (with 13.2 p.p. in 2011). In general, the dependence of Poland's exports on the EU market is overwhelming (reaching 80%), making the Polish economy excessively dependent on what happens with this group of countries.

Table 2
Share of intra-EU exports in Poland's total exports compared with the EU average (%)

	2008	2009	2010	2011
Poland	**77.8**	**79.6**	**79.1**	**77.8**
EU	67.5	66.7	65.3	64.6

Source: Own calculation based on: http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do, accessed March 22, 2012.

For comparison, we will look at the inverse relationship. In 2008, Poland accounted for 3.9% of total intra-EU imports and for 2.6% of total extra-EU imports. In 2009, both these shares declined only to return to their 2008 levels in 2010. In 2011, the share of Poland in total extra-EU imports inched up by 0.1 p.p., while its share in total intra-EU imports dropped by 0.1 p.p. In terms of exports, Poland accounted for 3.3% of total intra-EU exports in 2008, followed by 3.7% in 2011, a figure exactly equal to the non-weighted average for the EU as a whole. Poland's share in total extra-EU exports did not change and stood at 2% in both 2008 and 2011.

This data show that Poland plays a more important role in intra-EU exports and imports than in the bloc's trade with the rest of the world. Moreover, the share of Poland in intra-EU exports displayed an upward trend during the studied period (with a slight decrease, by 0.1 p.p., recorded in 2011). Thus, Poland is becoming an increasingly significant exporter of goods to the markets of other EU member states. Its role in intra-EU exports is increasing, and at the same time EU market is becoming increasingly important (even more so) in Poland's exports. With these trends, Poland has recorded a surplus in trade with other EU countries since 2009.

Table 3
Increase/decrease of imports and exports for Poland, the EU and the eurozone, 2009–2011 (2008 = 100)

	Imports			Exports		
	2009	2010	2011	2009	2010	2011
Poland	**75.5**	**94.6**	**105.1**	**84.4**	**104.0**	**116.2**
EU	79.2	94.5	104.6	81.8	96.6	107.5
Eurozone	81.3	96.0	106.5	83.4	97.4	108.2

Source: Own calculation based on: http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do, accessed March 22, 2012.

The direction and magnitude of changes in the volume of Poland's exports and imports can be seen more clearly if they are compared with the corresponding figures for the EU as a whole and the eurozone. In 2009, Poland recorded a larger decline in imports than the EU as a whole and the eurozone. After a substantial increase in Poland's imports in 2010, their volume approached the average EU level, despite the fact that imports in both Poland and the EU as a whole are still more than 5 p.p. lower than in 2008. An increase in imports to a level exceeding the 2008 level was only recorded in 2011 (with the eurozone reporting the greatest increase, of around 8.2%).

In exports, Poland's position is completely different. In all three analyzed years, Poland recorded better results than the EU as a whole and also better figures than the eurozone. In 2009, its exports decreased less than those in both the EU as a whole and in the eurozone: Poland recorded a 15.6% drop vs. 16.6% for the eurozone and 18.2% for the EU as a whole (see Table 2). In 2010, Poland's exports increased by 4%, while both the EU as a whole and the eurozone recorded a drop. In 2011, exports in both the EU as a whole and the eurozone increased in comparison to 2008, but Poland's growth was the most impressive (16.2% vs. 7.5% for the EU as a whole).

Poland's main trading partners

In this section, we take a look at Poland's 10 largest trading partners. We separately examine the key suppliers of goods to the Polish market (Table 4) and the largest export markets for Polish goods (Table 5). These two groups differ, providing complementary information about Poland's trade. We analyze the value of Poland's imports from these countries and the value of Poland's exports to these markets in 2008 and 2011. We compare their role in Poland's imports and exports for the same years and their position on a list of Poland's main trading partners. By comparing the situation in 2008 and 2011, we can evaluate the changes that took place in the geographical pattern of Poland's trade during the crisis. The list of Poland's key

commercial partners given in Tables 4 and 5 is arranged in an order that corresponds to these countries' 2011 rankings.

Table 4

Poland's main import markets for goods in 2008 and 2011 (value of imports, increase/decrease in € billion, % share in Poland's imports, change in share in percentage points, rank)

Poland's main trading partners in imports	Value of Polish imports in € billion		Share in Poland's imports, (%)		Rank		Change	
	2008	2011	2008	2011	2008	2011	Change in value (€ billion)	Change in share (p.p.)
Germany	40.6	41.2	28.6	27.6	1	1	0.6	–0.9
Russia	13.7	18.1	9.7	12.1	2	2	4.4	2.5
Netherlands	7.9	8.4	5.6	5.7	4	3	0.6	0.1
Italy	8.9	7.7	6.3	5.1	3	4	–1.3	–1.2
China	6.3	7.6	4.4	5.1	6	5	1.4	0.7
France	6.8	6.3	4.8	4.2	5	6	–0.4	–0.5
Czech Republic	5.8	6.1	4.1	4.1	7	7	0.4	0.1
Belgium and Luxembourg	4.5	4.6	3.2	3.1	8	8	0.1	–0.1
Britain	4.0	4.1	2.8	2.8	9	9	0.1	0.0
Slovakia	2.9	3.7	2.1	2.5	13	10	0.7	0.4

Source: Own calculation based on: http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do, accessed March 22, 2012.

Germany and Russia are the largest suppliers of goods to Poland. Germany's share in Poland's imports is significantly higher than that of Russia. In 2008, it was almost three times as high. But in 2011, Germany's share fell by 1 p.p. (to 27.6%), while Russia's share rose by 2.4 p.p. (to 12.1%), and the difference between these two countries decreased.

If the predominance of Germany is hardly surprising, the high position of Russia and the strong growth in its deliveries to Poland during the crisis (up by €4.4 billion from 2008 to 2011) seems puzzling at first glance. Germany has characteristics that positively influence that country's trade with Poland. Germany is the EU's most powerful economy and has a long stretch of common border with Poland. It has always had intensive commercial ties with Poland, conducting trade that is not restricted by any barriers (thanks to the participation of both partners in the SEM). Germany can be an attractive partner for Poland in both inter- and intra-industry trade, because it provides a wide range of high-quality manufactured goods.

Poland's close trade ties with Russia could be attributed to both countries' traditional economic relations dating back to the communist period, combined with a short shared border. However, it is doubtful that this latter fact has a major positive influence because the shared border is in northeastern Poland, in an area that is oriented toward tourism and has a poor level of economic development and a low level of urbanization. a number of factors argue against an intensive exchange of goods between Poland and Russia. The main factor is the considerable difference between the two countries in terms of economic potential as well as the different levels of population wealth and the lack of integration ties that would enable Poland and Russia to conduct trade free from barriers. The two countries are also divided by cultural differences (including religion) and political differences (resulting from historical reasons, among other factors).

The main reason behind the large role of Russia in Poland's imports is its resources abundance, especially in energy (not analyzed in detail in this chapter). Russian raw materials dominate among Poland's raw material imports from non-EU countries (this aspect is analyzed further in the next section). Russia's high position among countries playing the biggest role in Poland's imports is due to the high raw material needs of Poland's growing economy and the rising prices of raw materials, especially fuels.

Table 5

Poland's main export markets for goods in 2008 and 2011 (value of exports, increase/decrease in € billion, % share in Poland's imports, change in share in p.p., rank)

Poland's main exports markets	Value of Polish exports in € billion		Share in Poland's exports (%)		Rank		Change	
	2008	2011	2008	2011	2008	2011	Change in value (€ billion)	Change in share (p.p.)
Germany	29.0	35.1	25.0	26.1	1	1	6.1	1.0
Britain	6.7	8.6	5.8	6.4	4	2	2.0	0.7
Czech Republic	6.6	8.3	5.7	6.2	5	3	1.7	0.5
France	7.2	8.3	6.2	6.1	2	4	1.1	–0.1
Italy	6.9	7.2	6.0	5.4	3	5	0.3	–0.6
Russia	6.0	6.1	5.2	4.5	6	6	0.0	–0.7
Netherlands	4.7	5.9	4.0	4.4	7	7	1.2	0.3
Sweden	3.7	3.8	3.2	2.8	9	8	0.2	–0.3
Hungary	3.2	3.4	2.8	2.6	10	9	0.2	–0.2
Ukraine	4.3	3.4	3.7	2.5	8	10	–1.0	–1.3

Source: Own calculation based on: http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do, accessed March 22, 2012.

Further down the list of countries playing large roles in Poland's imports is the Netherlands (a small but open country, the world's fifth-largest exporter in 2010, tied to Poland through EU membership, and not very distant geographically). Italy comes next (a country with relatively high economic potential, EU member state, not very distant geographically), followed by China (the world's No. 1 exporter).

Poland's EU partners decidedly dominate among the country's largest export markets, which once again testifies to the significance of removing trade barriers to the competitiveness of Polish goods. EU member states occupy the first five places in the rankings. These are Germany; Britain (which is gaining importance as an export market for Polish goods mainly due to a large number of Poles working in that country and their preference for buying Polish products); the Czech Republic (which has a long common border with Poland and a history of economic and political ties, in addition to a similar level of development); France, and Italy. Russia, in sixth place, is the highest-ranking non-EU country in the top 10 (Ukraine comes next, in 10th place).

Of special note is Poland's large and growing trade deficit with Russia. In 2008, it stood at €7.7 billion, and in 2010 it rose to €12 billion, exceeding the level recorded by Poland with Germany, its key trading partner. Poland also has a trade deficit with Italy, one of its five largest partners.

Commodity pattern of Poland's foreign trade

The study of the commodity pattern of Poland's foreign trade was conducted with a division into imports and exports within the EU (intra-EU imports/exports) and outside the EU (extra-EU imports/exports). The study was conducted on CN2 groups, taking into account 97 commodity groups. The groups that ranked among the top 10 in 2011 were selected. We analyzed the value of trade in 2008 and 2011, shares in trade, and rankings. Subsequently, a comparison was made between 2011 to 2008 to assess changes in the pattern of trade during the crisis.

Poland imports mainly high value-added products (machines and vehicles from groups 84, 87, 85) from other EU countries. However, the value of these imports decreased in the analyzed period, as did their shares. Plastics (group 39) comprise another important commodity group among Poland's imports from fellow EU countries. The role of this commodity group is growing.

Table 6

The 10 main commodity groups in Poland's imports from other EU countries in 2011 (value, increase/decrease in value in € billion, share in %, change in share in p.p.)

CN2 code	Commodity group	Value in € billion		Share in imports		Rank		Change	
		2008	2011	2008	2011	2008	2011	Change in value (€ billion)	Change in share (p. p)
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	15.9	13.7	15.6	13.3	1	1	–2.1	–2.3
87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	12.7	11.0	12.4	10.6	2	2	–1.7	–1.8
85	Electrical machinery and equipment and parts thereof, sound recorders and sound recorders and reproducers	11.4	10.8	11.2	10.4	3	3	–0.6	–0.8
39	Plastics and articles thereof	6.7	7.7	6.6	7.5	4	4	1.0	0.9
72	Iron and steel	5.2	4.9	5.1	4.7	5	5	–0.3	–0.4
30	Pharmaceutical products	3.7	3.7	3.6	3.6	7	6	0.0	0.0
27	Mineral fuels, mineral oils and products of their distillation, bituminous substances, mineral waxes	4.1	3.5	4.0	3.4	6	7	–0.5	–0.6
48	Paper and paperboard, articles of paper pulp, paper or paperboard	2.8	3.2	2.7	3.1	9	8	0.4	0.4
73	Articles of iron or steel	3.5	3.1	3.4	3.0	8	9	–0.3	–0.4
90	Optical, photographic, cinematographic, measuring, checking or precision instruments and apparatus	2.3	2.8	2.2	2.7	10	10	0.5	0.5

Source: Own calculation based on: http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do, accessed March 22, 2012.

Table 7

The 10 main commodity groups in Poland's imports from non-EU countries in 2011 (value, increase/decrease in value in € billion, share in %, change in share in p.p.)

CN2 code	Commodity group	Value in € billion		Share in imports		Rank		Change	
		2008	2011	2008	2011	2008	2011	Change in value (€ billion)	Change in share (p.p.)
27	Mineral fuels, mineral oils and products of their distillation, bituminous substances, mineral waxes	12.0	15.5	29.9	34.0	1	1	3.5	4.0
85	Electrical machinery and equipment and parts thereof, sound recorders and sound recorders and reproducers	3.6	4.1	9.0	9.1	2	2	0.5	0.0
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	3.4	4.1	8.4	9.0	4	3	0.7	0.6
99	Other	3.6	3.1	8.9	6.9	3	4	–0.4	–2.1
89	Ships, boats and floating structures	1.3	1.7	3.3	3.7	8	5	0.4	0.4
90	Optical, photographic, cinematographic, measuring, checking or precision instruments and apparatus	1.3	1.6	3.4	3.4	6	6	0.2	0.1
72	Iron and steel	1.3	1.2	3.3	2.5	7	7	–0.2	–0.8
87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	1.8	1.0	4.4	2.3	5	8	–0.7	–2.2
39	Plastics and articles thereof	0.7	0.8	1.7	1.8	11	9	0.1	0.1
40	Rubber and articles thereof	0.5	0.8	1.3	1.8	13	10	0.3	0.5

Source: Own calculation based on:
http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do, accessed March 22, 2012.

Poland imports chiefly fuels and oil (group 27) from outside the EU. Between 2008 and 2011 the share of this group of goods in Poland's imports from non-EU countries increased by 4 percentage points. Since these imports are necessary for the functioning of the Polish economy, their position is unlikely to decrease. Further down the list, as in the case of intra-EU imports, is machinery (groups 85 and 84). The role of ships, on the other hand, is growing; they advanced by three notches in the analyzed period.

Table 8

The 10 main commodity groups in Poland's exports to other EU countries in 2011 (value, increase/decrease in value in € billion, share in %, change in share in p.p.)

CN 2 code	Commodity group	Value in € billion		Share in imports		Rank		Change	
		2008	2011	2008	2011	2008	2011	Change in value (€ billion)	Change in share (p.p.)
87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof	13.2	14.3	14.7	13.6	1	1	1.0	–1.1
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	10.5	12.5	11.7	12.0	3	2	2.0	0.3
85	Electrical machinery and equipment and parts thereof, sound recorders and sound recorders and reproducers	12.0	12.3	13.4	11.8	2	3	0.3	–1.6
94	Furniture, bedding, mattresses, cushions; lamps and lighting fittings	5.6	6.1	6.3	5.8	4	4	0.5	–0.4
27	Mineral fuels, mineral oils and products of their distillation, bituminous substances, mineral waxes	4.2	5.6	4.6	5.3	5	5	1.4	0.7
39	Plastics and articles thereof	3.6	4.7	4.0	4.5	7	6	1.1	0.5
73	Articles of iron or steel	4.1	3.8	4.5	3.7	6	7	–0.2	–0.8
72	Iron and steel	3.5	3.3	3.9	3.2	8	8	–0.2	–0.7
40	Rubber and articles thereof	2.0	2.9	2.2	2.8	10	9	1.0	0.6
74	Copper and articles thereof	1.7	2.6	1.9	2.5	12	10	0.9	0.6

Source: Own calculation based on: http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do, accessed March 22, 2012.

In Poland's exports to other EU countries, as in the case of imports, value-added products dominate (vehicles and machinery from groups 87, 84 and 85), though the role of some of them decreased in 2011 compared with 2008. Further down the export list are manufactured goods not based on modern technology (furniture and plastics). What's even more unsettling, other top exports are non- or low-value-added products (mineral fuels, iron, rubber, and copper), which shows that Poland largely plays the role of a supplier of intermediate products for manufacturing industries in other EU countries.

Table 9

The 10 main commodity groups in Poland's exports to non-EU countries in 2011 (value, increase/decrease in value in € billion, share in %, change in share in p.p.)

CN 2 code	Commodity group	Value in € billion		Share in imports		Rank		Change	
		2008	2011	2008	2011	2008	2011	Change in value (€ billion)	Change in share (p.p.)
84	Nuclear reactors, boilers, machinery and mechanical appliances; parts thereof	3.7	4.0	14.5	13.4	1	1	0.3	–1.0
85	Electrical machinery and equipment and parts thereof, sound recorders and sound recorders and reproducers	2.3	2.9	9.0	9.7	3	2	0.6	0.7
87	Vehicles other than railway or tramway rolling-stock, and parts and accessories thereof	3.5	2.8	13.6	9.4	2	3	–0.7	–4.2
89	Ships, boats and floating structures	1.7	2.7	6.7	9.2	4	4	1.0	2.4
39	Plastics and articles thereof	1.1	1.1	4.1	3.8	5	5	0.1	–0.3
27	Mineral fuels, mineral oils and products of their distillation, bituminous substances, mineral waxes	0.8	1.0	3.0	3.5	10	6	0.3	0.5
94	Furniture, bedding, mattresses, cushions; lamps and lighting fittings	0.9	1.0	3.7	3.5	7	7	0.1	–0.2
48	Paper and paperboard, articles of paper pulp, paper or paperboard	0.9	1.0	3.5	3.3	8	8	0.1	–0.2
74	Copper and articles thereof	0.6	0.9	2.3	2.8	12	9	0.3	0.5
73	Articles of iron or steel	1.0	0.8	3.7	2.7	6	10	–0.1	–1.0

Source: Own calculation based on:
http://epp.eurostat.ec.europa.eu/newxtweb/mainxtnet.do, accessed March 22, 2012.

Products from groups 84, 85 and 87 also dominate in Poland's exports to non-EU countries. Again, the value and share of vehicles declined considerably in the analyzed period. This means that the importance of vehicles is decreasing in Poland's imports and exports—in both intra-EU and extra-EU trade. This may be related to the general decline in the trade of vehicles worldwide. This industry has been hardest hit by the global economic crisis (see, e.g., Alessandria, Kaboski, Madrigan, 2010).

Poland's intra-industry trade with selected countries and groups of countries

Poland's transition to a market economy and EU entry brought about a change in the geographical structure and the commodity pattern of Poland's trade and in the competitive position of Polish goods on foreign markets. One aspect of this issue is change in the intensity and characteristics of Poland's intra-industry trade (IIT). The changes came, first of all, due to the market-orientation and modernization of the Polish economy (as a result of moves including its opening and an inflow of foreign capital). Second, adjustments necessitated by the country's EU entry (including, the introduction of EU norms and standards) resulted in an improved quality and consequently increased competitiveness of Polish products. Third, the integration of EU economies and participation in the Single European Market contribute to a further increase in the role of EU countries in Poland's trade, including intra-industry trade. The competitive position of Polish goods has improved, and the volume and importance of production of value-added goods has increased. These changes led to an increased share of intra-industry trade in Poland's overall trade.

In this section, we examine Poland's intra-industry trade with the European Union as a whole and with selected member states, as well as with China and Japan. The analysis of intra-industry trade with EU countries is justified by the fact that the European Union is Poland's main trading partner and brings together industrialized countries, which usually conduct this type of trade (for more see Czarny, 2002). Due to an enormous amount of data, we limit the analysis to selected member states. We calculate intra-industry trade indices, including horizontal, vertical and product trade: first, for the EU as a whole (EU26[8]), second, because of differences in the levels of development, for new and old member states (EU11 and EU15 respectively). Third, the survey covers Germany as Poland's most important trading partner, and France and Britain, which are also important partners for Poland. Among the new member states, we analyze in detail the Czech Republic and Slovakia. The study of Poland's intra-industry trade with China and Japan is supplemented by a discussion of this type of exchange with the EU and its member states. We believe that as a result of factors such as geographical distance, cultural differences and differences in strategy and development levels, this type of trade stands little chance of increasing its role in Poland's overall trade with Asian partners.

8 The term "the European Union as a whole" covers all of Poland's trade partners in the EU. We, therefore, write not about the EU27, but about the EU excluding Poland, which is the focus of this study, which means the EU26. For the same reason, the new member states are referred to as the EU11. Although Romania and Bulgaria became EU members only in 2007, to ensure data comparability, we assume that these countries were part of the EU26 throughout the analyzed period.

In addition, we present data on intra-industry trade in the products of two industries that are Poland's key export specialties: machinery and vehicles. This analysis also exclusively applies to the aforementioned trading partners.

When analyzing Poland's intra-industry trade, we examine not only its overall volume, but also horizontal and vertical trade. In the case of the latter, we distinguish Polish exports of products that are of higher quality than imports (high-quality vertical trade), and Polish exports of products that are of lower quality than imports (low-quality vertical trade). We also calculate product IIT indices.

The analysis covers the period from Poland's EU entry in 2004 to 2010, the last year for which disaggregated data on trade is available. Such a time frame for the study not only makes it possible to analyze changes in the intensity of intra-industry trade after accession, but also enables us to see what happened with this form of trade during the economic crisis.

We begin our empirical analysis with a brief discussion of the research methodology. Next, we analyze the changes in the position of intra-industry trade as well as horizontal and vertical trade in Poland's overall trade with the EU as a whole, selected member states, and with China and Japan. The study ends with an analysis of product IIT.

Research methodology

We process the data on trade in accordance with the Grubel and Lloyd (1975) index, which is the basis for measuring intra-industry trade. It is calculated according to the following formula:

$$GL = \sum_{i=1}^{n} w_i GL_i = \sum_{i=1}^{n} \left(\frac{X_i + M_i}{\sum_{i=1}^{n} (X_i + M_i)} \right) = 1 - \frac{\sum_{i=1}^{n} |X_i - M_i|}{\sum_{i=1}^{n} (X_i + M_i)} \quad (1),$$

where:
w_i is the share of trade in product "i" in overall trade,
GL_i is the Grubel-Lloyd index (GL) for product "i,"
X_i is the volume of exports of product "i,"
M_i is the volume of imports of product "i."

In line with the Grubel and Lloyd convention, total trade can be divided into inter- and intra-industry trade. The share of intra-industry trade ranges from 0 to 1, where 0 means that all trade is inter-industry trade, and 1 means that all trade is intra-industry trade. The GL index is sometimes used not only to determine the type of trade conducted by a country with a selected trading partner, but also to determine the type of trade in products from a single industry.

Since intra-industry trade covers different types of trade flows, in our empirical analysis we make a distinction between horizontal trade, which means trade of goods of similar quality, and vertical trade, which means trade of goods of different quality.

In statistical classifications, exports and imports of each product are characterized by a unit value.[9] The unit value of a product exported from country X to country Y is defined as UV^i_{Ex} (UV stands for *Unit Value*), where "i" is the type of product. The unit value of goods imported from country Y to country X is in turn expressed as UV^i_{Im}. These values roughly define the quality of the goods traded.

Horizontal trade is when the difference between UV^i_{Ex} and UV^i_{Im} is small. Then the following condition (called similarity criterion) is met:

$$\frac{1}{1+\alpha} \leq \frac{UV_i^{Ex}}{UV_i^{Im}} \leq 1+\alpha \quad (2),$$

where α is equal to 15%.
Otherwise, i.e. when the following inequalities:

$$\frac{UV_i^{Ex}}{UV_i^{Im}} > 1+\alpha \quad (3a)$$

and

$$\frac{UV_i^{Ex}}{UV_i^{Im}} < \frac{1}{1+\alpha} \quad (3b)$$

are the case, trade is either vertical in which the exports of the analyzed country are either of high quality (3a), or low quality compared with the imports of a similar product (3b).

The last of the IIT indices studied here is the product intra-industry trade index. In contrast to traditional intra-industry trade indices, which are based on the volumes of trade, product intra-industry trade indices show what proportion various types of products subject to intra-industry trade represent in the total number of varieties subject to trade from a single industry. The index ranges from 0 to 1. An index of 0 means that no variety of the product is subject to intra-industry trade. An index of 1 means that all tradable varieties of the product are subject to intra-industry trade.

9 When the unit value of a product could not be determined, the product was excluded from the study. Because such cases were few, the loss of data is small.

At the same time, this measure provides information on the diversification of the varieties of the product subject to trade in goods. Second, it shows the importance of intra-industry trade in the exchange of different varieties of the product. Third, the index makes it possible to keep track of new products appearing in trade.

Poland's intra-industry trade at the start of the 21st century

The share of intra-industry trade in Poland's total turnover with the EU26 rose from 23.7% in 2004 to 28.5% in 2010 (see Table 10). The role of intra-industry trade increased the fastest in trade with EU15 countries (in 2004, it accounted for 24% of Poland's total trade with these countries, compared with 29.3% in 2010). The steady increase in this type of trade with the EU15 testifies to the convergence of Poland's economy with other EU economies. The share of intra-industry trade in Poland's overall exchange with new member states (EU11) grew at a slightly slower rate: from 22.6% in 2004 to 25.2% in 2010. Aggregate IIT indices in this period ranged from 22.6% in 2004 in trade with the EU11 to 29.3% in 2010 in trade with the EU15. The share of IIT has thus increased in recent years, accounting for more than one-fourth of total trade.

In 2004–2008, the share of intra-industry trade in Poland's overall trade with Germany, its main trading partner, also rose. In 2008, it stopped growing and has remained at a relatively stable level since then. In exchange with this partner, IIT ranged from 30.7% in 2005 to 38.5% in 2009. The lowest IIT shares are in trade with Slovakia, a EU member country less developed than Poland, and with Britain, a country distant from Poland geographically and moving away from the trade of goods in favor of services.

The role of IIT in Poland's trade with the analyzed Asian countries is far less prominent. This indirectly confirms the importance of factors considered to be the most important to the development of this form of trade: geographic proximity and similarity of production structures and consumption patterns, as well as the lack of barriers to trade. The role of IIT in Poland's trade with China decreased continually until 2007. In 2004, IIT accounted for 8.3% of Poland's total trade of goods with China, while in 2007 the figure fell to 4.7%. The share of intra-industry trade in Poland's exchange with Japan also declined, from 8% in 2004 to 6.1% in 2007. However, during the crisis, the role of IIT in trade with both China and Japan increased significantly. Also visible were major fluctuations in this type of trade in Poland's exchange with Asian countries. This may have been due not only to the instability of trade in goods, but also the relatively poor quality of trade data.

Table 10

Poland's intra-industry trade with selected EU member states as well as with China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	22.1	22.1	19.0	26.9	26.8	27.1	27.7
Germany	31.1	30.7	31.7	33.9	37.5	38.5	38.3
Britain	19.1	14.2	25.4	21.4	21.4	19.5	24.8
EU15	24.0	23.2	24.9	27.1	28.9	29.2	29.3
Czech Republic	31.7	33.2	31.1	32.9	35.1	34.1	33.5
Slovakia	17.5	17.6	19.0	20.2	21.3	21.4	22.9
EU11	22.6	23.0	23.4	23.7	25.3	24.9	25.2
EU26	23.7	23.1	24.7	26.5	26.7	28.4	28.5
China	8.3	7.5	4.7	4.7	5.8	6.0	7.1
Japan	8.0	8.9	6.3	6.1	10.1	9.0	12.0

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

Contrary to expectations, there was no drastic decrease in the intensity of Poland's intra-industry trade during the economic crisis. Such a decline was expected because the value of global trade declined more dramatically than the value of global GDP. In 2009, small decreases were recorded in the role of IIT in Poland's trade with the EU11 as well as with Britain, the Czech Republic, and Japan. At the same time, the role of IIT in Poland's trade with the EU15 stopped growing. In trade with other analyzed countries and groups of countries, the role of IIT increased. In 2010, a slight decrease in the role of IIT (not exceeding 0.5 p.p.) was only observed in trade with Germany and the Czech Republic, accompanied by a strong increase in trade with France, Britain, Slovakia, China, and Japan. Poland's IIT with these five countries was higher than in 2007 and 2008. In the case of Germany and the Czech Republic, the level of IIT in 2010 was also higher than in 2007 and 2008, despite the decrease from 2009. This data confirms that the Polish economy is doing relatively well compared with the economies of other industrialized countries.

Poland's horizontal and vertical intra-industry trade with selected partners at the start of the 21st century

Aggregate intra-industry trade data does not make it possible to identify the detailed characteristics of these trade flows. Meanwhile, it is important to determine whether intra-industry trade involves the turnover of intermediaries rather than final products because these two types of trade testify to different characteristics of the countries

involved. To more clearly show the features of this trade and its participants, we divide IIT into horizontal and vertical. We disaggregate the latter depending on whether the quality of the analyzed product in exports is higher or lower than in imports.

Horizontal intra-industry trade is based on the exchange of varieties of products of similar quality but with different non-qualitative characteristics important from the perspective of consumers. Vertical intra-industry trade involves an exchange of varieties of final goods of different quality or final goods and intermediate products from the same industry. The division into horizontal and vertical intra-industry trade is based on the assumption that differences in the quality of products are reflected in different price levels. It is assumed that the unit values (and therefore price) of homogeneous (or very similar) products are concentrated around a mean value in exports to different countries. When, on the other hand, a product is highly differentiated, then the unit values and prices vary, which suggests differences in the quality of the varieties exported to different countries and imported from them.

This means that we deal with horizontal intra-industry trade when the relative unit values of simultaneous exports and imports of similar products are within a narrow range. In this study, we treat intra-industry trade—in the case of which the ratio of the unit values of exports and imports is in the [0.87[10]–1.15] range—as horizontal intra-industry trade. In the opposite case, i.e. when the differences between the unit values are significantly large, we consider intra-industry trade to be vertical.

Table 11

Poland's horizontal intra-industry trade with selected EU member states and with China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	5.7	5.9	3.9	5.7	5.8	8.8	8.8
Germany	7.0	9.0	10.5	8.9	10.3	8.6	9.9
Britain	4.2	3.0	3.2	2.9	2.3	3.8	5.2
EU15	5.4	6.0	6.4	6.7	7.2	7.2	7.7
Czech Republic	9.2	11.0	7.8	9.6	12.9	11.1	14.1
Slovakia	7.0	7.4	8.1	9.0	7.8	7.9	7.8
EU11	8.0	7.5	6.1	7.2	8.8	8.3	9.5
EU26	5.8	6.4	6.6	6.8	7.1	7.5	8.1
China	2.3	3.5	0.7	0.5	0.3	0.7	0.5
Japan	0.4	0.2	0.4	0.9	0.4	0.3	2.0

Source: Own calculation based on: http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

[10] Strictly speaking, the lower boundary of the range used in the study is 0.869565217391304, which represents the opposite boundary to 1.15. For simplicity, we round it off to two decimal places.

The share of horizontal intra-industry trade in Poland's trade in goods with the EU26 increased steadily from 5.79% in 2004 to 8.09% in 2010 (Table 11). The share of horizontal trade in Poland's trade with the EU15 also grew steadily in that period (from 5.4% in 2004 to 7.7% in 2010). In dealings with the EU11, this form of trade declined from 8% in 2004 to 6.1% in 2006. In 2007 and 2008, it increased (reaching 8.8% in 2008), and then, during the economic crisis (2009), its share dropped slightly to 8.3%, only to rise again (by 1.2 p.p.) in 2010. Horizontal IIT also rose in trade with the EU26 (by 0.6 p.p.) and the EU15 (by 0.5 p.p.). Consequently, in the last analyzed year, the highest shares of horizontal intra-industry trade were noted for each group of countries. The steady increase in these shares in Poland's overall trade with the EU26 and EU15 may indicate a continuous improvement in the competitive position of many Polish goods in trade with the EU as a whole and with the EU15.

In trade with Germany, the share of horizontal intra-industry trade was subject to fluctuations. In 2004–2006, it rose to 10.5%; in 2007 it fell; in 2008 it increased again; in 2009 it dropped, and in 2010 it rose once more. Yet it did not reach its pre-crisis level, nor its record level from 2006, when it exceeded 10%. In trade with Britain, horizontal intra-industry trade also underwent changes, but in 2010 it reached a record share of 5.2% (which means it increased by almost 1 percentage point compared with its previous high in 2004). The share of horizontal trade in Poland's turnover with the Czech Republic also increased by almost 5 p.p. (2010 was when Poland's turnover with the Czech Republic was marked by the highest share of horizontal trade).

Horizontal trade accounts for a small proportion of Poland's commerce with the analyzed Asian countries. The largest share of horizontal trade was recorded in turnover with China in 2005 (3.5%). Horizontal trade with Japan increased in 2010, reaching its highest level of 2%, but it remains far less important than in trade with EU countries. In the case of this type of trade it can be the most clearly seen why intra-industry trade is the specialty of countries that are close geographically, culturally and economically. The subjects of horizontal trade are close substitutes of similar quality and therefore with similar production costs. In the case of trade of such substitutes, a major expense is transaction costs related to international trade, especially the cost of transport. Since these costs tend to grow with the distance between trading countries, this discourages partners from buying varieties coming from a distant partner, while encouraging the purchase of substitutes produced in neighboring countries.

The share of vertical intra-industry trade in which Poland exports relatively high-quality goods, compared with imports, grew moderately in turnover with the EU26, reaching 7.9% in 2008. In 2009, the figure increased to 10.3%, followed by a decline to 9.2% in 2010 (Table 12). The latest changes were brought about by a dynamic increase in the share of this type of exchange with the EU15 and EU11 in 2009 (by 1.3 p.p. and 1.6 p.p. respectively) and by a decreased role of intra-industry trade in turnover with the EU15 (by 0.5 p.p.) and with the EU11 (by 3.2 p.p.) in 2010. Even though at the beginning of the crisis Poland improved its position in intra-industry trade,

delivering relatively high-quality products, in 2010 it began to lose out (a similar trend was evident in trade with Germany and the Czech Republic). This means that Poland will lose some of its advantage in the production of diversified goods subject to intra-industry trade (this is confirmed by the previously described increase in the share of horizontal trade in exchange with the EU26, the EU15, and with Germany and the Czech Republic, for example). It seems that in trade of many products, vertical trade involving high-quality Polish exports has been replaced by horizontal trade. However, Poland lost some ground in vertical trade involving relatively high-quality exports to Slovakia. After initial increases, the role of vertical trade involving high-quality Polish exports declined in exchange with new member states (EU11), which means that Poland is losing its previous competitive advantage with regard to this group of partners.

Table 12

Vertical intra-industry trade with the high-quality Polish exports to selected EU member states and to China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	5.2	5.0	4.5	7.4	7.4	8.9	9.2
Germany	7.4	6.8	7.0	10.0	12.7	14.4	13.7
Britain	4.7	4.7	15.3	3.7	4.0	5.6	5.4
EU15	6.5	6.0	6.9	7.9	9.1	10.4	9.9
Czech Republic	9.4	9.8	12.7	11.7	11.4	12.8	8.4
Slovakia	5.6	4.7	5.1	5.9	7.1	7.5	6.4
EU11	6.6	6.6	8.5	7.7	8.0	9.6	6.4
EU26	6.5	6.2	7.4	7.9	7.9	10.3	9.2
China	5.5	3.2	2.9	3.0	4.2	4.3	5.3
Japan	5.7	7.2	4.5	2.8	8.5	5.9	5.0

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

Until 2007, the share of vertical trade in which Poland exports high-quality products was relatively stable in turnover with Germany (ranging from 7.4% in 2004 to 7% in 2006), after which it increased by 3 p.p. in 2007. During this period, the share of the same type of trade in turnover with Britain underwent considerable fluctuations. In 2006, it increased to 15.3% from 4.7%, and then dropped to 3.7% in 2007. Meanwhile, the share of this type of trade in exchange with Slovakia was relatively stable, ranging from 4.67% in 2005 to 5.9% in 2007, while in exchange with the Czech Republic it changed by no more than 3 p.p.

In the case of the analyzed Asian countries, the share of vertical trade with high-quality Polish exports did not exceed 8.5% at any time and for any of the partners, with a record figure recorded in turnover with Japan in 2008.

Table 13

Vertical intra-industry trade with low-quality Polish exports to selected EU member states and to China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	11.2	11.2	10.7	13.9	13.6	9.4	9.8
Germany	16.7	14.9	14.3	15.1	14.5	15.5	14.6
Britain	10.2	6.5	6.9	14.9	15.2	10.1	14.2
EU15	12.1	11.2	11.5	12.5	12.7	11.5	11.7
Czech Republic	13.1	12.4	10.6	11.7	10.8	10.1	11.0
Slovakia	4.9	5.5	5.8	5.3	6.5	6.1	8.8
EU11	8.1	8.9	8.7	8.8	8.6	6.9	9.3
EU26	11.4	10.5	10.8	11.8	11.7	10.6	11.2
China	0.6	0.8	1.0	1.2	1.3	1.0	1.3
Japan	1.7	1.5	1.5	2.5	1.3	2.8	5.1

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

The share of vertical trade in which Poland exports low-quality goods in the country's total turnover with the EU26 is relatively stable (Table 13) and has stayed within the 10.5%–11.8% range. Similarly, the share of this type of trade in Poland's turnover with the EU15 has remained at a relatively equal level, ranging from 11.2% in 2005 to 12.7% in 2008. The greatest fluctuations were recorded in this kind of trade in turnover with the EU11. In this case, after a rise to 8.9% in 2005, the share remained stable until 2008, but then declined to 6.9%. However, in 2010, the figure increased significantly again (by 2.4 p.p.).

During the studied period, vertical trade in which Poland exports low-quality goods was losing its importance in trade with Germany, France, and the Czech Republic. On the other hand, it gained importance in trade with Slovakia. In trade with Britain, this type of exchange was subject to considerable fluctuations. a record share of 15.2% was observed in 2008, while the lowest figure of 6.5% was in 2005. In the exchange of goods with the analyzed Asian countries, vertical trade in which Poland exports low-quality goods played a small, though growing, role throughout the period. Larger shares of this type of trade in all the analyzed years were seen in trade with Japan, which is a relatively more developed country. This points to the relative predominance

of Japan in production of the traded goods. Moreover, in the last analyzed year, the share of this type of exchange nearly doubled.

Intra-industry trade and key products exported by Poland to selected markets in the 2004–2010 period

Data on total IIT as well as horizontal and vertical trade do not make it possible to find out how intra-industry trade fares in the case of individual commodity groups. Such information is important because a steady growth in the role of intra-industry trade (especially horizontal and vertical trade in which Poland exports high-quality goods) in the trade of products from industries that lead the way in Poland's exports is more important than periodic surges in other industries. Many industries display major fluctuations; they occur in opposite directions and do not show a definite trend. Therefore, it is worth examining the role of intra-industry trade in the exchange of products from industries that are the most prominent in Poland's overall trade. This makes it possible to evaluate the possibilities for Poland's best export products on the markets of the country's main trading partners. The industries in question are machinery and vehicles—which, due to the variety of products they manufacture, are good candidates for intra-industry trade.

The machinery sector recorded steady growth in the share of IIT in Poland's turnover with the EU26, from 23.6% in 2004 to 28.1% in 2008 (Table 14). At the time of the economic crisis, however, intra-industry trade declined (the total decrease in its share in the 2008–2010 period was 3.4 p.p.). The increased role of IIT of machinery in Poland's trade with the EU26 was mainly due to an increase in this exchange with the EU15 in 2004–2008 and a major rise in trade with the EU11 in 2008. On the other hand, the drop during the crisis was largely the consequence of a significant weakening in the intra-industry trade of machinery with the EU15.

Throughout the studied period, IIT of machinery accounted for about one-third of the total value of Poland's trade in machinery with Germany. Even higher shares of intra-industry trade of machinery were recorded in turnover with the Czech Republic. Worryingly, however, the share of this type of trade decreased in the 2009–2010 period in trade with Germany and France and in general with all the most developed economies of the EU, i.e. the EU15. If this trend continues, it would weaken Poland's competitive position in the trade of its main export products.

In trade with the analyzed Asian countries, IIT of machinery has a relatively good position. Its share ranged from 2.8% in 2005 to 16.5% in 2010 (in trade with Japan).

Throughout the analyzed period, horizontal IIT of machinery played a marginal role in trade with all the partners studied. In Poland's trade with the EU26, the share of horizontal IIT of machinery ranged from under 2% in 2009 to 4% in 2005. The low level of this type of trade is chiefly the result of insubstantial intra-industry trade of

machinery with the EU15. Similar changes occurred in this type of trade in Poland's exchange with EU15 countries such as Germany, France, and Britain, as well as with the Czech Republic and all EU11 countries, except that in trade with the EU11 and with France and the Czech Republic, the last analyzed year was a record year, while in trade with Germany and the EU15 Poland failed to achieve a level similar to the record level in 2005. The drop in the share of horizontal trade in 2009 in exchange with all partners (except Britain and the Czech Republic) may point to both a decrease in consumption across the EU and the fact that Poland's trade of machinery was chiefly limited to vertical trade.

Table 14

Poland's intra-industry trade of machinery and electrical equipment with selected EU member states and with China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	26.4	22.3	15.5	26.3	24.1	22.3	20.5
Germany	33.0	32.0	31.6	33.5	39.3	35.9	33.5
Britain	17.5	12.2	33.8	14.8	14.4	11.9	15.3
EU15	23.6	22.7	24.4	26.0	28.8	26.8	24.9
Czech Republic	34.7	38.5	30.8	34.1	36.3	37.1	35.3
Slovakia	23.3	17.2	14.8	14.3	16.2	13.2	21.0
EU11	24.0	23.3	21.9	20.8	23.6	22.8	23.3
EU26	23.6	22.7	24.1	25.4	28.1	26.2	24.7
China	6.4	8.5	6.5	6.2	6.3	6.4	7.3
Japan	3.1	2.8	3.7	7.5	14.8	7.9	16.5

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

In trade with Asian countries, horizontal intra-industry trade of machinery plays hardly any role. It has a negligible share not exceeding 1%. The only exception was China in 2005–2006, when the figure ranged between 1.2% and 1.3%. In our opinion, this situation is further confirmation that geographical distance and cultural and income differences between trading partners have a large negative impact on horizontal trade.

The vertical trade of machinery with the EU26, in which Poland exports high-quality goods, declined after posting a record level in 2009, when its share was 11.3%—see Table 16. In turnover with the EU15, the largest share of this type of trade was also noted during the crisis (10.9% in 2009), while a year later it decreased significantly (by 2.6 p.p.). a similar situation occurred in the case of the EU11: the best year was 2009 (when the share of this type of trade was 13.5%), after which

a significant decrease was recorded (by 7.7 p.p.). At the same time, Poland failed to maintain its competitive advantages in the export of high-quality machinery in trade with both the EU26 and the EU15 as well as the EU11. The decreases occurred at a time when the economic crisis appeared to be waning. Could it be that the increases in 2009 only reflected the good value for money in the case of Polish machinery, rather than a lasting improvement in their competitive position? Another unsettling development is considerable annual fluctuations in the role of vertical trade whereby Poland exports relatively high-quality machinery to various EU countries, which may show that Polish products do not have a stable position on these markets. For example, in 2007, this type of trade accounted for 3.1% of Poland's total trade with Britain, down from a record 26.8% a year earlier (a decrease of 23.7 p.p.). In turnover with the Czech Republic the share of this type of trade increased from 13.3% in 2008 to 21.2% in 2009, and then decreased again to 10.3%. With Germany, this type of trade was more stable, though in 2008 it increased by almost 10 p.p.

Table 15

Poland's horizontal intra-industry trade of machinery and electrical equipment with selected EU member states and with China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	2.9	1.9	2.5	2.9	4.5	1.6	4.9
Germany	1.8	6.4	5.1	2.8	2.6	1.3	4.1
Britain	1.3	1.9	1.6	1.1	1.3	1.5	1.5
EU15	2.0	4.0	3.0	3.1	2.8	1.6	3.5
Czech Republic	4.1	5.1	3.5	4.7	5.7	6.4	14.7
Slovakia	4.7	4.4	2.2	1.8	2.5	1.5	2.9
EU11	4.4	4.2	3.9	3.4	4.9	3.7	6.4
EU26	2.2	4.0	3.1	3.1	3.1	1.9	5.0
China	0.1	1.3	1.2	0.7	0.5	0.7	0.5
Japan	0.0	0.2	0.5	0.8	0.7	0.5	0.5

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

In relations with China and Japan, the role of vertical trade in which Poland exports relatively high-quality machinery is gaining importance, though the increases between 2004 and 2010 period were small, 0.6 p.p. in the case of China and 1.4 p.p. in the case of Japan. The structure of Poland's IIT of machinery with Japan was favorable to Poland before the crisis, because until 2008 vertical trade in which Poland exported high-quality products was the predominant form of this exchange. However, in 2009-2010, the position of this form of exchange in intra-industry trade with Japan decreased

considerably. This type of trade of machinery also accounts for a sizeable portion of Poland's trade of goods with China, which points to Poland's relative technological advantage in the production of machinery.

Table 16

Vertical intra-industry trade with Poland exporting high-quality machinery and electrical equipment to selected EU member states and to China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	5.8	5.8	3.2	6.9	5.6	8.1	4.2
Germany	9.6	4.8	6.5	10.7	16.5	12.6	11.4
Britain	6.5	3.8	26.8	3.1	3.8	3.9	4.9
EU15	7.3	5.0	8.5	8.0	10.7	10.9	8.3
Czech Republic	8.3	9.9	12.0	13.0	13.3	21.2	10.3
Slovakia	7.8	4.5	6.1	5.8	8.2	6.4	4.5
EU11	6.0	5.6	8.9	6.9	7.8	13.5	5.8
EU26	7.2	5.1	8.6	7.9	10.3	11.3	7.9
China	5.2	5.9	4.4	4.6	5.0	5.2	5.8
Japan	2.0	1.3	2.1	3.9	12.5	2.8	3.4

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

Table 17

Vertical intra-industry trade with Poland exporting low-quality machinery and electrical equipment to selected EU member states and to China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	17.6	14.6	9.8	16.5	14.0	12.6	11.4
Germany	21.6	20.8	20.1	20.0	20.3	22.0	18.0
Britain	9.7	6.6	5.4	10.5	9.3	6.5	8.8
EU15	14.3	13.7	12.9	14.9	15.4	14.2	13.1
Czech Republic	22.3	23.5	15.3	16.5	17.3	9.6	10.3
Slovakia	10.8	8.2	6.5	6.7	5.6	5.3	13.7
EU11	13.6	13.6	9.2	10.5	10.9	6.0	11.2
EU26	14.2	13.7	12.5	14.4	14.8	13.0	12.8
China	1.1	1.3	0.9	0.9	0.9	0.5	1.0
Japan	1.1	1.2	1.1	2.9	1.7	4.7	12.6

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

In 2010, Poland did not manage to maintain its good position in vertical intra-industry trade with its export of relatively high-quality machinery, while the role of vertical intra-industry trade in which Poland exports low-quality machinery was relatively stable in the country's turnover with both the EU26 and the EU15 (Table 17). The latter type of trade was less stable in Poland's turnover with the EU11, since its share fell by 4.4 p.p. in 2006 and then continued to run at 10.5% until 2009, when it decreased by almost 5 p.p.; in 2010, it revived again to 11.2%. In an unsettling development, the share of vertical intra-industry trade in which Poland exports low-quality machinery increased in the country's exchange with EU partners on markets where Polish machinery had already made a mark for themselves.

The form of vertical intra-industry trade in which Poland exports low-quality machinery is also gaining importance in Poland's turnover with Japan. This was especially true of the crisis period. In 2009, the share of this type of trade increased by almost 3 p.p., followed by 8 p.p. in 2010. While the growing share of this form of trade in Poland's exchange with Japan may mean that Polish goods are entering Japan's technologically advanced machinery market more aggressively than previously, it also suggests why vertical trade in which Polish exports high-quality products is declining, what is an undoubtedly negative trend (see Table 7).

Table 18

Poland's intra-industry trade of vehicles with selected EU member states and with China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	29.2	36.8	26.3	39.7	38.3	34.7	35.4
Germany	50.1	48.4	51.7	45.1	47.4	58.4	58.8
Britain	40.0	27.3	27.8	41.0	44.3	40.1	51.0
EU15	40.6	39.8	40.3	39.5	41.4	47.6	47.3
Czech Republic	26.7	28.0	37.9	33.0	38.6	36.7	36.0
Slovakia	22.2	11.1	20.0	17.1	29.4	37.8	32.5
EU11	20.3	20.5	34.8	33.3	34.6	34.3	34.5
EU26	38.2	37.1	39.5	38.6	40.5	45.8	45.7
China	56.0	55.6	7.0	4.8	6.0	8.0	10.8
Japan	1.7	21.8	10.1	5.7	9.8	14.4	16.5

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

Vehicles are the second most important industry in terms of Poland's exports. The share of intra-industry trade of vehicles in Poland's turnover with the EU26 showed an upward trend, though slight declines were recorded in 2005, 2007 and 2010. a particularly sharp increase took place in 2009, by 5.3 p.p. The growing share

of IIT of vehicles in Poland's overall trade with the EU26 is chiefly due to the growing role of this form of trade in relations with the EU15. The good news for Poland is a marked increase in the share of this type of trade in the country's commerce with the EU15 during the crisis period (from 41.4% in 2008 to 47.6% in 2009, followed by a subsequent stabilization). Another positive development is that the share of IIT in vehicles in Poland's turnover with Germany has remained at record levels (over 58%) since 2009 (when it soared by more than 6 p.p.), and that it increased in the case of Britain by 10.9 p.p. in 2010. Far less intense was intra-industry trade of vehicles with the EU11, although in this case a well-established upward trend was reported, with its share rising from 20.3% in 2004 to 34.8% in 2006, a level that remained roughly unchanged until 2010.

At the beginning of the analyzed period, intra-industry trade dominated Poland's overall trade of vehicles with China (Table 18). After several years of a sharp slide, intra-industry trade of vehicles regained its importance during the crisis period, yet it remained far lower than in the first two analyzed years. The role of IIT in Poland's overall trade of vehicles from Japan has been relatively substantial albeit unstable as well.

Table 19

Horizontal intra-industry trade of vehicles with selected EU member states and with China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	17.6	24.4	10.7	16.2	13.8	16.2	17.7
Germany	20.0	23.9	34.0	17.6	24.6	21.1	18.7
Britain	16.4	10.8	8.2	4.5	1.8	8.3	6.1
EU15	16.7	18.0	20.8	12.3	15.9	19.0	14.4
Czech Republic	10.0	14.3	9.8	10.5	10.4	15.2	16.1
Slovakia	3.9	1.3	3.2	3.9	6.8	13.1	5.6
EU11	8.6	9.8	5.1	5.1	8.3	16.3	14.6
EU26	15.8	16.9	18.4	11.3	14.8	18.6	14.4
China	23.3	53.5	0.5	0.1	0.2	1.5	0.5
Japan	0.0	0.0	0.0	1.2	0.0	0.0	5.4

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

Poland's horizontal trade of vehicles was subject to considerable fluctuations for all groups of EU member states (Table 19). The role of this type of trade was relatively stable in turnover with the EU26, where it ranged from a low of 11.3% in 2007 to a high of 18.6% in 2009. More considerable fluctuations were noted in the share of horizontal IIT in Poland's overall trade with the EU11: from 9.8% in 2005 to 5.1% in 2006, while in 2009 a new high was set at 16.3% (up by 8 p.p. over 2008). In 2010,

a decline was recorded in the case of all groups of Poland's trading partners within the EU and most individual countries with the exception of the Czech Republic and France. For example, in turnover with Germany, horizontal IIT of vehicles shrank in both 2009 and 2010, after a periodic rise in 2008 (when the share stood at 24.6%, far below a high of 34% in 2006). Earlier, in 2007, the share of horizontal IIT of vehicles also dropped in Poland's turnover with Germany. On the other hand, in turnover with Japan, the share of this type of trade increased by 5.4 p.p. in 2010.

Overall, Poland maintained its competitive position in this particular industry even during the crisis period. Yet this position has been unstable, with large fluctuations in the role of horizontal trade in vehicles. An especially unsettling trend is a drop in the intensity of this type of trade in Poland's commerce with Germany.

The kind of vertical trade in which Poland exports vehicles of higher quality than those it imports from the EU26 reached its highest value in 2009, at 6%. Before the economic crisis began, the share of this type of vertical IIT was relatively stable in Poland's turnover with the EU26. In 2010, the intensity of this type of trade decreased in the case of all groups of countries, especially the EU11 (down by 6.7 p.p.), as well as in turnover with Germany, France, the Czech Republic, and Slovakia. In commerce with China and Japan, the kind of vertical trade in which Poland exports high-quality vehicles was relatively important at the beginning of the analyzed period (at 32.7% with China in 2004, and 21.3% with Japan in 2005). Later, its shares declined considerably (by over 30 p.p. with China in 2005 and by nearly 12 p.p. with Japan in 2006). Overall, however, the fact that this form of trade continued to account for more than 10% of Poland's overall trade with Japan in 2010 can be considered a success.

Table 20

Vertical intra-industry trade with Poland exporting high-quality vehicles to selected EU member states and to China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	5.4	4.5	4.5	9.6	3.7	14.2	12.8
Germany	12.8	14.2	10.1	18.8	14.9	24.7	22.9
Britain	3.3	3.6	2.9	3.3	2.5	5.2	5.3
EU15	11.3	10.9	8.8	13.6	10.8	16.2	16.0
Czech Republic	14.5	7.1	24.8	13.8	21.1	17.5	10.5
Slovakia	10.2	2.1	7.6	5.2	15.4	22.7	5.0
EU11	9.4	5.5	12.3	8.6	12.4	14.7	8.0
EU26	11.1	10.2	9.3	12.8	11.0	16.0	15.0
China	32.7	2.0	6.4	4.4	5.5	6.0	6.7
Japan	0.7	21.3	9.8	2.5	9.6	13.6	10.5

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

The losses incurred by Polish vehicle exporters as a result of a decreased share of their products in vertical exchange with Polish high-quality exports as well as in horizontal exchange have been offset by their increased role in the vertical trade of vehicles with Poland exporting low-quality products (or intermediaries); see Table 21. Such is the case with Poland's trade with the EU26, EU15 and the EU11 as well as with Germany and Britain. The increased role of vertical trade in which Poland exports low-quality products is a negative trend because Poland is strengthening its position as a supplier of products that are usually the domain of countries less developed than their partners. Moreover, these products, due to their relatively low level of technological advancement, are relatively easy to replace with deliveries from other countries. This type of exchange is sometimes a form of entering the markets of developed countries by nations that have just entered a phase of industrialization, while Poland is a member of the EU and is part of the Single European Market, so this breakdown of intra-industry trade, now unfavorable to Poland, can be expected to improve. The good news is that the type of vertical trade in which Poland exports relatively high-quality products plays a role similar to that of the kind of vertical trade in which Poland exports relatively low-quality products. This may indicate that Poland provides not only intermediate goods for the production of vehicles, but also final products of better quality.

Table 21

Vertical intra-industry trade with Poland exporting low-quality vehicles to selected EU member states and to China and Japan, 2004–2010 (%)

Country/group of countries	2004	2005	2006	2007	2008	2009	2010
France	6.2	8.0	11.1	14.0	20.8	4.3	4.9
Germany	17.3	10.3	7.7	8.6	7.8	12.6	17.2
Britain	20.3	12.9	16.9	33.3	40.0	26.6	39.7
EU15	12.6	10.8	10.8	13.7	14.8	12.4	17.0
Czech Republic	2.3	6.6	3.3	8.7	7.2	4.1	9.4
Slovakia	8.1	7.7	9.2	8.0	7.2	2.1	22.0
EU11	2.2	5.1	17.4	19.5	14.0	3.4	11.9
EU26	11.4	10.0	11.8	14.5	14.6	11.2	16.3
China	0.1	0.1	0.1	0.3	0.3	0.5	3.6
Japan	1.0	0.4	0.3	2.0	0.1	0.8	0.7

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

Table 22

Product intra-industry trade in Poland's turnover with selected EU member states and with China and Japan, 2004–2010 (%)

Country	2004	2005	2006	2007	2008	2009	2010
China	16.7	20.4	22.2	24.5	25.1	29.7	31.6
Czech Republic	60.3	59.8	61.8	64.5	66.4	66.4	66.4
France	45.7	44.7	49.5	50.3	50.9	51.9	54.3
Japan	16.3	20.4	19.8	21.3	21.9	21.7	25.2
Germany	64.6	60.0	61.6	60.8	62.9	68.7	66.1
Slovakia	40.6	39.6	45.1	50.7	51.7	50.2	54.3
Britain	39.1	35.7	38.5	40.7	43.0	44.4	45.6

Source: Own calculation based on http://epp.eurostat.ec.europa.eu/newxtweb/, accessed Nov. 4, 2011.

Another method for studying intra-industry trade is to analyze product IIT (Table 22). In Poland's turnover with other European Union countries (except Britain), most product varieties have been subject to intra-industry trade since 2007. The share of product IIT has grown in trade with both old and new member states since 2004, though with varying intensity. The index of Poland's product intra-industry trade with other EU countries is significantly higher than general and sector IIT indices. This shows that even though most product varieties subject to trade are also covered by intra-industry trade, the volume of IIT is relatively small. The fact that the product IIT indices are relatively higher than traditional intra-industry trade indices shows that the goods covered by intra-industry trade are strongly diverse rather than that this exchange focuses on specific types of products.

Summary and conclusions

This analysis of Poland's foreign trade shows that its volume in the case of EU countries is completely different than in the case of non-EU countries. At the same time, Poland's imports and particularly exports are strongly dependent on what happens in other EU economies, especially in Germany. Poland also depends on Russia because of the considerable role of raw materials imported from that country. These imports make Russia the second-largest supplier of goods to the Polish market. The dependence on Russia seems to be even more dangerous because, while Poland has some impact on decisions concerning the EU economy, it has no influence on Russian policy, including that country's economic policy. No less disturbing is Poland's growing deficit in trade with Russia. Since Poland cannot afford to become independent of Russian raw materials, not even in the short run, it should work to encourage Russia

to increase its purchases of Polish products, for example by highlighting the reputation that Polish consumer goods once enjoyed on that market.

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2.2. Poland's Investment Attractiveness

Marzenna Anna Weresa, Tomasz Napiórkowski

Foreign direct investment (FDI) attractiveness is one of the basic indicators of a country's competitive position. There are two types of FDI, inward and outward. Changes in FDI inflows and inward stocks show a country's ability to attract foreign resources and use them for building national competitiveness. Foreign companies can be attracted by natural resources, the size and growth of a market, gains in efficiency, or the presence of strategic assets, such as qualified labor or technology (Dunning, 1981). Therefore the ability to attract foreign capital by creating a favorable business environment reflects, to some extent, the current competitive position of a country compared with other economies.

On the other hand, FDI inflow can shape the current competitive position of a host country by adding new resources, increasing competition, or creating different learning spillovers (Narula, 2009). Therefore the size of FDI inflows and inward stocks also shows the potential for building the competitive advantages of a country in the future.

The second type of FDI, i.e. FDI outflows from a country as well as outward stocks of FDI located abroad, shows the strength of the competitive advantages of local companies. In order to invest abroad, local companies should possess special ownership advantages that allow them to face global competition.

This theoretical context determines the focus of this subchapter. The aim is to assess Poland's position in terms of foreign capital flows and stocks compared with

those of its peers, i.e. selected EU10 countries.[11] This assessment is supplemented by an econometric study focused on FDI determinants that are significant for attracting FDI to EU10 countries. In particular, the importance of education is estimated in enhancing FDI flows into selected new EU member states including Poland. The results make it possible to draw conclusions for policy aimed at increasing the country's attractiveness to foreign investors.

FDI inflows and inward stock: Poland and other EU10 countries compared

The global financial crisis caused a huge slowdown in inward FDI flows to Poland and other countries in the region. In 2008–2009 FDI flows to EU10 countries declined from €53,135 million in the peak year 2007 to €19,857 million in 2010. The highest decline, by more than half on an annual basis, was observed in 2009. In 2010, total inflows to EU10 remained at nearly the same (relatively low) level as in 2009. Poland also experienced a slowdown in FDI inflows, but the country was not hit by the crisis as hard as many other EU10 member states. Poland's share in total FDI inflows into the EU10 region remained relatively stable during the 2004–2010 period and this country was the most attractive among EU10 member states to foreign investors; the value of FDI invested in Poland constituted more than one-third of the total foreign direct investment flows into this region (Table 23). Nevertheless, comparing Poland's investment attractiveness with those of other EU10 countries, it should be noted that in 2010 only three countries in this group experienced declines in FDI inflows compared with the preceding year. These countries were Poland, Bulgaria and Romania. In other EU10 countries, a recovery in FDI inflows was observed, with a particularly significant inflow in the Czech Republic. In that country, the value of the FDI inflow doubled in 2010 over 2009, putting the Czech Republic in second place (just after Poland) among the largest FDI recipients in the EU10 region (Table 23). a year later the recovery was also felt in Poland. Preliminary estimates for 2011 based on NBP data show that the inflow of foreign investment to Poland increased by more than half, from €6.7 billion in 2010 to over €10 billion in 2011. Despite this growth, in 2011 FDI inflows into Poland remained below their pre-crisis average and nearly 30 percent below their 2007 peak.

[11] The EU10 are post-socialist countries that joined the European Union in 2004 (Poland, the Czech Republic, Slovakia, Hungary, Slovenia, Estonia, Latvia, and Lithuania) and in 2007 (Bulgaria and Romania).

It is worth comparing Poland's investment attractiveness during the global crisis with those of Romania and Bulgaria. These countries, after they joined the EU in 2007, were regarded as Poland's main competitors in the region as capital recipients, due to similar market potential and relatively lower labor costs. However, after a period of dynamic growth in FDI inflows just before their EU accession, they experienced tremendous decreases in foreign capital inflows during the global crisis as they were less resistant to external shocks than Poland. As a result of these changing trends, Poland managed to maintain its leading role in the region in terms of investment attractiveness measured by the inflow of foreign capital.

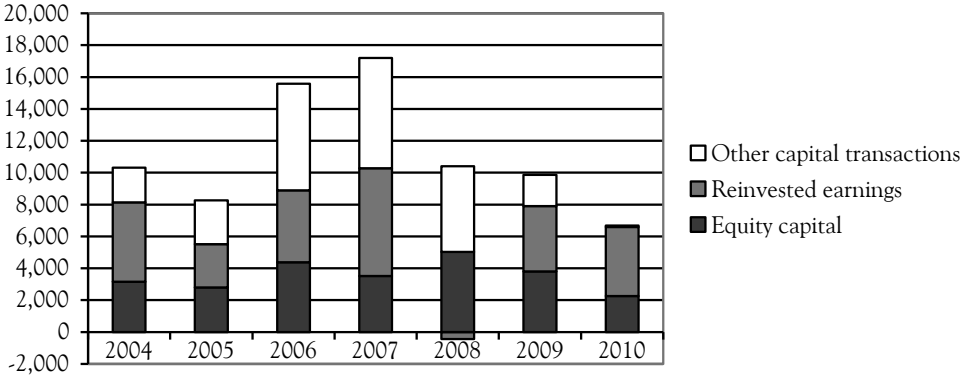
Table 23
Inflow of FDI to Poland and other EU10 countries in 2004–10 (€ million and %)

	FDI inflows (in millions of euros)							Share in total inflow to EU10 (%)	
	2004	2005	2006	2007	2008	2009	2010	2004	2010
Bulgaria	2,739	3,152	6,222	9,052	6,728	2,437	1,779	8.9%	9.0%
Czech Republic	4,009	9,374	4,355	7,633	4,415	2,111	5,122	13.0%	25.8%
Estonia	771	2,307	1,432	1,985	1,182	1,323	1,162	2.5%	5.9%
Hungary	3,630	6,203	5,868	2,886	4,329	1,119	1,366	11.8%	6.9%
Latvia	517	573	1,339	1,704	862	67	284	1.7%	1.4%
Lithuania	623	826	1,448	1,473	1,341	47	568	2.0%	2.9%
Poland	**10,382**	**8,265**	**15,578**	**17,221**	**10,059**	**9,835**	**6,686**	**33.6%**	**33.7%**
Romania	5,182	5,215	9,034	7,254	9,496	3,486	2,219	16.8%	11.2%
Slovakia	2,442	1,952	3,732	2,618	3,203	–4	397	7.9%	2.0%
Slovenia	562	662	504	1,309	1,330	–470	274	1.8%	1.4%
Total EU10	30,857	38,529	49,512	53,135	42,945	19,951	19,857	100.0%	100.0%

Source: Author's elaboration based on Eurostat data, accessed March 30, 2012.

While in 2009 the structure of the FDI inflow into Poland was relatively balanced, in 2010 reinvested earnings played the key role, constituting 65% of the total inflow. Equity capital, at €2,251 million, represented nearly 34% and other capital transactions accounted for the remaining 1% (NBP, 2011, p. 5) (Figure 3).

Figure 3
FDI inflow into Poland by main components, 2004–2010 (€ million)



Source: Author's estimates based on NBP data.

In 2010, about 85% of the foreign capital inflow into Poland was intra-EU investment, one-fifth of which was investment by new EU member states. Moreover, the share of EU countries in the FDI inflows into Poland has increased. In 2010, it was 3 percentage points higher than in 2009.

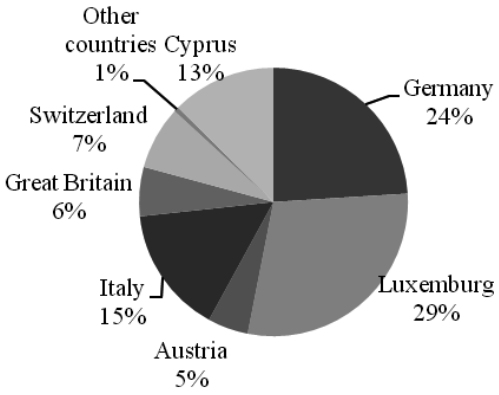
Luxembourg was the largest investor in Poland in 2010, accounting for 29.1% of the total FDI inflow into Poland. Germany, the leader in 2009, was second in 2010, with 24.0%, and Italy was third with 15.3%, followed by Cyprus (12.6%), Britain (5.9%), and Austria (4.9%).

A major non-EU investor country in 2010 was Switzerland (7.6%), while there occurred some withdrawal of capital (-€ 131 million) by investors from the United States (NBP, 2011, p. 11).

The global crisis caused fluctuations in the FDI inflow into Poland in 2008–2011 and shaped the value of the total inward stock[12] of FDI located in the country. By the end of 2010, the total FDI stock located in Poland amounted to €150.4 billion (Table 24). However, a slowdown in the rate at which the FDI stock grew in Poland caused a small decline in Poland's share in the total FDI stock located in the EU10. In 2004, Poland's share stood at 30.1%, and after some fluctuations in 2005-2009, it reached 29.4% in 2010. Poland maintained its leading position among the EU10 countries with regard to the value of foreign investment stock, followed by Hungary (20.1% in 2010) and the Czech Republic (19.7% in 2010) (Table 24).

[12] According to UNCTAD, FDI stock is the value of the share of the capital and reserves (including retained profits) attributable to the parent enterprise, plus the net indebtedness of affiliates to the parent enterprises.

Figure 4
FDI inflow into Poland in 2010 broken down by investing countries (%)



Source: Author's elaboration based on NBP (2011), pp. 5–18.

Table 24
Foreign direct investment inward stock in Poland compared with other EU10 countries in 2004-2010 (€ million and %)

	FDI inward stock (in millions of euros)							Share in FDI stock in EU10 (%)	
	2004	2005	2006	2007	2008	2009	2010	2004	2010
Bulgaria	7,420	11,738	17,831	25,770	31,659	34,171	36,173	3.5%	4.5%
Czech Republic	42,036	51,433	60,643	76,315	81,468	87,304	95,262	19.9%	19.7%
Estonia	7,374	9,561	9,644	11,386	11,775	11,654	12,302	3.5%	3.7%
Hungary	45,874	52,341	62,488	64,947	62,005	68,279	67,024	21.8%	20.1%
Latvia	3,349	4,199	5,747	7,534	8,063	7,998	8,108	1.6%	1.6%
Lithuania	4,690	6,921	8,377	10,283	9,191	9,560	10,297	2.2%	2.7%
Poland	**63,428**	**76,673**	**95,417**	**120,726**	**116,914**	**128,948**	**150,441**	**30.1%**	**29.4%**
Romania	15,040	21,865	34,494	42,799	48,345	49,889	52,866	7.1%	8.4%
Slovakia	16,089	19,951	25,564	29,075	36,226	36,469	37,632	7.6%	7.6%
Slovenia	5,582	6,132	6,822	9,765	11,236	10,538	10,772	2.6%	2.4%
Total stock in EU10	210,882	260,814	327,027	398,600	416,882	444,810	480,877	100.0%	100.0%

Source: Author's elaboration based on Eurostat data, accessed March 30, 2012.

A comprehensive picture of Poland's investment attractiveness and the investment climate in the country can be derived from an assessment made by UNCTAD. The Inward FDI Performance Index calculated by UNCTAD ranks 141 countries according to the value of FDI they receive in relation to their GDP.[13] The index makes it possible to compare FDI inflows for different economies in relation to their size measured by GDP. It also captures the importance of other factors, such as the business environment, political stability, the availability of natural resources, infrastructure, technology, and innovation as well as the effectiveness of FDI incentives.

Poland's position in terms of FDI performance weakened in 2010. According to UNCTAD's Inward FDI Performance Index, Poland ranked 75th among 141 countries worldwide, outpaced by four other new EU member states from Central and Eastern Europe, Estonia, Bulgaria, the Czech Republic, and Romania (Table 25).

Table 25

Inward FDI Performance Index: Poland's position on the ranking list compared with other EU10 countries in 1990–2010

	1990	1995	2000	2005	2006	2007	2008	2009	2010
Bulgaria	103	92	22	11	7	4	5	27	42
Czech Republic	n/a	20	17	15	70	53	87	97	50
Estonia	n/a	21	27	3	19	16	36	14	23
Hungary	33	4	33	25	44	97	60	95	81
Latvia	n/a	31	41	50	27	36	73	132	100
Lithuania	n/a	75	64	54	45	64	66	131	90
Poland	**94**	**42**	**38**	**65**	**49**	**60**	**90**	**60**	**75**
Romania	n/a	73	75	28	24	57	42	63	73
Slovakia	n/a	2	13	41	26	69	58	138	124
Slovenia	n/a	88	116	106	116	92	76	141	88

Note: The ranking covers 141 economies.

Source: UNCTAD, 2011.

While FDI performance makes it possible to compare the current position of various countries in attracting FDI, the Inward FDI Potential Index reflects the prospects for attracting FDI in the future. The Inward FDI Potential Index is based on 12 economic and structural variables.[14] The ratings of countries according to UNCTAD's Inward FDI Potential Index show that Poland is in 41st place, surpassing five other EU10

[13] The ratio of a country's share in global FDI inflows to its share in global GDP.

[14] Raw data and methodology available at: www.unctad. org/wir.

countries: Slovakia, Hungary, Latvia, Romania, and Bulgaria. Estonia ranks the highest among new EU members from Central and Eastern Europe, occupying 31st place, followed by the Czech Republic (32nd), Slovenia (33rd), and Lithuania (40th) (UNCTAD, 2011).

Despite its relatively strong resilience to crisis, Poland was in the middle of the list of EU10 countries in 2010 in terms of both FDI performance and potential.

Over the last decade, the industry pattern of foreign direct investment in Poland has evolved, with a growing role of the service sector. In the 1990s, Poland attracted FDI chiefly because of its low labor costs and large market. Therefore FDI was located mainly in labor-intensive manufacturing industries. The development of the Polish economy, progress in political and economic reforms, and integration with the EU, supported by some improvements in the business environment, caused a shift from resource-seeking and market-seeking FDI toward efficiency-seeking FDI, with services gaining a predominant position. The share of manufacturing dropped from 39% in 2000 to about 30% in 2010. With regard to individual manufacturing industries, some shifts in Poland's FDI stock were also observed toward more technologically advanced industries (Weresa, 2011).

Polish investment abroad: outflows and outward stocks

While EU10 countries have been an appealing destination for foreign direct investment for several years, until recently they did not have sufficient resources to invest abroad themselves. In recent years, these countries have completed their successful transition from central planning to a market economy, which enabled many companies to expand abroad and strengthen their position on both regional and global markets. Poland, similar to other EU10 countries, has not only attracted more FDI, but also started to invest abroad.

Investment abroad by Polish enterprises could be an indicator of the extent to which the ownership advantages of domestic firms are transferrable to foreign countries in order to generate profits higher than at home. Thus, outward investment could be treated as a test showing just how successful local businesses are in coping with global competition.

In 2004–2010, there were strong fluctuations in outward FDI from the EU10. In the first few years after these countries' EU entry, FDI outflows increased. However, the global crisis led to a decrease in the value of outflows in 2007, a trend that continued in the 2008–2010 period (Table 26). Nevertheless, in 2010 outflows from the EU10 were still twice as high as in 2004. In terms of the value of FDI outflows, Poland has been the largest foreign investor among EU10 countries since 2005. In 2010, its investment abroad amounted to €4,142 million and was 10.4% higher than in the preceding year. Poland's outward FDI flows constituted 60% of the total EU10 outflows in 2010. The

Czech Republic was the second-largest foreign investor, with an 18.6% share, followed by Hungary with 13.5%. Foreign investments by other EU10 countries were minor and some countries from this region, such as Romania and Slovenia, showed a negative value of investment abroad in 2010 (Table 26).

Table 26

Outflows of direct investment abroad from Poland and other EU10 countries in 2004–2010 (€ million and %)

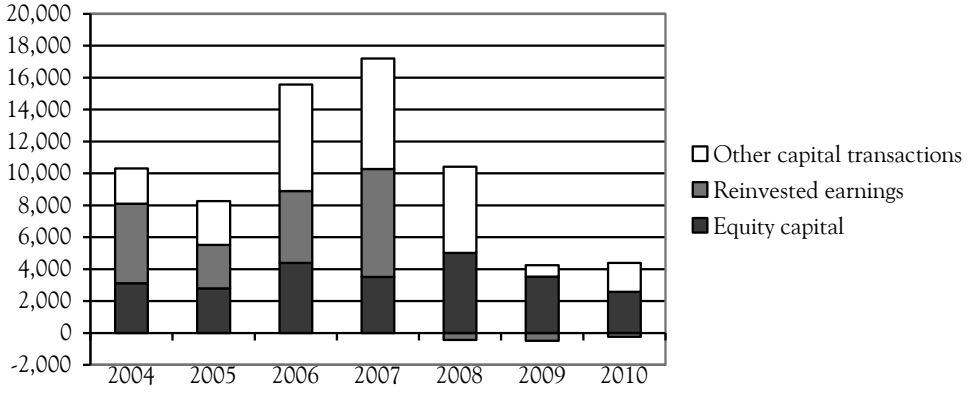
	FDI outflows (in millions of euros)							Share in total outflow from EU10 (%)	
	2004	2005	2006	2007	2008	2009	2010	2004	2010
Bulgaria	–166	249	141	206	483	–90	193	–5.2%	2.8%
Czech Republic	817	–15	1,170	1,184	2,958	966	1,286	25.4%	18.6%
Estonia	217	556	882	1,276	760	1,109	100	6.8%	1.4%
Latvia	89	103	138	271	167	–44	16	2.8%	0.2%
Lithuania	212	278	232	437	229	156	60	6.6%	0.9%
Hungary	901	1,775	3,087	2,646	2,124	1,724	932	28.0%	13.5%
Poland	**729**	**2,738**	**7,060**	**3,927**	**2,996**	**3,753**	**4,142**	**22.7%**	**60.0%**
Romania	56	–24	337	204	188	–62	–16	1.7%	–0.2%
Slovenia	376	535	748	1,420	949	121	–60	11.7%	–0.9%
Slovakia	–17	120	408	438	362	311	247	–0.5%	3.6%
Total FDI outflows from EU10 countries	3,214	6,315	14,203	12,009	11,216	7,944	6,900	100.0%	100.0%

Source: Author's elaboration based on Eurostat data, accessed March 15, 2012.

The increase in Polish investment abroad in 2010 was a result of growing equity capital investment, which amounted to € 2,579 million and constituted 62% of the total outflow (Figure 5).

Most of the Polish investment abroad in 2010 went to Luxembourg, which absorbed 39% of Poland's outward FDI. Other EU countries that absorbed a high value of Polish capital included Belgium (12%) and Cyprus (11%) (Figure 6). Two new EU member states in Central and Eastern Europe, the Czech Republic and Lithuania, have been gradually gaining importance as destinations for Polish investors, but these countries' shares in the total outflow of Polish capital in 2010 were still relatively low.

Figure 5
Outflow of direct investment from Poland by main components, 2004–2010 (€ million)

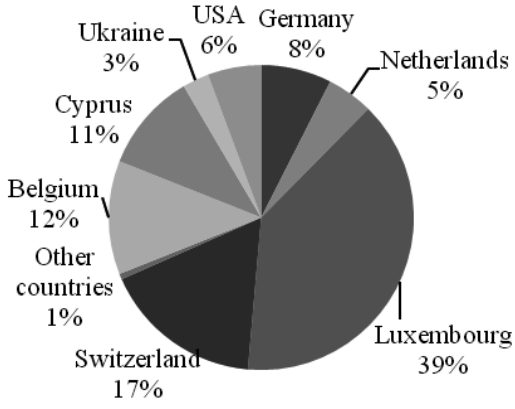


Source: Author's elaboration based on NBP (2011a), p. 4.

Among non-EU countries, the most important destinations for Polish direct investment were Switzerland (17%), the United States (6%), and Ukraine (3%) (Figure 6).

It should be pointed out that at least a part of the Polish investment abroad, in particular projects in Luxembourg, Cyprus and Switzerland, have been motivated by reasons of tax optimization because taxes in these three countries are much lower than in Poland.

Figure 6
FDI outflow from Poland in 2010 broken down by countries of investment location (%)



Source: Author's elaboration based on NBP (2011a), pp. 4–14.

Table 27

Outward investment stock abroad (€ million and %): Poland and other EU10 countries compared, 2004–2010

	FDI outward stock (in millions of euros)							Share in outward FDI stock from EU10 (%)	
	2004	2005	2006	2007	2008	2009	2010	2004	2010
Bulgaria	–87	105	344	552	1,029	935	1,186	–0.6%	1.7%
Czech Republic	2,760	3,061	3,811	5,810	9,021	10,087	10,868	19.6%	15.2%
Estonia	1,040	1,639	2,732	4,188	4,765	4,596	4,325	7.4%	6.0%
Latvia	176	240	366	643	737	615	664	1.2%	0.9%
Lithuania	310	608	793	1,072	1,413	1,610	1,571	2.2%	2.2%
Hungary	4,411	6,619	9,414	11,783	14,195	16,124	14,681	31.3%	20.5%
Poland	**2,456**	**5,305**	**10,878**	**14,351**	**17,111**	**20,527**	**29,212**[a]	**17.4%**	**40.8%**
Romania	201b	180	667	843	1,044	968	1,137	1.4%	1.6%
Slovenia	2,225	2,788	3,452	4,917	5,677	5,485	5,519	15.8%	7.7%
Slovakia	619	504	1,010	1,268	2,113	2,566	2,495	4.4%	3.5%
Total FDI outward stock from EU10	14,111	21,049	33,467	45,427	57,105	63,513	71,658	100.0%	100.0%

Notes: [a] data by the National Bank of Poland (NBP); b estimates based on UNCTAD data.

Source: Author's elaboration based on Eurostat data, accessed March 15, 2012.

A continuous outflow of capital abroad led to an increase in Poland's total outward investment stock. By the end of 2010 it reached €29.2 billion, increasing more than tenfold since 2004. By the end of 2010, Poland accounted for 40.8% of the total outward FDI stock from EU10 countries, and its share increased by 9 percentage points compared with 2004. Hungary was second in this respect, with a 20.5% share in 2010, followed by the Czech Republic (15.9%). The shares of these three countries constituted more than 75% of the total outward FDI stock from EU10 countries (Table 27).

The service sector has been the most important sector in the overall structure of Poland's outward investment stock, accounting for more than two-thirds of all capital invested abroad, while manufacturing's position weakened (Weresa, 2011).

The importance of FDI to Poland's economy

Both theoretical considerations and empirical studies show that the inflow of FDI impacts a host country's development, bringing tangible assets such as finance, capital goods, and intermediate inputs. Apart from delivering additional capital into

the economy, FDI brings a set of assets, such as new technology and know-how, which after some time spill over to local enterprises. All these assets are important for the development of a host country (Lipsey 2002 and 2006).

There are several indicators that can be used for assessing the importance of foreign investment to a host economy. The key ones include so-called foreign direct investment intensity, which is calculated as the average value of inward and outward FDI flows divided by GDP; the share of foreign investment flows in gross fixed capital formation, and the ratio of FDI stocks to GDP. a broader perspective on FDI's impact on a host country's development can be obtained by comparing these indicators across countries. Therefore, in order to evaluate the influence of foreign capital on the Polish economy, Poland will be compared with other EU10 countries using the abovementioned indicators.

In the first half of the last decade, the intensity of foreign direct investment in Poland increased rapidly. The index reached 4.2 in 2006, which was twice as high as the EU27 average. However, the global crisis caused a dramatic drop in both FDI inflows and outflows, and since 2007 the intensity of foreign direct investment has decreased in both Poland and other EU10 countries. In 2010, the index for Poland stood at 1.5 and was somewhat higher than the EU10 average (1.0), but lower than in Estonia (4.4), Bulgaria (2.7) and the Czech Republic (2.1) (Table 28).

Table 28

Foreign direct investment intensity (average value of inward and outward FDI flows divided by GDP, multiplied by 100): Poland and other EU10 countries compared

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
EU27	n/a	n/a	n/a	0.9	1.7	2.3	3.9	2.2	2.1	1.0
EU15	2.6	1.4	1.4	1.1	2.0	n/a	4.2	2.4	2.2	1.3
Bulgaria	2.5	2.0	5.1	6.3	7.3	12.0	15.0	10.1	4.6	2.7
Czech Republic	4.7	5.8	1.3	2.7	4.7	2.4	3.5	2.5	1.1	2.1
Estonia	5.9	2.9	5.5	5.1	12.8	8.6	10.3	6.0	8.4	4.4
Latvia	0.9	1.4	1.6	2.7	2.6	4.6	4.7	2.2	0.1	0.8
Lithuania	1.9	2.6	0.6	2.3	2.6	3.5	3.3	2.5	0.5	1.1
Hungary	4.0	2.4	2.3	2.7	4.5	5.0	2.7	3.4	1.7	1.2
Poland	**1.5**	**1.1**	**1.2**	**2.7**	**2.3**	**4.2**	**3.4**	**1.8**	**2.2**	**1.5**
Romania	1.4	1.3	n/a	n/a	3.3	4.8	3.0	3.5	1.5	0.9
Slovenia	1.3	2.3	2.7	1.7	2.1	2.0	3.9	3.1	–0.4	0.3
Slovakia	3.7	7.8	3.6	3.6	2.7	4.6	2.8	2.8	0.2	0.5

Source: Eurostat data, accessed March 15, 2012.

Nevertheless, the role of inward FDI in shaping the competitiveness of Poland's economy remained relatively significant, which is reflected by the ratio of the inward investment stock to GDP. This ratio was relatively stable during the time of crisis. In 2010, it stood at 41.2%, near the EU average (Table 29). However, this indictor alone does not cover all aspects of FDI's impact on the economy. The effects of FDI on productivity and growth depend not only on the FDI/GDP ratio, but mainly on the strengths of economic linkages between foreign investors and local enterprises.

Poland's outward investment stock was relatively less important for the country's economic development. By the end of 2010 it constituted only 7.9% of Poland's GDP (UNCTAD, 2011).

Table 29

Inward FDI stock as a percentage of GDP: Poland and other EU10 countries compared in selected years of the 1990–2010 period

	1990	1995	2000	2004	2005	2006	2007	2008	2009	2010
World	9.6	11.0	22.5	26.3	25.2	27.9	32.0	25.0	30.9	30.3
EU27	10.0	11.3	25.1	36.3	34.3	37.8	44.3	35.5	44.6	42.4
Bulgaria	0.5	3.4	21.0	40.0	47.9	70.7	90.1	84.9	100.9	100.2
Czech Republic	n/a	13.3	38.2	52.3	48.7	56.0	64.5	52.4	66.2	67.6
Estonia	n/a	15.4	46.6	83.6	81.4	75.6	77.5	69.5	87.1	85.6
Hungary	1.6	24.7	48.3	59.9	55.5	71.1	69.2	57.0	76.7	71.0
Latvia	n/a	12.4	26.6	32.9	30.7	37.5	37.7	34.3	44.8	45.2
Lithuania	n/a	5.2	20.4	28.3	31.6	36.6	38.5	27.6	38.0	37.1
Poland	**0.2**	**5.6**	**20.0**	**34.3**	**29.9**	**36.8**	**42.0**	**31.0**	**43.2**	**41.2**
Romania	0.0	2.3	18.6	27.0	26.0	37.0	36.9	33.2	44.7	43.9
Slovakia	n/a	6.6	23.3	51.9	49.4	60.2	56.9	54.0	60.1	58.1
Slovenia	n/a	8.5	14.5	22.5	20.3	23.1	30.4	28.6	30.8	31.5

Source: UNCTAD database, accessed Feb. 16, 2012.

The importance of FDI as a source of capital can also be examined using the ratio of FDI flows to overall capital formation. In 2000–2007, the share of FDI inflow in fixed capital formation in Poland hovered around 18%–29%. In 2008, it dropped to 12.6% due to the global crisis, which brought a sharp decline in FDI inflow. After some increase in 2009, this ratio decreased again to 10.6% in 2010. This was due to a 32% decrease in the FDI inflow in 2010 (see Table 23), on the one hand, and a slight increase in gross fixed capital formation during the same period (by 2.2%, according to World Bank data[15]), on the other.

[15] Estimation based on http://data.worldbank.org/indicator/NE.GDI.FTOT.CD, accessed April 1, 2012.

In 2010, the inflow of foreign capital measured as a percentage of gross fixed capital formation in Poland was lower than in Estonia, Bulgaria, and the Czech Republic, and similar to that in Lithuania and Romania as well as the EU27 average. (Table 30).

Table 30

Inward FDI flows into Poland and other EU10 countries as a percentage of gross fixed capital formation, selected years of the 2000–2010 period

	1990	1995	2000	2004	2005	2006	2007	2008	2009	2010
World	4.2	5.1	19.0	8.3	9.9	13.2	15.6	12.5	9.5	9.1
EU27	5.7	6.9	35.7	8.6	18.0	19.1	23.5	12.6	11.1	10.1
Bulgaria	0.1	4.5	49.9	66.0	52.7	85.1	102.6	56.6	28.2	22.9
Czech Republic	n/a	14.7	31.3	17.5	37.5	15.4	23.7	12.4	6.8	16.7
Estonia	n/a	17.1	26.8	25.8	64.3	29.7	36.5	25.7	44.3	41.8
Hungary	7.0	54.2	24.9	18.5	30.4	27.7	13.4	22.2	7.6	9.5
Latvia	n/a	26.7	21.8	16.8	14.4	25.6	24.0	12.8	1.7	8.1
Lithuania	n/a	5.3	17.6	15.4	17.4	23.9	18.2	16.9	2.7	10.8
Poland	**0.7**	**14.8**	**23.2**	**28.1**	**18.6**	**29.2**	**25.7**	**12.6**	**15.0**	**10.6**
Romania	0.0	5.5	15.0	39.0	27.6	36.2	19.3	21.3	11.7	10.1
Slovakia	n/a	53.3	36.6	29.9	19.1	31.7	18.2	20.0	– 0.3	3.0
Slovenia	n/a	3.4	2.6	9.8	6.5	6.2	11.5	12.4	– 4.9	7.8

Source: UNCTAD database, accessed Feb. 16, 2012.

The role of education as a determinant of foreign direct investment in Poland

The aim of this part of the study is to either confirm or invalidate the hypothesis that, in addition to determinants that represent basic groups of inward foreign direct investment (FDI) in theoretical studies, in the case of Central and Eastern European countries, and Poland in particular, the level of education had a positive impact on the host country's attractiveness to foreign direct investment from 1996 to 2010. The countries studied are Poland, Hungary, Romania, Slovakia, Slovenia, the Czech Republic, and Bulgaria.

EU member states have been the object of interest of many previous works focusing on developed economies such as Germany, France, and Britain (for example: Beer & Cory, 1996; Narula & Wakelin, 1997). Fewer works focus on developing and transition economies such as those analyzed in this research. a study was done by Melanie

Lansbury, Nigel Pain and Katerina Smidkova in 1990, providing an econometric analysis of variables impacting FDI in four of the seven countries examined in this chapter. The nearest research to this one, based on the parallel coverage of studied countries, has been conducted by Kai Carstensen and Farid Toubal (2003). It used GDP as the representative of the market potential group, tariffs as a proxy for the cost of trade, and a relative unit labor cost, among other variables, arriving at a conclusion that the "education of the [labor] force in the host country … has a strong positive impact on FDI inflows" (Carstensen and Toubal, 2003, pp. 13). The works of Peter Nunnenkamp (2002) and Assaf Razin, as well as Yona Rubinstein with Efraim Sadka (2004) have further proven the importance of education in attracting FDI.[16] These studies cover earlier periods; therefore it is worth confirming their findings also for the recent period.

FDI stock[17] will be the dependent variable in the model used, for which data has been obtained from the United Nations Conference on Trade and Development (UNCTAD) database (UNCTADStat) and is reported in U.S. dollars at current prices and current exchange rates in millions. Data for explanatory variables, unless specified otherwise, has been obtained from the World Bank's database.[18]

FDI researchers worldwide use a broad range of explanatory variables, which can make it difficult to decide which determinants should be included in a model. The problem of the proper choice of determinants has been extensively described by Bruce A. Blonigen and Jeremy Piger (2011). Despite this variance, however, it can be stated that there are three primary groups of determinants that are used in most FDI research: those referring to the market potential of the host country, those involving its trade environment, and those concerned with its cost of labor.

The first group consists of GDP (i.e. Bénassy-Quére, Coupet and Mayer, 2005) and GDP per capita (Walsh and Yu, 2010) as well as their numerous permutations such as the squared difference between the GDPs of the home and host countries (Xun and Awokuse, 2005). This research will use GDP per capita as examined by Peter Nunnenkamp (2002). The reason is that GDP per capita, unlike GDP, allows for a relative comparison rather than a simple comparison of magnitudes. The unit of this determinant is constant 2000 U.S. dollars. The sign of this independent variable is expected to be positive, as overwhelmingly proven in the literature.

The group that measures the trade environment of the host country can be represented by two variables, namely exports and imports with various permutations, such as the sum of the two expressed as a percentage of the host country's GDP (Kerr

16 The works quoted in this study are just an example of the extensive body of literature discussing the determinants of FDI.

17 The FDI stock is defined by UNCTAD as the value of the share of capital and reserves (including retained profits) attributable to the parent enterprise, plus the net indebtedness of affiliates to the parent enterprise.

18 World Databank: World Development Indicators & Global Development Finance.

and Peter, 2001) and lagged exports from the home to the host country (Narula and Wakelin, 1997). This research will combine both exports and imports (excluding one of these does not appear to be sound) and express them as a share of the host country's GDP, which is similar to the idea presented by Ian A. Kerr and Vasanthi Monsingh Peter (2001). Constant 2000 U.S. dollars will be used as the units when computing this variable. Again, this allows for a relative comparison. The impact that an increase in the trade openness of the host country has on FDI is expected to be positive.

The cost of labor is provided by the Organization for Economic Cooperation and Development database (OECD.StatExtracts) for the entire economy with the OECD index (2005 = 100) not seasonally adjusted as the unit. Unfortunately, data was not available for the entire set of countries throughout the entire time period. To compensate for this, an assumption had to be made that the percentage changes for Romania (1996 to 1998 and 2007 to 2010) and Bulgaria (1996 and 2008 to 2010) were same as those for Poland (considering that the portion of the adjusted data is small, 11 observations out of 105, this adjustment should not distort the overall trends in the data). Previous work on FDI determinants in countries in this region (for example, Carstensen and Toubal, 2003) suggests that higher costs of labor will deter foreign investment.

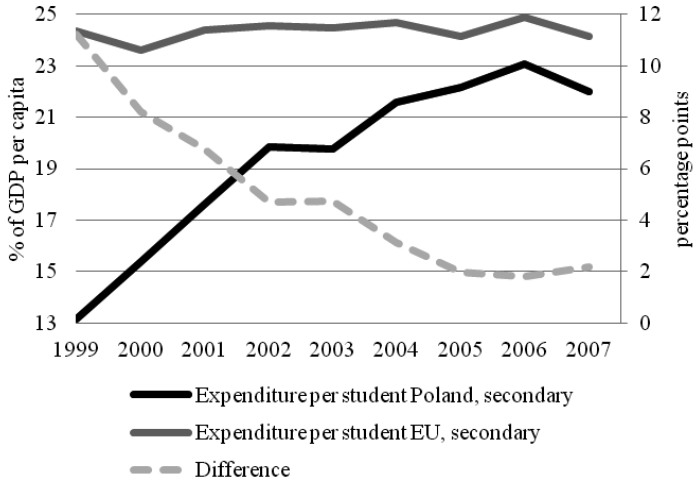
Human capital will be represented by education, as put forward by Peter Nunnenkamp (2002) and symbolized by the total sum of secondary and tertiary enrollment, both public and private, full and part time, according to data provided by UNESCO (Institute for Statistics), relative to the host country's population. An additional assumption here is that the current level of enrolment is reflective of, or better than, those in past years. The sign is expected to be positive. This assumption can be partly supported by data comparing expenditures on education in Poland and in the EU measured as a percentage of GDP (Figures 7 and 8).

Figure 7 shows expenditure per student in secondary education.[19] It confirms that education has played an increasingly important role over the past decade; the gap between Poland and the EU average decreased significantly from 1999 to 2006, followed by a slight increase in 2007. However, the same cannot be said of expenditure per student in tertiary education (Figure 8) where the gap decreased until 2004 only to resurge to a new peak in 2006.

[19] Measured as a percentage of GDP per capita; 1999–to–2001 data for Poland estimated assuming constant annual growth between 1998 and 2002.

Figure 7

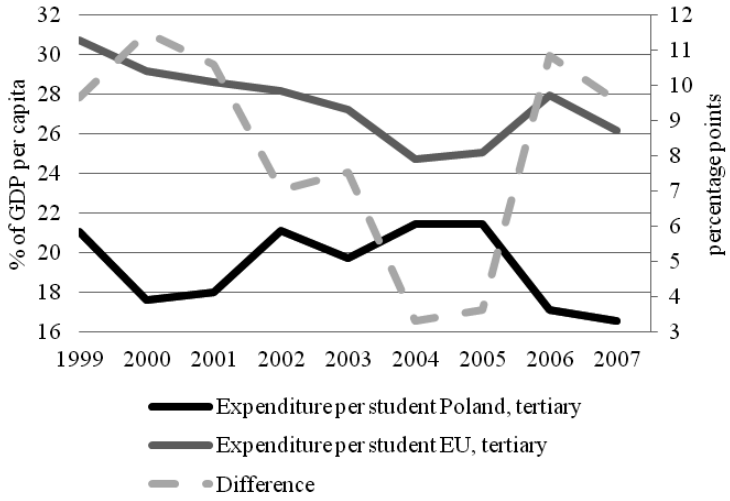
Expenditure per student in secondary education in Poland and the European Union (left axis; % of GDP per capita) and relative differences (right axis; in percentage points)



Source: Author's elaboration based on World Bank data.

Figure 8

Expenditure per student in tertiary education in Poland and the European Union (left axis; % of GDP per capita) and relative differences (right axis; in percentage points)



Source: Author's elaboration based on World Bank data.

Lastly, investment climate is represented in the model by the cost of obtaining funds in the host country. The lending interest rate, defined by the World Bank as "the rate charged by banks on loans to prime customers," has been used because it was available for the most studied countries for the most years. Missing data for Poland (2007 to 2010), Slovakia (2009 and 2010), and Slovenia (2010), has been supplemented using respective central banks' statistics on loans to non-financial corporations. In the case of Poland, this involved loans of over ZL 4 million and in the case of Slovakia and Slovenia loans exceeding € 1 million and granted for between five and 10 years. The sign of this variable is ambiguous. On the one hand, an increase in the cost of borrowing funds in the host country will force investors to import funds; therefore, the variable will have a positive sign. Conversely, a low cost of borrowing in the host country may attract investors with an incentive that, after an initial foreign investment, the capital for expansion can be obtained at a low cost on the spot, in the host country.

The resulting model will have the following structural form:

$$\mathrm{FDI}_{it} = \beta_0 + \beta_1 \ln GDPCAP_{it} + \beta_2 \ln[(X+M)/GDP]_{it} + \beta_3 ULC_{it} + \beta_4 \ln[(2EDU+3EDU)/POPULATION]_{it} + \beta_5 LENDINGRATE_{it} + \varepsilon_{it}$$

where FDI, the dependent variable, is modeled using host's GDP per capita, openness to trade expressed as the sum of its exports and imports divided by GDP, the unit cost of labor, the combined enrollment in the secondary and tertiary education as a share of the host's population, and the lending rate. Subscripts *i* and *t* are used to represent countries and time periods respectively.

All explanatory variables are in logarithmic form with the exception of the unit labor cost and the lending rate as the former is represented by an index and the latter is already expressed in percentages.

The model, calculation and results

This static model is estimated using the EViews 7 software package. The coefficients are estimated using the Ordinary Least Squares method (Leitão, 2010) with fixed cross-section and period effects (also used by Razin, Rubinstein and Sadka, 2004) to compensate for any country-specific and time-specific information that was not captured by the used explanatory variables, while recognizing that the literature provides other options including the Generalized Method of Moments (Walsh and Yu, 2010) and that some researchers compare results across different techniques (Kalemli-Ozcan and Nikolsko-Rzhevskyy, 2010). Additionally, the White cross-section coefficient covariance method has been employed assuming that errors are contemporaneously (cross-sectionally) correlated.

The output of the model is presented in Table 31. As the model is in the linear-log form, for interpretation, the coefficients of the logged variables need to be divided by 100.

Table 31
Model Output

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CONSTANT	–932948.7	59817.2	–1.559601	0.1229
LOG(GDPCAP)	148152.0	63160.12	2.345658	0.0215
LOG(OPEN)	129130.1	25015.18	5.162072	0.0000
ULC	–1427.614	194.5695	–7.337298	0.0000
LOG((_2EDU+_3EDU)/POPULATION))	83783.09	40341.79	2.076831	0.0411
LENDINGRATE	–53.11137	44.73967	–1.187120	0.2387

Source: Results obtained using EViews 7 software package.

As expected, GDP per capita is found to be statistically significant at 5% and having a positive sign. a 1 percent increase in the host country's GDP per capita will result in a US$ 1,481.52 million increase in inward FDI. Similarly, a 1 percent increase in the openness to trade, as measured by the sum of exports and imports divided by the host country's GDP, will affect inward FDI by increasing it by US$ 1,291.3 million. The coefficient of the openness to trade of the host is highly significant with its p-value equaling to 0.00. This shows that, in the case of the examined countries, trade and FDI are complementary rather than substitutes. A one-unit increase in the unit cost of labor, as measured by the OECD index, will decrease inward FDI by US$ 1,427.61 million. As in the case of the previously described coefficient, this one is also found to be highly significant statistically, having p-value equal to 0.00. This confirms the hypothesis that lower costs of labor are an encouraging factor for inward FDI.

Regarding the determinant of interest in this study, a 1 percent increase in the combined enrollment in secondary and tertiary education relative to the host country's population will result in a US$ 837.83 million increase in inward FDI. The coefficient of education is found to be statistically significant at 5%. This knowledge, in combination with the low-cost seeking hypothesis, presents a theory that FDI investors are looking for inexpensive labor but are also interested in what portion of the host country's population is highly (secondary and up) educated. Lastly, the lending rate proved to have a negative sign and a 1 percent (unit of measurement) increase is expected to decrease incoming FDI by $53.11 million. Yet, this coefficient is found to be statistically insignificant as its p-value (0.2387) is over the 0.05 threshold. If we were able to assign one extra point changing any of the used determinants,

allocating that point to increasing GDP per capita would yield the greatest increase in inward FDI followed closely by the allocation of the point to decreasing the unit cost of labor. This shows that, even though an increase in education has a positive and a statistically significant impact, the inward FDI is still highly focused on access to a low-cost labor factor of production.

The R-squared and the F-statistic associated with the model are 0.897887 and 0.00 respectively, both suggesting a rather good fit of the model to the actual data.

Conclusions

Poland's international competitive position from 2009 to 2011, as reflected in the country's foreign direct investment flows, was affected by the global financial turmoil. However, despite a downward trend in FDI flows due to the crisis, Poland remained relatively attractive to FDI, and its importance to Poland's competitiveness cannot be neglected. FDI has been an important source of physical capital supplementing local resources necessary for development.

As far as FDI determinants are concerned, this study proved that—in addition to the basic groups of determinants of inward FDI such as the three most commonly represented groups of determinants: market potential, trade environment and costs of labor—in the case of the researched Eastern and Central European countries, and Poland in particular, the level of education has a positive and statistically significant impact on the host country's attractiveness as a target for foreign investment. Therefore, in order to attract increasing amounts of FDI, economic policymakers should focus not only on obvious factors such as economic growth and reducing the cost of labor, but also on a wider opening to international trade and on increasing the role of trade in the economy. Furthermore, and probably most importantly, the labor force is evaluated by foreign investors not only by the costs associated with it, but also by the level of its education, which makes education an important determinant of FDI. Therefore, a policy oriented toward attracting FDI should also focus on increasing the overall education level in the country.

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PART II

DETERMINANTS OF POLAND'S COMPETITIVENESS IN 2011

Chapter 3
Assets and Their Productivity

3.1. Human Resources

Mateusz Mokrogulski

The main objective of this subchapter is to evaluate trends in the development of human resources in Poland in 2011 as one of the factors behind the competitiveness of the economy. The analysis covers the key elements that determine the state of and changes in human resources in the economy, such as demographic trends, employment and unemployment, as well as wage formation in the context of education and the development of labor productivity.

Demography[1]

In 2011, the positive demographic trends that developed in previous years were partially inhibited. According to the preliminary findings of the National Population and Housing Census,[2] at the end of the first quarter of 2011, the country's population totaled 38.3 million, up from 38.2 million at the end of 2010. If the data covering the entire year are confirmed, 2011 was the fourth consecutive year in which Poland's population increased. Preliminary data show that the number of live births totaled 391,000, down from 413,300 in 2010. The lowest number of live births, 351,100, was recorded in 2003. Births then rose until 2009, with an especially high birth rate in 2008. The significant decrease in the number of live births in 2011 could indicate that a new negative trend has begun that may carry over into subsequent periods. The permanent residence migration balance was -2,100, which corresponded to the 2010

[1] Only partial data for 2011 was available as this report went to press.
[2] The census was conducted between April 1 and June 30, 2011.

figure. According to estimates by the Central Statistical Office (GUS), at the end of 2010, 1.99 million Poles were living abroad on a temporary basis, which represents an increase of 120,000 from the end of 2009. a record year in this respect was 2007 when 2.27 million people were abroad. As in previous years, in 2010, the most popular countries for Poles seeking temporary emigration were Britain (560,000), Germany (455,000), and Ireland (125,000). At the same time, the Netherlands (108,000) and Italy (92,000) gained importance among the favorite destinations of Polish people looking for work abroad. Switzerland also attracted more Poles due to an appreciation of the Swiss franc against both the Polish zloty and the euro. On the other hand, the number of Polish citizens living in Spain declined in the analyzed period as a consequence of a severe economic crisis affecting this country. According to GUS estimates, around 300,000 Poles were living outside Europe on a temporary basis. Although official data for 2011 was unavailable at this writing, it is possible to assume that further occupational groups decided to seek work abroad, especially due to the opening of the German, Austrian, and Swiss labor markets to Polish workers as of May 1, 2011. According to a European Job Vacancy Monitor survey, the most sought-after professions are qualified sellers, sales representatives, doctors and medical staff, accountants and financial advisors, engineers and IT specialists. This means that there is demand not only for technical staff but also for employees with a higher education. At the same time, beginning May 1, 2011, Germany introduced a minimum wage for workers hired through temporary employment agencies, with an hourly rate of € 6.89 in the eastern states and € 7.79 in the western Länder. The minimum wage applies to both immigrants and native workers, but excludes the agriculture sector and employees hired directly by employers.

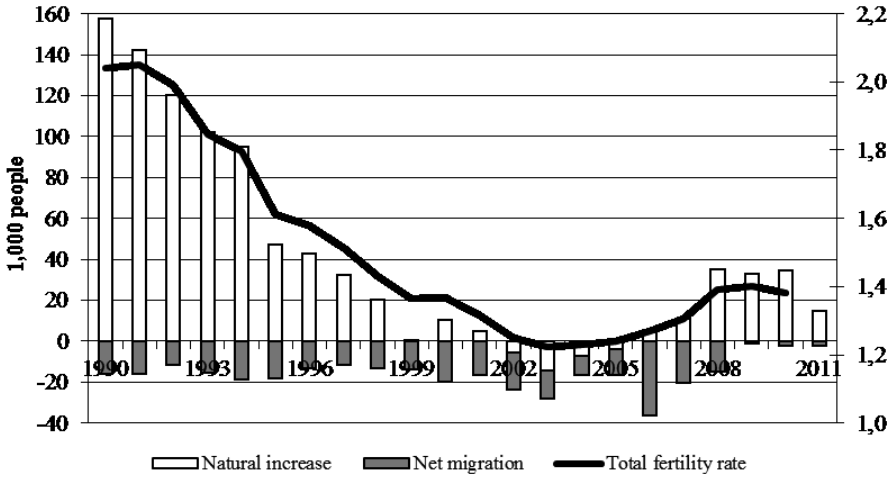
The fertility rate stood at 1.38 in 2010, compared with 1.40 in 2009 and 1.22 in 2008. This means that every 100 women from the 15-49 age group accounted for 138 newborn babies. After a period of gradual growth in 2004-2009, the fertility rate decreased slightly in 2010 and is still distinctly below a level guaranteeing stable demographic development, i.e. 2.10-2.15. Additionally, in 2011, the number of divorces increased to 64,700, from 61,300 in 2010, while the number of marriages fell to 207,000 from 250,800 in 2009 and 228,300 in 2010.

Life expectancy rose again in 2010, to 72.1 years for men and 80.6 years for women, from 71.5 and 80.1 years respectively in 2009. With the less favorable demographic trends, the age structure of the population worsened. Residents aged 60-65 and older represented 16.9% of Poland's population in 2010, compared with 16.5% in 2009 and 14.8% in 2000. Statistically speaking, for every 100 working-age individuals, there were 55 non-working-age people (including 26 at retirement age and 29 under 17 years). At the same time, the percentage of the youngest population group is falling gradually. In 2010, those aged up to 17 represented 18.6% of Poland's population (19.0% in 2009 and 24.4% in 2000). On the other hand, the number of pensioners is decreasing gradually. In December 2011, it stood at 7,372,500, compared with 7,458,200 in December 2010.

In the coming years, the aging of the population will pose a serious problem to Poland as well as several other economies. Additionally, mortality among men is excessive in Poland. In the youngest population group, the death rate for men is four times higher than for women and in the older groups the indicator is two to three times higher than for women.

Figure 1

Natural increase, net migration (left axis), and total fertility rate (right axis) in Poland, 1990-2010



Source: GUS.

Internal migration is an interesting demographic trend in Poland. In 2005-2010, the number of people in provinces with the largest cities increased significantly. The greatest increase was recorded in Pomorskie province, where the average annual rate of population growth in the studied period was 1.88%. Tangible increases were also noted in Mazowieckie, Wielkopolskie and Małopolskie provinces, at 1.65%, 1.39% and 1.34% respectively. The population in Kujawsko-Pomorskie and Zachodniopomorskie provinces remained relatively unchanged (0.06% and –0.07% respectively), while the number of people living in Łódzkie province decreased by 1.67%. The city of Łódź, the capital of Łódzkie province, is the third-largest city in Poland by population. The steepest decline was recorded in Opolskie, Świętokrzyskie and Lubelskie provinces, at 1.80%, 1.48% and 1.27% respectively. In the coming years, Poland's population is expected to continue moving to large urban centers and their environs.

Table 1
Key demographic data: Poland vs. selected European Union countries in 2010

Country	Population (as of Jan. 1, 2011)	Natural increase	Net migration	**Old-age dependency ratio[b] (%)**	Total fertility rate	Marriages	Divorces
	1,000					per 1,000 inhabitants	
Poland	**38 200.0**	**34.8**	**–2.1**	**19.0**	**1.38**	**6.0**	**1.6**
Czech Republic	10 532.8	10.3	15.6	22.2	1.49	4.4	2.9
Slovakia	5 435.3	7.0	3.4	17.1	1.40	4.7	2.2
Hungary	9 985.7	–40.1	11.5	24.4	1.25	3.6	2.4
Lithuania	3 244.6	–6.5	–77.9	24.1	1.55	5.7	3.0
Latvia	2 229.6	–10.8	–7.9	25.2	1.17	4.1	2.2
Estonia	1 340.2	0.0	0.0	25.2	1.63	3.8	2.2
Germany	81 751.6	–180.8	130.2	31.2	1.39	4.7	2.3
France	65 048.4[a]	282.3[a]	75.0[a]	25.9[a]	2.00[d]	3.8	2.1[e]
Spain	46 152.9	104.2	59.8	25.2	1.39	3.6	2.2
Ireland	4 480.9	46.6[a]	–33.6[a]	17.4	2.07	4.6	0.7
Sweden	9 415.6	25.2	49.7	28.4	1.98	5.3	2.5
Romania	21 413.8[a]	–47.5	–0.8	21.4[c]	1.38[d]	5.4	1.5
Bulgaria	7 504.9	–34.7	–24.2	25.9	1.49	3.2	1.5
EU27	502 477.0[a]	514.0[a]	858.8[a]	25.9[ac]	1.59[d]	4.5[d]	2.0[e]

[a] Preliminary data. [b] Data for 2011; The old-age dependency ratio is the ratio between the total number of people aged 65 and over and the number of those aged 15–64. [c] Data for 2010. [d] Data for 2009. [e] Data for 2008.

Source: Eurostat.

Despite the continued growth of the post-working-age population, Poland performs well compared with other EU countries in terms of the old-age dependency ratio (Table 1). The indicator is lower than both the EU average and the ratios for certain Central and Eastern European countries, for example the Czech Republic and Hungary. However, in the coming years, the number will continue to grow (in 2000, it stood at 17.6%) due to factors including a continually low fertility rate, which decreased further in 2010. At the same time, the number of marriages per 1,000 inhabitants in Poland is one of the highest among EU countries (Cyprus leads the way with 7.9, according to data for 2009). The relative number of divorces in Poland is also far below the EU27 average. The number of legally induced abortions in the EU27 as a whole is anywhere between 1.1 million and 1.3 million annually, according to Eurostat data. As the total number of deaths is around 4.8 million a year, the negative impact of

abortions seems visible. The number of legally induced abortions is comparable to the number of deaths caused by tumors.

Employment and unemployment

The year 2011 was a time of stagnation on the labor market. Employment in the enterprise sector was relatively stable throughout the year, with insignificant monthly fluctuations. Although employment increased 3.2% in year-on-year terms, this was mainly due to statistical factors. Information on employment in the enterprise sector included only businesses with nine or more employees, and the list of these is updated at the beginning of each calendar year. Thus, an increase in the number of examined enterprises leads to a significant rise in the number of employed inhabitants. Such an effect could also be observed in late 2007 and early 2008. Therefore, employment data from the enterprise sector should be treated with caution. Average employment in the economy provides more reliable information; in Q1-Q3 2011, average employment grew by 2.1%, with the greatest increases recorded in the following sectors:

- construction (7.5%),
- accommodation and catering (6.9%),
- real-estate activities (6.8%),
- professional, scientific and technical activities (6.8%),
- administrative and support service activities (6.2%).

At the same time, employment dropped in mining (by 6.3%), public administration and defense (1.8%), agriculture, forestry and fishing (1.6%), human health and social work activities (0.6%), and education (0.1%). The demand for labor varied across the economy.

The unemployment rate remained higher than in the corresponding periods of 2010. Unemployment gained momentum in February (13.4%) and then began falling due to seasonal factors. In November 2011, joblessness started to increase again for seasonal reasons. At the end of 2011, the indicator was 12.5%, vs. 12.4% a year earlier and an all-time low of 9.5% at the end of 2008. In a disturbing trend, the number of long-term unemployed increased. At the end of 2010, long-term unemployed accounted for 46.4% of all unemployed; by the end of 2011, the figure increased to 50.3%. Those laid off during the financial and economic crisis (mostly poorly qualified employees) had serious problems finding another job. That negative trend may contribute to an increase in structural unemployment and is expected to last throughout 2012. Moreover, the crisis made the labor market more rigid, leading to serious problems for people seeking employment for the first time. According to labor force statistics,[3]

[3] According to labor force statistics, the overall unemployment rate was 9.7% in Q4 2011 vs. 9.3% in Q4 2010.

the unemployment rate for those aged 15–24 rose to 26.5% in Q4 2011 from 23.6% in the corresponding period of the previous year. At the same time, the unemployment rate increased among individuals with a tertiary education (from 4.7% to 5.3%), post-secondary and vocational secondary education (from 9.1% to 9.3%), general secondary education (from 13.1% to 13.8%), and basic vocational education (from 10.5% to 11.3%). Conversely, the indicator dropped for people with a lower secondary, elementary and incomplete elementary education (from 17.2% to 17.1%), yet it remains relatively high. At the same time, the number of individuals looking for a job for 13 months or longer increased sharply, a trend that corresponds with the aforementioned data on registered unemployment. In 2012, a gradual exacerbation on the market should be expected, mostly as a consequence of the projected economic slowdown. However, due to the several-month lags that usually occur between fluctuations in the real product in the economy and trends on the labor market, changes on the labor market will not be immediately observable.

Despite the partially adverse labor market trends—which were recorded in most economies worldwide—Poland still has a competitive advantage over Western European countries in terms of labor costs. The need to curb expenses in the wake of the economic crisis may force foreign enterprises to relocate their service centers to countries where wages are lower. This in unlikely to fully offset the negative implications of the crisis for the Polish labor market. This year the unemployment rate in Poland will be much higher than prior to the financial and economic crisis.

According to business sentiment research by the National Bank of Poland (NBP),[4] in Q1 2011, most enterprises planned to fire rather than hire workers, especially in public-owned companies. However, foreign-owned companies enterprises planned to increase employment significantly. Employment forecasts for industry, construction and services were negative. In construction and services, projections have been revised recently. Forecasts for large companies were far more negative than those for small and medium-sized companies, although layoffs are planned in both groups. However, forecasts for the largest enterprises, with 2,000 and more employees, were positive in terms of labor demand. In the last two years, prospects for export-oriented companies have been more optimistic than those for companies oriented toward the domestic market. This marks a reversal of a trend that began in 2008. Thus the data provided by enterprises should be considered negative. Polish enterprises are no longer optimistic about their future financial position; such transitory optimism was observed after the first wave of the global financial and economic crisis. Therefore the assumption that the unemployment rate will remain high in 2012 is realistic, according to NBP's research. However, demand for labor is expected to drop at a varying rate across the economy.

4 The NBP research is carried out every quarter. This subchapter contains the results of a survey carried out in Q4 2011, but refers to activities planned for Q1 2012.

Table 2

Employment rate in Q3 2011 and unemployment rate in 2011 (average): Poland vs. selected countries

Country	Employment rate (%) 15–64 years				Unemployment rate (%)		
	Total	Women	Men	55–64 years	Total	Under 25 years	Long-term[a]
Poland	**60.2**	**53.2**	**67.2**	**37.7**	**9.7**	**25.8**	**3.6**
Czech Republic	66.1	57.5	74.6	47.8	6.8	18.2	2.7
Slovakia	59.9	53.0	66.8	42.2	13.4	33.6	8.7
Hungary	56.4	50.9	62.1	36.2	10.9	25.9	5.1
Lithuania	61.4	61.0	61.8	51.1	15.4	32.9	8.0
Latvia	62.7	61.7	63.7	51.0	14.7[a]	29.9[a]	7.9
Estonia	67.2	64.5	70.1	57.5	12.5	22.3	6.3
Germany	72.8	68.0	77.6	60.2	5.9	8.5	2.8
France	64.3	60.0	68.7	41.7	9.7	23.2	4.0
Spain	57.9	52.1	63.6	44.7	21.7	46.4	8.9
Ireland	59.1	55.0	63.3	49.7	14.4	29.2	8.8
Netherlands	75.1	69.9	80.2	56.5	4.4	7.6	1.4
Britain	69.5	64.6	74.5	56.6	8.3[a]	21.8[a]	2.7
Denmark	73.8	71.0	76.5	60.0	7.6	14.2	1.7
Romania	59.1	52.8	65.4	40.5	7.4	23.7	3.0
Bulgaria	59.9	57.3	62.4	44.2	11.1	26.0	6.2
EU27	64.6	58.7	70.5	47.7	9.7	21.4	4.1
United States	66.7[b]	62.4[b]	71.1[b]	60.3[b]	8.9	17.3	2.8[b]

[a] Data for Q3 2011. [b] Data for 2010.

Source: Eurostat.

The Manpower Employment Outlook Survey for Poland yielded more optimistic findings.[5] In the survey, 14% of 750 employers questioned declared an intention to expand their staff, 11% were planning layoffs, and 71% did not intend to make any personnel changes. In six of 10 sectors surveyed,[6] more employers planned to increase employment rather than reduce it in Q1 2012. Growing optimism could be observed

[5] The survey is conducted in 41 countries and includes the opinions of over 65,000 directors of human resources departments. This subchapter contains the results of the report in which employers formulate their expectations for Q1 2012.

[6] The sectors included in the research are construction; electricity, gas and water supply; finance, insurance, real estate and business services; wholesale and retail trade; public-sector institutions; mining

among transportation and storage companies, where the net employment forecast stood at +15% (an increase of 8 p.p. qoq and no change from the corresponding period of the previous year). Good expectations regarding future trends are formulated by employers from the finance, insurance, real estate and business services sectors, where the net employment forecast is +12% (marking stabilization in qoq and yoy terms). The indicators for construction and trade are +8% (down by 4 p.p. qoq and up by 8 p.p. yoy) and +7% (down by 2 p.p. qoq and up by 3 p.p. yoy) respectively. Slightly optimistic expectations can be observed among public-sector institutions.[7] On the other hand, employers in sectors such as "agriculture, forestry and fishing" and "electricity, gas and water supply" expect to lay off workers, with the net forecasts at –12% (a decline of 17 p.p. qoq and 2 p.p. yoy) and –11% (a decline of 8 p.p. qoq and 13 p.p. yoy) respectively. When it comes to other countries, demand for labor is rising in Germany and Sweden, while being uncertain in Central and Eastern Europe (except Slovenia). Employers in Greece and Hungary are the most reluctant to create new jobs, while employers in countries with significant foreign debt in relation to GDP (Italy, Spain and Ireland) are far from optimistic.

In 2011, Poland's unemployment rate was equal to the EU27 average, and it rose insignificantly from 9.6% in 2010. The highest unemployment rate was recorded in countries most severely hit by the crisis (Table 2), namely Spain (21.7%), Lithuania (15.4%), Latvia (14.7%) and Ireland (14.4%). The unemployment rate also soared in Portugal and Greece. However, Germany saw a stabilization or even slight recovery on its labor market. Under a November 2011 forecast by the European Commission, the average unemployment rate in the European Union will be 9.8% in 2012 and 9.6% in 2013. For the United States, the expected figures are 9.0% and 8.8% respectively, compared with 9.2% and 8.6% for Poland.

Poland fares better than other EU member states in terms of cross-country data on the employment rate. Poland's employment rate was 60.2%, less than the EU27 average of 64.6%, but a substantial improvement over Q1 2004, the quarter preceding Poland's entry into the European Union. Poland had the lowest employment rate at the time, while the EU27 average was close to its value from 2010. Today, Poland's indicator is higher than Hungary's, Slovakia's, Spain's or Ireland's. Similarly, the number of economically active people in the 55–64 age group increased in the analyzed period; the employment rate in that group rose from 25–26% to almost 37.7%. However, in Poland, this indicator is still at the lowest level compared with other EU27 countries, excluding Malta. Under the Lisbon Strategy, it should rise to 50% by 2020. As the number of people eligible for transition state pensions was significantly reduced, the employment rate in the 55–64 age group is expected to rise again.

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and quarrying; industry; restaurants and hotels; agriculture, hunting and forestry; and transport, storage and communications.

7 The forecasts here differ highly from the results of the NBP survey.

Education and wages

Polish society is well educated compared with other European countries. This is illustrated by data on the percentage of the population aged between 25 and 64 years with at least an upper secondary education. However, in the case of tertiary education, the figures for Poland are below the EU27 average (Table 3). Similarly, a relatively small number of adult Poles participate in lifelong learning. The figure for Poland has stayed at a low level for several years and is much less than the EU27 average.

The level of education positively influences wages, a relationship that is confirmed by statistical data. Nevertheless, lifelong learning and education are equally important because human capital accumulated in employees needs to be improved on an ongoing basis. If an employee is oriented toward career development and frequent improvement in professional skills, the probability of becoming unemployed during an economic slowdown, or economically inactive just before retirement, is lower. Experienced employees who have been gaining new abilities on the labor market are valuable asset for many employers who benefit from long-lasting cooperation.

Labor costs in Poland are still low compared with Western Europe and are similar to those in Slovakia and Hungary, but slightly lower than in Czech Republic in purchasing power parity (PPS) terms. In 2011, wage pressure was stronger than in 2010 as wages and salaries rose by 5.4% in nominal terms and 1.2% in real terms, compared with 3.9% and 1.4% respectively in 2010. According to data for Q1–Q3 2011, it is possible to assume that wages in the public sector increased more dramatically than in the enterprise sector (for the fourth consecutive period). Typically, in times of economic slowdown wages in the public sector tend to grow faster than in the private sector, which is partially attributed to the functioning of automatic stabilizers. On the other hand, an increase in wages should reflect a rise in labor productivity. It is highly doubtful such a situation indeed occurred in the public sector. In Q3, gross wages grew at a varying pace across the economy. In industry, they went up by 6.2% (with a 5.6% increase in manufacturing), in construction by 6.7%, and in trade by 6.8%. Wages soared in agriculture, forestry and fishing (16.3%), mining and quarrying (14.0%), and administrative and support service activities (10.1%). The slowest growth was recorded in transportation and storage (1.8%) and human health and social work activities (2.8%).

Table 3

Education and labor costs[8] in Poland compared with selected other EU countries (data on unit labor costs in real terms, Q3 2011)

Country	Tertiary education	Lifelong learning	Unit labor costs growth (%, yoy)	Hourly labor costs		Minimum wages[c]	
	% of population (aged 25–64)			EUR	PPS	EUR	PPS[b]
Poland	**22.9**	**5.3**	**–0.4**	**7.46**	**11.92**	**336**	**537**
Czech Republic	16.8	7.5	0.6	9.68	13.44	310	430
Slovakia	17.3	2.8	–1.2	8.25	11.59	327	459
Hungary	20.1	2.8	1.7	7.22	11.02	296	452
Lithuania	32.6	4.0	–5.5	5.45	8.58	232	365
Latvia	26.9	5.0	–3.7	5.74	8.28	286	413
Estonia	35.3	10.9	–2.1	n/a	n/a	290	n/a
Germany	26.6	7.7	0.7	29.20	28.02	–	–
France	29.0[a]	5.0[a]	0.6	33.15	29.64	1,398	1,250
Spain	30.7	10.8	–3.4	20.25	20.94	748	773
Luxembourg	35.5[a]	13.4	–1.2	32.46	27.07	1,801	1,502
Britain	35.0	19.4	–0.1	19.20	19.15	1,202	1,199
Sweden	34.2[a]	24.5	–1.8	35.99	29.46	–	–
Romania	13.8	1.3	2.6	4.20	7.17	162	277
Bulgaria	23.2	1.2	2.2	3.10	6.13	138	273
EU27	25.9	9.1	n/a	n/a	n/a	–	–

[a] Preliminary data. [b] Own calculations. [c] Data for 2012.

Source: Eurostat.

The NBP's business sentiment research shows that 23.6% of enterprises were considering whether to offer pay raises to their employees in Q1 2012. This percentage is lower than the average for the 2005–2011 period. The weighted average growth was 4.6%. On the other hand, 3.0% of enterprises were thinking of cutting pay. The largest enterprises and foreign-owned companies were most frequently considering pay raises. Those planning to offer pay raises also declared an intention to hire new workers, while enterprises planning to cut pay were at the same time thinking of reducing

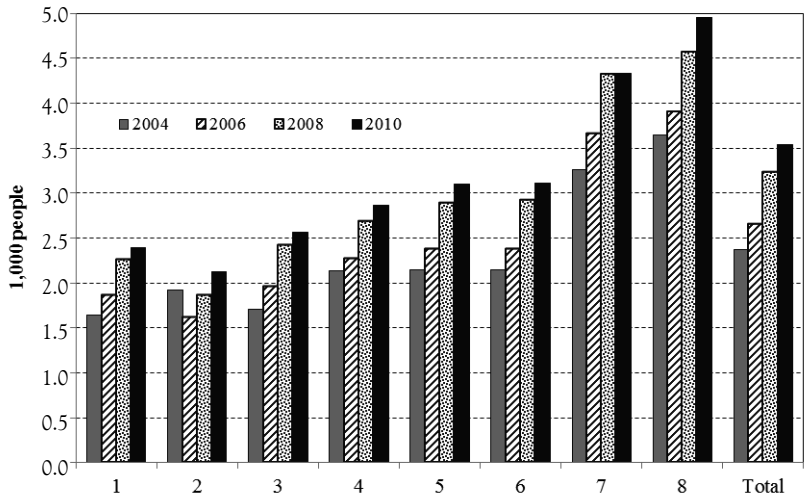
8 Government-regulated minimum wages are used in 20 countries in the European Union. In the remaining member states—Germany, Sweden, Finland, Italy, Denmark, Austria, Cyprus—the minimum wage is set in collective agreements.

employment. According to 70% of companies, wage growth was commensurate with the increase in labor productivity in Q4 2011; 20.7% of those surveyed said wages rose faster than productivity. Surveyed enterprises were also asked what they planned to do in connection with an increase in disability contributions paid by employers (from 4.5% to 6.5%[9] of gross monthly wage) as of Feb. 1, 2012. In answering this question, 68.8% of the companies said they do not plan any moves; 13.8% are thinking of cutting base salary and other components of remuneration, while 3.0% said they would decrease wages for new employees. The disability premium paid by employees remains unchanged at 1.5%. The NBP's business sentiment research findings accord with those in a report by Work Service SA, according to which 28.3% of Poles expect pay raises in 2012.

In Poland, workers' gross wages vary significantly across different education levels. In October 2010, the average gross monthly wage in the economy was ZL3,5430.50, with ZL3,804.70 in the public sector and ZL3,367.68 in the private sector. The diversity of wages and salaries depending on the level of education is illustrated in Figure 2.

Figure 2

Average monthly wage by education level in Poland—wages in 2004, 2006, 2008 and 2010



Source: GUS.
Education levels:

1 – Primary and incomplete primary; 2 – Lower secondary; 3 – Basic vocational; 4 – General secondary; 5 – Vocational secondary; 6 – Post-secondary; 7 – Tertiary with an engineering, bachelor's, certified economic, or equivalent degree; 8 – Tertiary with an academic degree no lower than Ph.D. or tertiary with a master's degree, medical degree or equivalent.

[9] The disability contribution paid by employers stood at 6.5% before 2008.

In October 2010, individuals with a tertiary education and an academic degree no lower than Ph.D. earned ZL 4,955.77 a month on average, 39.9% above the average wage. On the other hand, people with a lower secondary education had the lowest monthly wages, at ZL 2,123.01 on average, 40.1% below the average wage. This data shows only tertiary education results in a distinct increase in pay, while general secondary and vocational secondary education means an only slightly higher paycheck. However, employees with a lower secondary education earn less than those with a primary and incomplete primary education. In part this could be explained by the fact that lower secondary education is only a transitional stage on the education path, so individuals with a lower secondary education would most likely be lower paid due to the temporary nature of their work. In the private sector, wages were far more differentiated; the average salary of people with a doctorate stood at ZL 6,021.94 and was 78.8% higher than the private sector average. In the public sector, the figures were ZL 4,418.47 and 16.1% respectively. The 2004–2010 period saw a strong rise in wages (by 49.6%), especially between 2006 and 2008, with an average annual increase of 6.9%.

An interesting research problem is marking out an individual labor supply curve to provide information on how many hours an employee is willing to work at different rates of pay. Labor supply could be determined by a model in which the consumer chooses between labor (*L*) and leisure (*R*) every day. The entire wage is allocated to consumer goods (C), where $C = w \cdot L$, and "*w*" is the hourly rate of pay. The consumer's objective is to maximize utility, given a function of *R* and C, i.e. $U(C, R) \rightarrow max$. Thus, the consumer's utility is dependent on these two variables and finding an appropriate proportion between work and free time in a given period (for example a day) is an optimization problem. Work by itself does not give satisfaction; in fact, it is unpleasant under this microeconomic model. Only the goods that the consumer can purchase with the money earned contribute to an increase in the consumer's utility. The consumer's equilibrium can be described by the following equation:

$$\frac{\partial U / \partial R}{\partial U / \partial C} = \frac{w}{p}$$

where "*p*" is the price of unit of consumption. The "w / p" ratio could be identified as the consumer's real wage and the two partial derivatives should be interpreted as the marginal utility of free time (*R*) and consumption (C).

A situation in which real wages rise is the next step in the analysis of the consumer's decisions. In such a case, the consumer will strive to achieve an increase in the marginal utility of free time corresponding to the marginal utility of consumption, in line with the above equation. This could be achieved by a gradual increase in working time (*L*). Leisure (*R*) becomes a rare good then, so the marginal utility of *R* would be relatively high. In the observed substitution effect, working time is growing.

On the other hand, the consumer can enhance consumption (C) due to higher pay. The marginal utility of consumption will decrease gradually as a result. In this way, an income effect is created that leads to a drop in working time. The overall outcome could vary. If the substitution effect proves to be stronger than the income effect, the rise in real wages will result in an increased labor supply at the expense of free time. On the other hand, when the substitution effect is weaker than the income effect, the rise in real wages will result in a drop in the labor supply, accompanied by an extension of free time. When pay remains at a relatively low level, the first scenario is likely to occur; additional consumption will firmly contribute to an increase in the consumer's utility. Conversely, if real wages are high enough, the consumer will find free time far more valuable, and the second relationship materializes. a labor supply curve can be built by combining data on the number of hours worked in a given period (e.g. during a day or month) with data on the hourly pay rate. Usually, the macroeconomic supply function is an increasing function, which means that higher prices are accompanied by a wider range of products offered. However, if the income effect turns to be stronger above certain levels of salary, the supply curve will become backward bending.

Two data series were collated to study the shape of the Polish labor supply curve:

– a set of data on average hourly wages depending on the education level,
– a set of data on monthly hours worked, corresponding to the previous set.

Both data series refer to October 2010. Separate calculations were performed for the following groups of employees:

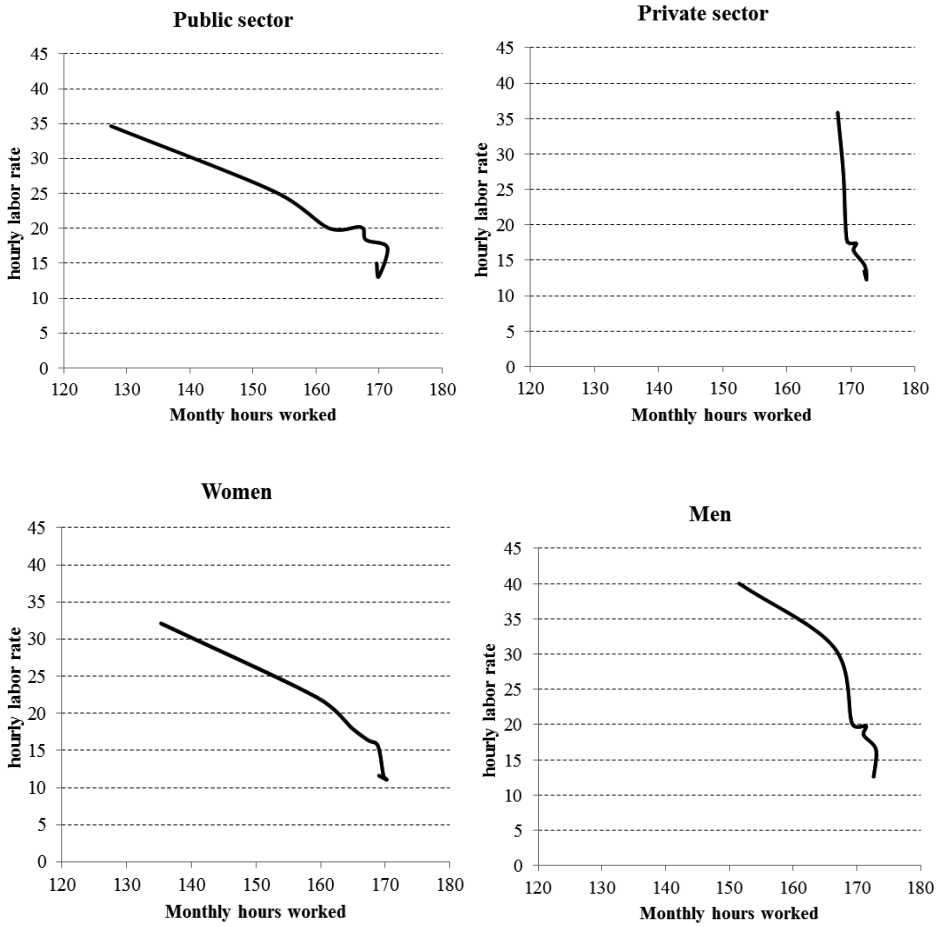
– employees from the public sector,
– employees from the private sector,
– men,
– women.

The labor supply[10] in the each of the four abovementioned groups is illustrated below (Figure 3).

Public-sector employees and women are the two groups in the case of which the occurrence of a backward bending supply curve is the most visible (Figure 3). In both cases, the lower number of hours worked accompanied by a higher hourly pay rate is the result of their advancement to the group of the best educated employees. On the other hand, in the case of private-sector employees, the labor supply curve is almost vertical.

[10] The curves in Figure 4 do not accurately map the labor supply curves, which should be based on time series for a homogenous sample of workers. Moreover, in the model, it is assumed that an employee can work any number of hours, which, however, is unlikely under a contract of employment. Nevertheless, the results could indicate the occurrence of a backward bending supply curve.

Figure 3
Relationship between monthly hours worked and hourly pay rate



Source: Own calculations based on GUS data.

Labor productivity

Labor productivity has grown slowly but steadily in Poland[11] over the past five years. Currently, Poland is among countries where labor productivity tends to stay at a low level. In 2010, lower figures were only recorded in Lithuania, Latvia, Bulgaria, and Romania (Table 4). This means that Poland had an advantage in labor productivity

[11] Data for 2011 were not yet available.

only over two Baltic states that suffered from a severe fall in demand because of the global economic crisis, and are among the new members of the European Union. As another economic slowdown hits the Polish economy, which could be accompanied by a recession in the eurozone, labor productivity in the country is expected to increase slowly and the process of catching up with Western Europe will continue. At a time of economic recovery, rising inflationary pressure does not automatically contribute to excessive rises in real wages, which might occur once inflationary expectations are highly adaptive. For employers, such a scenario would mean further unwillingness to create new jobs, as they would rather be focused on cutting labor costs.

The data in Table 4 clearly show that in the vast majority of EU27 countries, unit labor costs dropped in 2010. Especially strong declines occurred in the Baltic states and Spain, all of which experienced a severe economic recession. The decrease in unit labor costs in Poland in 2010 should be interpreted as a positive trend, especially as the Czech Republic and Hungary, as well as Germany and France, reported an increase in unit labor costs.

Table 4

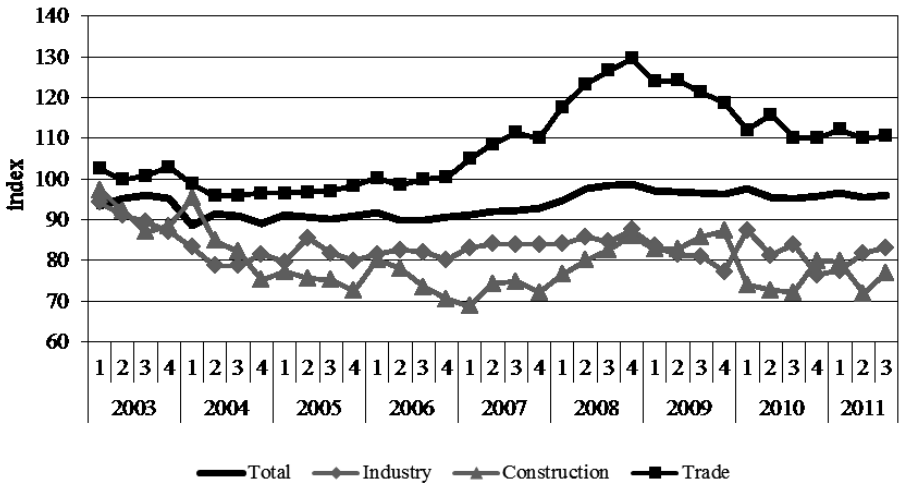
Labor productivity expressed in GDP (in PPS) per person employed: Poland in comparison to selected other EU countries (EU27 = 100 for each year)

Country	2001	2002	2003	2004	**2005**[a]	2006	2007	2008	2009	2010
Poland	**56.3**	**58.9**	**60.3**	**61.8**	**61.6**	**61.0**	**62.2**	**62.3**	**65.5**	**66.7**
Czech Republic	67.8	67.6	71.0	73.0	73.0	74.0	76.3	74.0	75.0	73.4
Slovakia	60.8	62.8	63.6	65.7	68.8	71.7	76.4	79.8	79.8	81.6
Hungary	61.5	64.7	65.9	67.0	67.7	67.8	67.0	70.9	72.1	71.2
Lithuania	47.3	48.5	52.5	52.8	55.0	56.8	59.6	62.1	57.5	62.3
Latvia	41.5	42.8	44.1	45.9	47.8	48.8	51.4	51.6	52.8	54.6
Estonia	48.3	51.2	54.9	57.7	60.8	62.4	66.7	66.0	65.8	69.2
Slovenia	76.1	77.4	78.8	81.5	83.2	83.4	83.1	83.8	80.8	80.4
Germany	106.2	105.8	107.8	107.5	108.6	108.7	108.4	107.9	104.9	105.3
France	120.4	120.7	116.9	116.2	117.4	116.2	116.4	116.1	117.1	116.0
Ireland	129.7	135.2	137.7	137.1	136.0	136.4	137.9	128.6	132.0	136.9
Britain	112.1	112.6	113.0	114.3	113.0	112.6	110.1	106.8	105.5	106.6
Luxembourg	163.0	164.0	168.0	170.5	170.3	179.5	179.9	178.1	168.0	169.9
EU27	104.6	104.4	104.3	104.1	104.0	103.8	103.6	103.3	103.3	103.2
Romania	25.7	29.4	31.2	34.6	36.1	39.7	43.4	49.1	49.2	49.0
Bulgaria	32.1	34.0	34.7	34.8	35.8	36.4	37.5	39.6	40.1	41.8
United States	140.9	140.7	142.6	143.5	144.6	140.6	139.7	138.2	140.6	143.5[b]

[a] Break in series. [b] Forecast.

Source: Eurostat.

Figure 4
Growth of seasonally adjusted unit labor costs in Poland (2002=100)



Source: Own calculations based on GUS data.

Nominal unit labor costs in the economy did not change markedly last year in comparison with 2010 (Figure 4). They leveled off at roughly 96% of their 2002 value. Labor costs did not vary significantly in the main sectors of the Polish economy. In the trade sector, unit level costs stabilized and showed a substantial increase during an upswing. As the crisis hit, the negotiating position of employees and the growth of wages could better adjust to the growth of labor productivity. The trade sector, which is a service sector, is only to a limited extent subject to international competition. In industry and construction, unit labor costs remain at levels significantly lower than those in 2002 (at 83% and 77% of their past values respectively). As the indicator is not growing, it can be expected that the current labor market trends will entail disinflationary processes. However, pricing processes in Poland are strongly dependent on trends in the world economy, where there is a high uncertainty. Another risk factor is the exchange rate of the Polish zloty with respect to the core markets' currencies, especially the euro and the U.S. dollar. The stabilization in overall unit labor costs is a positive sign for the Polish economy.

Conclusion

The year 2011 was not a time of recovery for the Polish labor market; demographic trends worsened. In the coming months, the economic slowdown will continue,

accompanied by a double dip recession in the eurozone. Despite a temporary increase in unemployment, Poland still has a visible competitive advantage over Western European countries in labor costs. Investment in education is particularly important during a period preceding a rise in demand in the economy, as it helps adjust to new market expectations, when the global economy enters a sustainable recovery phase. It is necessary to be aware that human capital can be developed through both education and lifelong learning throughout one's professional life.

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3.2. Investment and Infrastructure

Ireneusz Bil, Piotr Maszczyk

The competitiveness of an economy is shaped by many different factors. Among them, changes in the level of physical investment, including investment in

infrastructure, play an important role. This subchapter assesses the contribution of this factor to the competitiveness of the Polish economy in 2011 and draws conclusions about its importance.

Investment

The year 2011 marked a long-awaited positive change in a prolonged negative investment trend in Poland. Total investment outlays at the end of the third quarter of last year were ZL 66.8 billion, 12.4% higher than in the same period of the previous year. According to preliminary data published by the government's Central Statistical Office, investment outlays in the full year 2011 approached ZL100 billion. This increase, after two years of a considerable drop in investment, marked a positive trend, though the figure was considerably lower than those recorded in the 2007-2008 period.

The remarkable change in investment outlays and gross fixed capital formation in the Polish economy in 2011 took place despite an almost unchanged GDP growth rate (3.9% in 2010 and 4.3% in 2011, according to data by the Central Statistical Office). Poland's GDP growth was relatively moderate compared with that recorded in the 2006–2008 period, but impressive enough by European Union standards. The considerable change in the negative investment trend in 2011 seems to reflect the sequence of circumstances described in the Keynesian model. Thus investment outlays are responsible for the part of aggregate demand most dependent on the business climate. Due to a specific feedback mechanism, they influence the economy far more dramatically than private consumption or government spending.

The prime factor behind the change in the investment pattern in 2011 was direct financing from the European Union budget combined with structural and cohesion funds, which fueled capital formation in both the public and private sectors. The total expenditure of businesses, institutions and individuals benefiting from EU funds in Poland in 2011 reached ZL 57.3 billion, with EU co-financing at ZL 40.4 billion. Another important driver was the fact that the financial crisis which affected most countries in the European Union had a relatively moderate impact on Poland. The crisis began in the United States and soon spread to EU economies including Ireland, Britain and Spain. It also spread from financial markets to the rest of the economy, and then to other economies via foreign trade. In the case of Poland, the negative impact of the crisis on GDP growth was limited. Poland's cumulative growth rate in the 2008–2011 period was almost 15.8%, whereas the average cumulative growth rate for the EU as a whole was negative at –0.5%. However, the crisis led to a general decline in confidence among both households and enterprises, triggering a decreased propensity to consume and invest. The rate at which investment grew fell in 2008, followed by a significant drop in investment outlays in 2009 and 2010. Additionally, in the first two years of the crisis, the availability of credit offered to both households

and enterprises decreased significantly, because of a new, restrictive policy introduced by commercial banks. As time passed, banks became accustomed to the worse climate and started to lend money to enterprises planning investment projects.

One noteworthy factor that led to a considerable increase in the value of investment outlays is a significant growth in the FDI inflow to Poland. According to preliminary data by the Polish Information and Foreign Investment Agency (PAIiIZ), foreign direct investment in Poland increased by 46.7% yoy in 2011, totaling US$ 14.2 billion. This growth was considerably higher than the global average; according to UNCTAD estimates, global FDI increased by 17% in 2011. It is worth noting that the FDI inflow to Poland in 2011 was also higher than that recorded in 2009 and neared the 2008 level, which indicates that the annual FDI inflow has returned to levels preceding the 2009–2010 crisis. It seems obvious that the remarkable increase in FDI inflow was mostly due to internal factors such as faster growth in the Polish economy than in the rest of the EU, combined with increased domestic demand and private consumption spending.

In recent years Poland has stood out in terms of FDI compared with other countries in Central and Eastern Europe. According to UNCTAD data, foreign direct investment inflow to Poland in 2005–2010 totaled US$ 91.7 billion (compared with Lithuania's US$ 7.6 billion, Latvia's US$ 6.4 billion, the Czech Republic's US$ 37.7 billion, Bulgaria's US$ 39.5 billion, and Hungary's US$ 30.3 billion). Poland significantly improved its rank in UNCTAD's Investment Report last year, advancing by five notches from 11th place in 2010. This confirms the country's strong position on the international investment scene. Poland was only outperformed by the world's largest economies, China and the United States, while ranking ahead of Germany and Britain.

A comparison of Poland's investment statistics with those of the Czech Republic, Slovakia, and Hungary—Poland's main competitors in the region as far as foreign capital absorption is concerned—shows that although the level and growth of capital formation in all the Central and Eastern European countries that have joined the EU is chiefly determined by external factors, there are significant differences between them.[12] In 2011, investment in the Czech Republic was projected to grow by around 6.7%, which—as in the case of Poland—marked a reversal in a prolonged negative trend. However, the Czech economy has yet to return to its 2008 level of investment. Since an almost 24% drop in 2009, the growth of Czech investment outlays has not hit double digits. Data on investment outlays and their growth shows that, in the analyzed group of countries, the Czech pattern is the closest to that of Poland, although the rate of investment growth was slower. This could mean this pattern will change in the future.

[12] The data on investment outlays in the Czech Republic, Hungary and Slovakia during the period of 2002–2007 come from the Eurostat website: http://epp.eurostat.cec.eu.int.

Slovakia was the only country that not only managed to maintain positive investment growth in 2010 but also recorded a faster growth rate than in the previous year. However, Slovakia's 2011 growth rate was lower than Poland's. While the Slovak investment growth path was similar to that of Poland until 2008, 2010 marked a major change and the endogenous factors influencing the dynamics of investment outlays not only offset the negative influence of external problems, but resulted in higher investment outlays than in the previous year. It is worth adding that, like Poland, Slovakia struggled with a negative growth rate in investment in 2002 and 2003, while in 2004 investment outlays increased by less than 3%. Thus, an investment-friendly policy pursued by the Slovak government, based on adopting the single European currency, reducing taxes and increasing investment, proved to be successful. The best measure of this success is a 74% cumulative increase in investment in the Slovak economy in 2004–2008 (albeit followed by a 30% drop in 2009). During the same period the cumulative growth rate for Poland was 64%, while both the Czech Republic and Hungary reported 54%.

Hungary was the only country in the group which did not manage to change its unfavorable investment climate in 2011. Capital outlays were projected to decline by 2.5% in constant prices and it marked the third consecutive year of a negative change in this part of aggregate demand. This was chiefly because Hungary had increasing difficulty ensuring financial discipline, which, together with a rapid depreciation of the Hungarian currency, led to a real slump in the public finance sector. The misguided fiscal policy negatively influenced the growth of the Hungarian economy and created an unfavorable investment climate in the medium term.

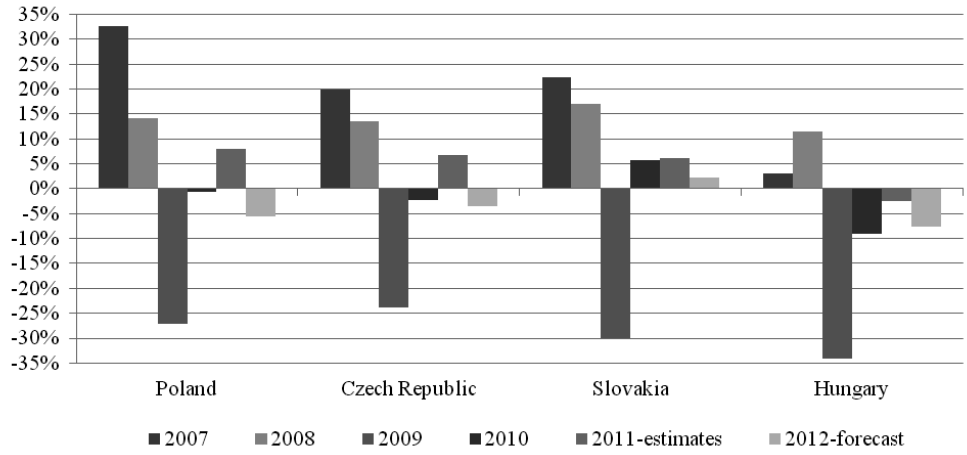
The chart below compares the growth of investment outlays in Poland and other new EU member states in 2007–2011, with some estimates for 2012.

Considering the factors that led to the positive change in the value of investment in Poland in 2011, it is risky to offer even a rough forecast for 2012. Taking into account some discouraging data published in February on a possible slowdown in the country's GDP growth to 2.5%, it is likely that investment in Poland will again decline in 2012, after a period of short-lived growth in 2011. This probably explains why the Eurostat projection for investment outlays in Poland was negative at –5.6%. The same applies to the rest of the group, with the exception of Slovakia (see Figure 5).

However, most international organizations and independent economists predict that investment outlays in Poland will grow at an annual rate of 3–5%. The future growth of investment is important because this part of aggregate demand, influenced by substantially lower net exports—due to a recession expected by the European Commission in most EU countries that are Poland's key economic partners—seems to be the most important factor affecting future GDP growth, along with consumer spending. However, it is unlikely GDP growth rate will be higher than 3% in the short term, and consequently it is quite unlikely that investment will grow more than 5% in 2012.

Figure 5

A comparison of investment growth in Poland, the Czech Republic, Hungary, and Slovakia, 2007–2012



Source: Author's own calculations based on Eurostat data.

The future path of investment growth: tentative estimates

In analyzing the probability of a negative scenario from a drop in investment outlays, two key factors should be taken into consideration. First, the negative scenario is more likely because the inflow of financial transfers from the EU budget began to decrease in 2012, as did the amount of investment related to the Euro 2012 soccer tournament. According to most independent economists as well as government officials, most of the growth in investment outlays in 2011 was generated by the public sector, via EU funds and public projects related to the Euro 2012 championships. But it is highly probable that this positive climate will turn negative in 2012. Due to the strategy introduced by the Polish government for the public finance sector for 2012 (calling for lowering the deficit below 3% of the GDP and thus bringing down the public debt level), local governments will no longer be able to freely incur debts to carry out projects co-financed by the European Union. This practice was particularly widespread in the case of projects financed under the Infrastructure and Environment Operational Program. As a result, the high ratio of absorption will decrease significantly together with the value of Polish investment. Secondly, the negative scenario is more likely due to the productivity of capital in Poland. The trend on the supply side, in particular the productivity of capital since the mid-1990s, shows that the rapid growth of investment was correlated with the high rate of GDP growth. Ever since the growth

of fixed capital investment in Poland started to decelerate at the end of 1997, GDP growth has slowed as well. When fixed capital outlays began to grow again at the end of 2001, the same trend was noted for GDP. The most peculiar situation emerged during the 2001–2003 period, when, together with the decreased investment outlays and reduced employment, the GDP growth rate remained positive chiefly thanks to total factor productivity (TFP). During this period, capital and labor were utilized so effectively that GDP continued to grow despite a decrease in these two factors of production. This seems to indicate that the high rate of fixed capital investment growth in the Polish economy leads to higher TFP growth in the medium and long term. This correlation suggests a specific business cycle in which periods of very fast growth in investment outlays and stable or even decreasing TFP are alternate with periods of negative growth in investment and labor outlays and high TFP dynamics, which keeps the GDP growth rate above zero. It is worth noting that in the case of the Polish economy, capital and labor create a substitutive relationship, while in Western European countries they are in a complementary relationship, as indicated by analyses of the impact of capital and labor on GDP growth. Taking into account the expected moderate growth of the Polish economy and rising unemployment in 2009, it is probable that the only growth factor on the supply side will be TFP, while capital outlays and the number of people working will decrease.

This negative factor could have even worse consequences in the longer run. So far the Polish economy has managed to develop without any significant investment in projects related to innovation. But, as the authors of a report entitled *Kurs na innowacje* (On Track for Innovation) point out, in the case of the Polish economy, this specific business cycle in which periods of fast growth in investment outlays and employment (and consequently rapid GDP growth) alternate with periods of very moderate growth (during which TFP is the only factor of GDP growth) could end soon. The efficiency of the predominant strategy whereby Polish enterprises (and the economy as a whole) import technology (mostly machinery) and know-how from more developed economies and countries—as a result of which the Polish economy is growing faster than more developed countries—is quickly petering out. What the Polish economy really needs to maintain its relatively high productivity of investment outlays and high level of FDI—as well as to stay on track for real convergence—is a strategy in which the enterprise sector will manage to transform imported technology in an original and productive way in order to be able to create innovative goods and services. And such a process would be impossible without investment in innovation, financed—at least in part and in the first few years—from public sources, including EU funds.

While analyzing the probability of the positive scenario (under which the positive trend from the previous year and the moderate growth of investment would continue in 2012), three key factors should also be taken into consideration. The first factor is expansionary monetary policy, which will probably lead to a lowering of the central bank's interest rates. The declining growth rate of the Polish economy, together

with the expected appreciation of the Polish currency, should keep inflation under control and establish a favorable climate, especially in the second part of the year, for decreasing the central bank rates by at least 50–75 basis points. Obviously, the banking sector does not have to transfer the monetary stimulus from the central bank to the economy. But it is easy to change such a situation, for example by having the banking supervision authorities apply administrative methods, combined with financial aid, to change the structure of the credit portfolio in favor of enterprises. This would help increase the amount of credit available to the corporate sector. The decreasing cost of money, coupled with credit expansion resulting from either voluntary moves or policies imposed by the banking supervision authorities, may lead to easier access to funds for enterprises. This should boost the overall level of investment in the country, especially in the third and fourth quarters of 2012.

Secondly, it is widely expected that the amount of FDI will increase in 2012. According to the PAIiIZ, the foreign direct investment inflow may increase by 5–8% yoy in 2012. Thanks to the impressive cumulative growth in the last three years and the positive change in the GDP level projected for 2012, Poland, with its relatively large domestic market, remains an attractive destination for multinational companies struggling with a recession in the western part of the European Union. Moreover, the fast depreciation of the Polish zloty, which began in the third quarter of 2008, makes the Polish economy much more competitive for foreign direct investment, due to lower labor costs in both euro and dollar terms, even taking into account the moderate appreciation of the Polish currency forecast for 2012 and a marginal increase of the labor cost due to higher average taxation. Poland should be an especially interesting place for an additional transfer of capital in 2012 for international companies, which have already invested in this country and could transfer a part or the whole of their production process from Western Europe to Poland. But this strategy could be stopped in its tracks by resistance from workers in plants slated for closure and the policy of governments in Western European countries worried about social unrest. The governments of France and Germany, which offer generous package deals to support industries such as the automobile sector, could limit access to this aid.

Another factor that favors the positive scenario is the sound fundamentals of the Polish economy. Most international institutions point out that Poland was and will probably continue to be less sensitive to the fallout of the financial crisis than other CEE countries and Europe as a whole. Due to lower tax rates, strong domestic demand and decreasing labor costs, Poland can expect the positive GDP growth rate to continue, while in other CEE countries (such as Hungary and the Baltic states), stagnation or even recession are far more likely in 2012. Additionally, the exports-to-GDP ratio in the Polish economy, at 33%, is much lower than in smaller economies in the region (Hungary has 69%, and the Czech Republic reports 66%), so Poland could be less sensitive to the kind of economic problems that are being experienced by Western European countries, especially Germany.

All these estimates have been made with the assumption that Poland's economic and political environment will develop according to some kind of baseline scenario in which no unexpected positive or negative trends will emerge either in Europe or worldwide during 2012. Poland's central bank will be able to pursue an expansionary monetary policy—one encouraging a moderate increase in credit offered by commercial banks to the corporate sector—only if inflation in Poland falls. But this could be prevented by a further increase in oil prices stimulated by continued tension in political relations between the EU and United States, on the one hand, and Iran on the other. Of course, in the event of a military conflict, any growth in either investment outlays or GDP would likely be impossible. The same situation would occur if the trouble within the eurozone increased and the crisis spilled over from Greece to Spain or Italy. In such a situation, all European countries would be hit by a recession, and investment outlays (together with FDI) in Poland would drop significantly.

On the other hand, if the political and economic situation in Greece improves and there is a relatively swift positive change in the business climate across the European Union, mainly the eurozone, economic growth in Germany and other countries that are Poland's most important foreign trade partners will pick up. As a result, Poland's own investment outlays and GDP will be higher than expected. However, such a scenario is far less probable.

Poland's infrastructure in 2011

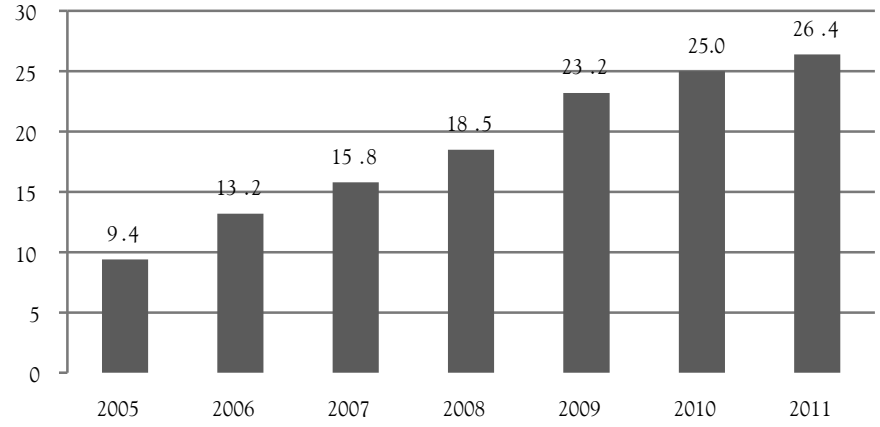
Infrastructure, which is a component of fixed capital, is one of the main determinants of a country's location and investment attractiveness. In the case of Poland, the level of infrastructure development has been degrading the country's position in terms of competitiveness for years. In particular, the quality of roads and railways remains below the European average. Losses suffered by the economy due to the poor quality of transportation infrastructure are significant. In 2010, the World Bank estimated that Poland loses US$ 10 billion, or 2% of its GDP, every year due to the poor condition of its road infrastructure and road accidents (World Bank, 2011).

Road infrastructure

The year 2011 was another period of intensive investment in road infrastructure in Poland. Road construction was under way as outlined in preparations for the Euro 2012 soccer championships in Poland and Ukraine in June 2012. During that period most of the financing made available as part of the EU's structural and cohesion funds was used for infrastructure development. As a result, the dynamics of construction sector output, generated mainly by road and bridge building, remained at a high level

throughout 2011. The sector's output grew around 25% in 2011 as a whole, with first-half growth at more than 40% in year-on-year terms (PMR 2011). Total expenditure amounted to an impressive ZL 26.4 billion (see Figure 6).

Figure 6
Road building expenditure in Poland in 2005–2011 (in billions of Polish zlotys)



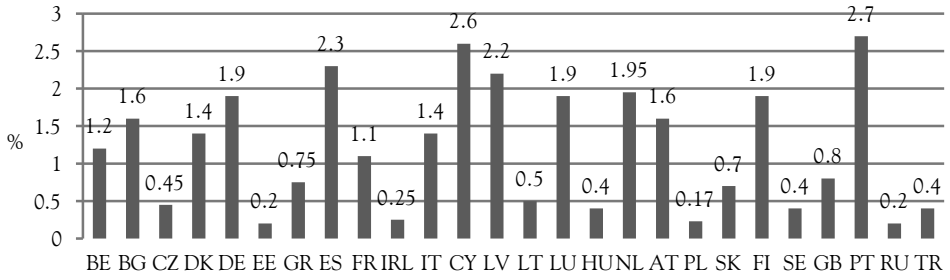
Source: Own compilation based on data provided by the Central Statistical Office (GUS) and the General Directorate of National Roads and Motorways (GDDKiA).

The increased amount of funding and the higher pace of investment projects for the Euro 2012 tournament resulted in 213.5 km of new freeway stretches and 70.2 km of expressways completed in 2011. To compare, between 2008 and 2010, 183.5 km of freeways and 293 km of expressways were built. This means that 2011 marked a breakthrough in the freeway construction program.

There were 1,072 kilometers of freeways and 736 kilometers of expressways in use in Poland at the end of 2011. A total of 1,323 kilometers of national roads are still under construction, and this figure includes 580 kilometers of freeways and 743 kilometers of expressways and beltways. However, Poland remains the country with Europe's worst developed freeway network (see Figure 7).[13]

[13] To compare, 1,350 kilometers of freeways were in use in 2011 in Hungary, 733 kilometers in the Czech Republic, and 432 kilometers in Slovakia.

Figure 7
Share of freeways in the network of national roads in selected countries



Source: European Commission, ERF.

Apart from the building of new transportation routes, there has been a gradual improvement in the quality of roads and bridges in Poland. Over 60% of roads in Poland are now considered to be in good condition (GDDKiA, 2011). The condition of bridge infrastructure is improving gradually as well. In 2005, the average score for structures of this type on a scale of 1 to 5 was 2.90; in 2011, the score increased to 3.21 (GDDKiA, 2011).

Delays in the construction of roads and freeways of special importance in the context of preparations for Euro 2012 forced the government at the beginning of 2012 to adopt regulations ensuring the so-called "passability" of certain national roads and freeways even though their construction has not been completed from the formal point of view (KPRM, 2012). Traffic using such roads would be subject to a number of restrictions, such as strict speed limits. The regulation is aimed at streamlining the movement of soccer fans between the country's main cities during the championships.

The prospects for road infrastructure expenditure in 2012 are positive. GDDKiA expects to boost the level of spending to around ZL 29 billion. The plan is that 1,500 kilometers of freeways and over 1,000 kilometers of expressways will be delivered by the end of the year. Similar prospects for the 2013–2014 period are considerably less optimistic, as funds granted by the EU under its 2007–2013 financial perspective will be used up. The investment-related obligations of individual freeway operators will also be nearing completion, and new investment projects will be commenced no sooner than 2014. The situation will be improved somewhat by the fact that certain funds originally planned for 2011 will be shifted to 2012 and 2013, as a result of delays in the construction process.[14] Such a postponement will make it possible to balance, to

[14] Chinese consortium Covec is the most prominent example here, as it was the first contractor from China to win a public tender in the EU, for the construction of the A2 freeway from Łódź to Warsaw. Performance-related and organizational problems resulted in delays and consequently in the termination of the contract.

a certain extend, the negative impact exerted on the road building sector by the lack of new, large-scale investment orders. The decreasing spending on national roads may also be partially compensated for by expenditure under the local road reconstruction program, whose continuation is planned in 2012–2015 (PMR, 2011).

After a revision in the National Road and Freeway Construction Program in 2010, it is estimated that, with the final form of the freeway and expressway network achieved, the expressway saturation rate in Poland will be 23 km/1,000 km,^{2} and the freeway saturation rate will be 6.4 km/1,000 km.^{2} However, these figures will represent only about 50% of the current EU average (KPRM, 2009).

Airport infrastructure

A large-scale airport and railway station modernization program was launched in Poland as part of preparations for the Euro 2012 championships. These facilities are where many tourists have their first contact with Poland, hence the efforts to ensure adequate service quality and capacity.

There are eight cross-regional airports in Poland that are part of the Trans European Transportation Network. These are Warsaw, Gdańsk, Wrocław, Katowice, Poznań, Rzeszów, Cracow, and Szczecin. Smaller airports, such as Lublinek near Łódź, Świdnik near Lublin, and Modlin near Warsaw, are growing rapidly as well. Modlin is intended for low-cost carriers. Some of these, including Wizzair and Ryanair, have already decided to move their Polish bases to Modlin, which will not be fully operational by the time Euro 2012 begins, but will be able to receive private aircraft. a direct railway link between Modlin and Warsaw is planned for completion in 2013, which will not only enhance the transport of passengers and goods, but will also improve Modlin's competitiveness compared with Warsaw's Okęcie Airport.

In September 2011, Poland's largest airport, Okęcie, finished the reconstruction and modernization of some of its runways, taxiways and roadways in a project worth around ZL1.2 billion. The Gdańsk airport, which served nearly 2.5 million passengers in 2011 (an increase of 10%), completed six new investment projects, including a new terminal. Construction of a new terminal is under way in Wrocław, where 3 million passengers will be served each year, a number expandable to 7 million after further expansion of the building facilities. The new terminal is four times larger than that currently in use and will be capable of handling twice as many passengers from day one onward. The situation in Poznań, where the current terminal is being expanded, is similar. Its arrivals section and the future main entrance will be completed in time for Euro 2012. Work to modernize and expand the Rzeszów airport's apron will begin in 2012. The total value of airport infrastructure-related projects will be ZL 4.5 billion by 2015, with ZL 1.27 billion co-financed by the European Union.

Railway infrastructure

Compared with other European countries with a similar geographical layout, Poland has a relatively dense railway network. Its disadvantages include uneven territorial distribution and a considerable degree of wear. The railway density factor is high at around 6.5 km/100 km^2 (4.6 km/100 km^2 for EU15). The highest degree of railway density is recorded in certain regions of the Czech Republic, Luxembourg, and Germany (over 10 km/100 km^2), but also in the Netherlands, Hungary, Austria, Slovakia, Britain, and Poland. The Polish railways rank second in the European Union (behind Germany) as far as the amount of transported goods is concerned, and sixth in terms of the number of passengers. The share of railway transport in Poland for goods (26%) is much higher than the EU average (17%), and almost the same (6.7%) in terms of passenger transport. However, due to the total length of the railway network, the traffic saturation rate in Poland, with 2,347 million transportation units per kilometer of railway lines, represented around 76% of the average traffic intensity rate in the EU27, and 46% of the traffic intensity rate in Germany (2009). Poland also has one of the highest private sector shares in the total railway transportation market (32.54% of the total number of ton-kilometers and 56.53% of the total number of tons transported) (World Bank, 2011).

In 2009 and 2010, a thorough stock-taking operation was conducted for the railway network managed by PKP Polskie Linie Kolejowe SA and the technical condition of the network was assessed. The evaluation showed that only 37% of all railway lines nationwide are in good condition and require no repairs except day-to-day maintenance. Another 38% of the lines were found to be in satisfactory condition, which means they required moderate train speed limits and minor repairs; and 25% of the lines are in unsatisfactory condition, meaning that considerable speed limits need to be introduced and serious modernization work is required, most often involving the need to replace rails and railway tracks (PKP PLK, 2011). In all, 7,500 of Poland's 19,200 kilometers of railway lines have poor technical parameters, and 4,000 kilometers are in a particularly serious condition and will have to be shut down by 2015 unless more funing is earmarked for their maintenance (PKP PLK, 2011).

The poor state of Poland's railroad infrastructure largely stems from the fact that 54% of the country's 29,000 railway-related civil engineering structures, such as bridges, overpasses, culverts, and tunnels, are more than 90 years old. It is practically impossible to modernize them to meet the requirements of today's railway systems. They need to be demolished and rebuilt from scratch. Nearly one-third of the 25,000-kilometer power supply network is more than 30 years old and should be replaced, as it has already surpassed its useful life period (PKP PLK, 2011).

Insufficient financing continues to be the main problem of Poland's railway infrastructure. Under the EU's financial perspectives for the 2004–2006 and 2007–2013 periods, Poland received funds from EU coffers to modernize around 1,500

kilometers of its railways, or 8% of the network in active service nationwide. a further 2,200 kilometers will be modernized by 2015 with the use of national funds. This means that no modernization work whatsoever will be performed in the years to come on over 15,400 kilometers of the railway network.

The relatively low level of expenditure leads to not only sluggish modernization, but also periodic disruptions in passenger traffic, cancellation of connections and poor condition of stations and rolling stock. In 2011, railway-related problems generated parliamentary debates and heated discussions in the media on several occasions. As a result of these debates, decisions were made to increase the level of funding to modernize the railway system at the expense of roads and other large projects such as High-Speed Rail (HSR). The new transport minister put the HSR project on hold until 2015. This seems to be the right decision as the existing railways routes are being modernized and the speeds at which trains travel are being increased. The ongoing expansion of the airport system, for which the HSR would be the greatest competitor, is another factor that comes into play.

Power grid infrastructure

The Polish power and heat generation sectors are more than 90% reliant on solid fuels, which stems from the massive use of domestic coal and lignite resources. There are 19 conventional power plants in Poland, most of them built decades ago. All of them are based on outdated technology and are seriously worn out. According to most available forecasts, produced by institutions such as the International Energy Agency (IEA) and Poland's Economy Ministry, demand for energy in Poland will continue to grow slowly but steadily, fueled by the country's economic growth and inadequate improvements in energy effectiveness. At the same time, emission levels in the Polish economy need to be reduced considerably.[15]

Due to a considerable role of solid fuels in Poland's energy mix, the country has a high ratio of emissions to energy consumed. In the analyzed period, Poland's emission levels were roughly one-third higher than the EU27 average, despite the fact that Poland reduced its relative emission levels by around 10% over that time.

In terms of electricity consumption, 2011 fit in with the slow consumption increase trend; electricity production in Poland totaled 163,153 GWh last year, an increase by 4.36%, and its consumption amounted to 157,910 GWh, an increase by 1.88%. Coal-powered plants produced 90,811 GWh of electricity, 1.79% more than in 2010. Lignite-powered plants produced 53,623 GWh in 2011, an increase of 8.42%. a slow growth in

[15] The emission intensity of the economy, expressed by the ratio between the emission of greenhouse gases (in tons of CO2) and the energy used, is the most important of all factors. The value of this indicator depends mainly on the structure of primary energy use, and to a lesser extent on the technological advancement of the power sector, the standards in effect or the geographical structure of a given country.

production volume was also recorded in 2011 in the case of gas-powered plants, which generated 4,355 GWh, compared with 4,167 GWh in 2010 (PSE Operator SA, 2012).

Many power-generating facilities in Poland's energy sector are obsolete and will reach the end of their useful life within the next 10 years. Nearly 45% of the country's energy capacity comes from equipment that has been in use for over 30 years, and 33% from equipment operated for 20 to 30 years. By 2020 it will be probably necessary to shut down power-generating units with a total power rating of around 7 GW (the facilities currently in use have a combined output of 36 GW). This is mainly due to the deteriorating condition of these facilities and the fact that they cannot compete with units based on modern technology.[16] Another reason is the ever stricter environmental requirements. As a result, 15 GW of new production capacity will have to be installed over the next nine years, as the government's energy policy until 2030 assumes that the total output of Poland's energy sector will increase from 36 GW to 44 GW in 2020.

Investment projects planned in the energy sector nearly match that amount, at 14.8 GW, and their total value approaches ZL 100 billion. Only three new units have been built over the past three years, Pątnów II, Łagisza, and Bełchatów 13. The total power rating of these units is 1.8 GW, which accounts for just 5% of all power installed in the Polish energy sector. Spending will be even higher if preliminary plans calling for a further reduction in CO2 levels (by anywhere between 80% and 95% by 2050, compared with 1990) are carried out. Such a far-reaching reduction is recommended by the European Union's Energy Roadmap 2050 document; (European Commission, 2011). Polish experts have widely criticized the plan as unworkable in the Polish economy (KIG, 2011).

Renewable energy seems to offer big potential in terms of power generation in Poland. However, the country lags behind most other European Union states in using such energy. This particularly applies to wind farms, which form a rapidly growing business sector. Poland's wind power plants had a combined capacity of around 1,180 MW and produced a total of 2,798 GWh of energy in 2011, up from 1,300 GWh in 2010. Wind power accounted for just 1.7% of all energy generated in Poland in 2011, up from 0.7% in 2009 (ARE, 2011). Under a program for developing renewable energy in Poland, by 2020 wind turbines are expected to supply 6,650 MW of power annually, an ambitious target that requires heavy investment in the sector.

The role of water-generated energy has not increased for years. Poland's hydrological position is uninspiring when it comes to power generation. The country's relatively flat landscape (small differences in elevation) and insignificant water resources are a natural barrier to investment. In 2011, the total output of Poland's hydroelectric power plants was 2,529 GWh, down from 3,268 GWh in 2010. Poland uses only 12%

16 The difference in efficiency between the old power units and those constructed with the use of modern technology is roughly 10 percentage points (35% vs. 45%).

of its hydroelectric power resources, and the share of water-generated energy in total production is just 1.7% (PSE Operator, 2011).

Biomass-powered plants, including biogas plants, are another important component of Poland's renewable energy sector. There were 10 biogas plants in operation in Poland in 2011, with a total power output of around 9.5 MW and a heat-generation capacity of 9.8 MW. a number of combined heat-and-power plants have been adapted to the co-use of biomass. These include CHP Siekierki, CHP Żerań, and the Połaniec power plant.

The year 2011 saw further preparations and social consultations related to the plan to build Poland's first nuclear power plant. The investor, Polska Grupa Energetyczna SA, has launched a procedure to select the technology supplier. The procedure is scheduled to be concluded by 2014. Meanwhile, the government's nuclear power program has met with public criticism. It intensified in the wake of the disaster at the Fukushima plant in Japan and after the German authorities finally decided to phase out that country's nuclear power plants.

Meanwhile, work continues at a liquefied natural gas (LNG) terminal in Świnoujście as part of a project that began two years ago. The terminal will make it possible to receive 5 billion cubic meters of natural gas a year to begin with. Later, depending on demand for this type of fuel, the terminal's regasification capacity may be increased to 7.5 billion cubic meters, or nearly 50% of the current annual demand for natural gas in Poland. The country uses around 14 billion cubic meters of natural gas a year. Completion of the first stage and commissioning of the project is planned for 2014. This will give Poland alternative ways to import considerable amounts of liquefied natural gas from a country other than Russia, which should have a positive impact on price negotiation

Poland has one of the largest potential deposits of shale gas in the world. According to estimates by the U.S. Department of Energy, the Polish deposits, stretching from the Baltic Sea to the Bieszczady region, may hold 5.6 billion cubic meters of exploitable gas. Theoretically, this is 32 times more than the amount of conventional gas deposits in Poland, and would suffice to satisfy current demand for 322 years. More than a dozen multinational companies, including ConocoPhilips, Exxon Mobil, and Chevron launched geophysical surveys in 2011 to confirm these estimates. In early 2012 worrying news arrived that the amounts of shale gas discovered so far are insufficient to guarantee profitable extraction on an industrial scale (ExxonMobil, 2011).

The still-unresolved Greek debt crisis and problems with the stability of the single European currency, the euro, have left their mark on the Polish market for mergers and acquisitions in the energy sector. The total value of mergers and acquisitions in Poland in 2011 was ZL11.5 billion, down from ZL12 billion in 2010. Treasury-controlled companies were the most active in this area. Most transactions were related to Swedish corporation Vattenfall's decision to sell its Polish assets (*for more on that*

see the 2011 report). The largest transaction of 2011 involved the purchase, by Tauron Polska Energia, of 99.98% of Górnośląski Zakład Energetyczny from Vattenfall, for over ZL 3.6 billion. The second-largest transaction was one in which Polskie Górnictwo Naftowe i Gazownictwo bought 99.98% of Vattenfall Heat Poland from Vattenfall for nearly ZL 3 billion. In the third-largest transaction, Dalkia Polska purchased 85% of SPEC from the city of Warsaw for over ZL 1.4 billion. These three transactions accounted for nearly 70% of all transactions in the sector in terms of value. Such high-profile M&A transactions are not expected in 2012, though the Treasury plans to sell its stake in a number of energy companies including PGE SA (PwC, 2011).

Generally speaking, 2011 brought a number of positive developments and encouraging trends in the infrastructure sector. Preparations for Euro 2012 have mobilized the government, public administration and businesses to accelerate investment in road, railway and airport infrastructure. Although delays were experienced and some of the projects (including freeway stretches) will not be completed in time for the championships, most of the plans have materialized. Work to modernize infrastructure in the energy sector gained momentum as well, in part due to Poland's obligations to reduce carbon dioxide emissions as a member of the European Union.

Plans for 2012 provide for further investment in infrastructure. This should help boost Poland's economic competitiveness and investment appeal. In subsequent years, however, investment in the country is likely to decelerate. Most projects related to the Euro 2012 tournament will have been completed and no mobilization of this kind will be present any longer. EU funds provided under the bloc's current financial perspective will be used up, and the economic outlook for Europe offers little hope for a return to fast growth.

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3.3. Science, Technology, Innovation: Poland Compared with Other Countries

Ziemowit Czajkowski, Marcin Gomułka

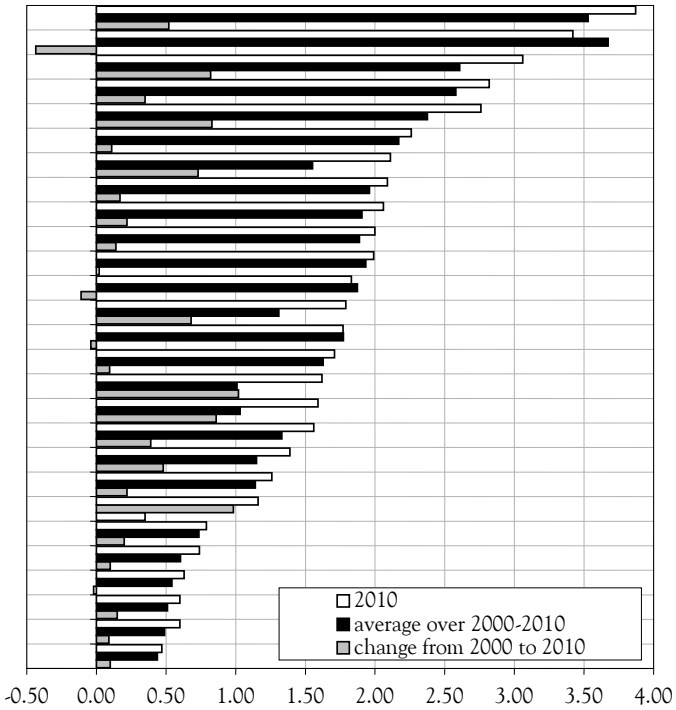
Research and development activities and modernization of production facilities and manufacturing processes, combined with investment in employee skills, determine the ability of enterprises to compete on international markets and the growth prospects of economies. In this subchapter, research and development (R&D) and innovation activities in Poland will be compared with the results achieved by other countries in the European Union as well as selected non-EU countries. The aim of this comparative analysis is to determine Poland's innovative capacity and its importance for the country's competitiveness.

Research and development expenditure

Research and development expenditure in the long run determines the ability of an economy to generate innovations that provide the greatest market value. Such innovations are connected with the application of advanced technology in manufacturing processes and the production of technologically advanced goods. Under the Europe 2020 strategy, all EU countries are expected to increase their R&D expenditures to meet a threshold of 3% of GDP.

Figure 8
Total intramural expenditures on R&D as a fraction of GDP, 2000–2010 period

	2010	average over 2000-2010	change from 2000 to 2010
Finland	3.87	3.53	0.52
Sweden	3.42	3.67	-0.44
Denmark	3.06	2.61	0.82
Germany	2.82	2.58	0.35
Austria	2.76	2.38	0.83
France	2.26	2.17	0.11
Slovenia	2.11	1.55	0.73
EU15	2.09	1.96	0.17
Euro area	2.06	1.91	0.22
EU27	2.00	1.89	0.14
Belgium	1.99	1.93	0.02
Netherlands	1.83	1.87	-0.11
Ireland	1.79	1.31	0.68
Britain	1.77	1.77	-0.04
Norway	1.71	1.63	0.10
Estonia	1.62	1.01	1.02
Portugal	1.59	1.03	0.86
Czech Republic	1.56	1.33	0.39
Spain	1.39	1.15	0.48
Italy	1.26	1.14	0.22
Hungary	1.16	0.98	0.35
Lithuania	0.79	0.74	0.20
Poland	0.74	0.60	0.10
Slovakia	0.63	0.54	-0.02
Latvia	0.60	0.51	0.15
Bulgaria	0.60	0.49	0.09
Romania	0.47	0.44	0.10



Source: Authors' compilation based on Eurostat data.

Polish authorities had planned to increase R&D spending to 2.2–3% by 2010 (OECD 2010, p. 89). According to Eurostat data, total intramural R&D expenditures in Poland amounted to 0.74% of the GDP in 2010 (see Figure 8), the fifth-lowest figure in the EU. Between 2000 and 2010, Poland's expenditure rose by 0.1 percentage points (p.p.). During this period, the share of intramural R&D expenditure as a percentage of GDP changed at highly variable rates in other EU10 countries. In Hungary, R&D expenditure increased by 0.35 p.p., in the Czech Republic by 0.39 p.p., and in Slovenia by 0.73 p.p. The figures suggest that these countries follow different development paths than other new EU member states.

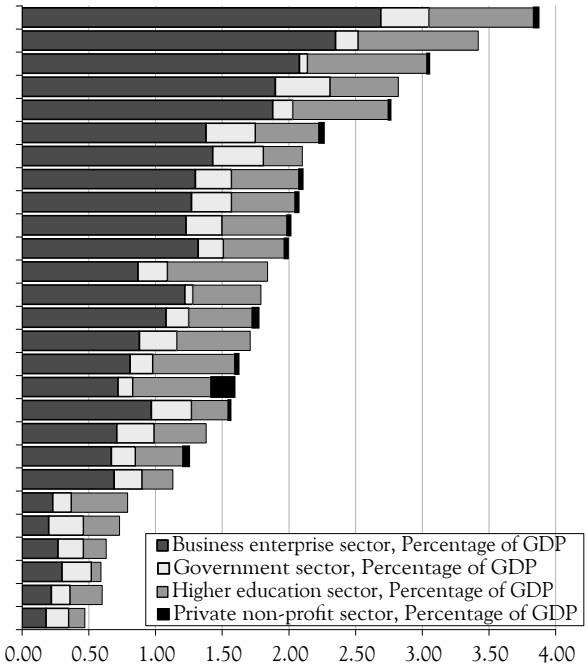
The requirements of the Europe 2020 strategy have so far been met only by Finland, Sweden and Denmark. However, further research is required to investigate whether the arbitrary thresholds of R&D expenditures' share of GDP are a worthy goal, especially as the recommendation does not take into account what strategy of development a particular economy follows and how important these expenditures are regarding the achieved stage of economic development. Another issue is whether

the country's R&D infrastructure and its R&D employment size make it possible to absorb the increase in expenditures.

Figure 9

Total intramural R&D expenditure (GERD) by sectors of performance (as % of GDP) in 2010

Finland	2.69	0.36	0.79	0.03
Sweden	2.35	0.17	0.90	0.00
Denmark	2.08	0.06	0.90	0.01
Germany	1.90	0.41	0.51	0.00
Austria	1.88	0.15	0.72	0.01
France	1.38	0.37	0.48	0.03
Slovenia	1.43	0.38	0.29	0.00
UE15	1.30	0.27	0.51	0.02
Euro area	1.27	0.30	0.48	0.02
UE27	1.23	0.27	0.49	0.02
Belgium	1.32	0.19	0.46	0.02
Netherlands	0.87	0.22	0.75	0.00
Ireland	1.22	0.06	0.51	0.00
Britain	1.08	0.17	0.48	0.04
Norway	0.88	0.28	0.55	0.00
Estonia	0.81	0.17	0.62	0.02
Portugal	0.72	0.11	0.59	0.17
Czech Republic	0.97	0.30	0.28	0.01
Spain	0.71	0.28	0.39	0.00
Italy	0.67	0.18	0.36	0.04
Hungary	0.69	0.21	0.23	0.00
Lithuania	0.23	0.14	0.42	0.00
Poland	0.20	0.26	0.27	0.00
Slovakia	0.27	0.19	0.17	0.00
Bulgaria	0.30	0.22	0.07	0.00
Latvia	0.22	0.14	0.24	0.00
Romania	0.18	0.17	0.12	0.00



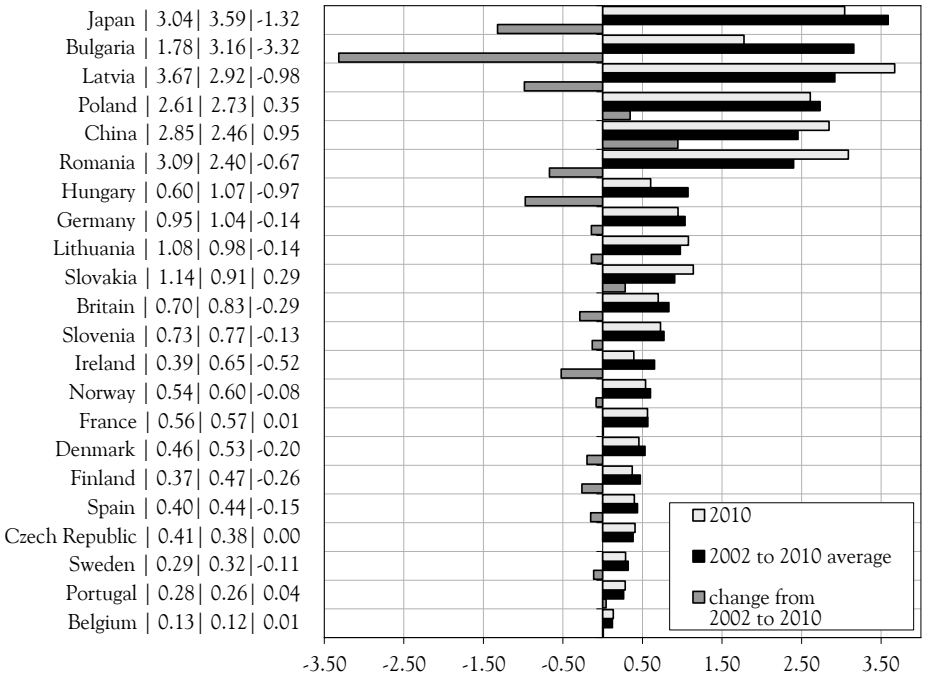
Source: Authors' compilation based on Eurostat data.

Analyzing Figure 9, one should note that the six countries with the lowest R&D activity also report a much lower share of the business enterprise sector in GDP. The differences in the government sector's share in total intramural R&D expenditures are not that significant. Poland, with its share of government R&D expenditures at 0.26% of GDP, is close to the average values for the EU15 (0.27%), EU27 (0.27%) and the eurozone (0.3%). Higher differences among EU countries in business R&D measured as a percentage of the GDP can be explained by the location of R&D activity by transnational corporations in their countries of origin paired with the inability of local enterprises to gather significant funds for R&D. Another reason might be the different strategy of local companies, which choose to reverse-engineer and replicate solutions developed elsewhere rather than take the financial risk related to research (imitator strategy).

Invention as a measure of productivity of research and development expenditures

Figure 10

Number of resident patent filings per US$ million (based on 2005 PPP) of research & development expenditure: value in 2010, average over 2002–2010 period and change from 2002 to 2010



Note: R&D expenditures are lagged by one year according to the approach introduced by WIPO.

Source: Authors' compilations based on data published by WIPO.

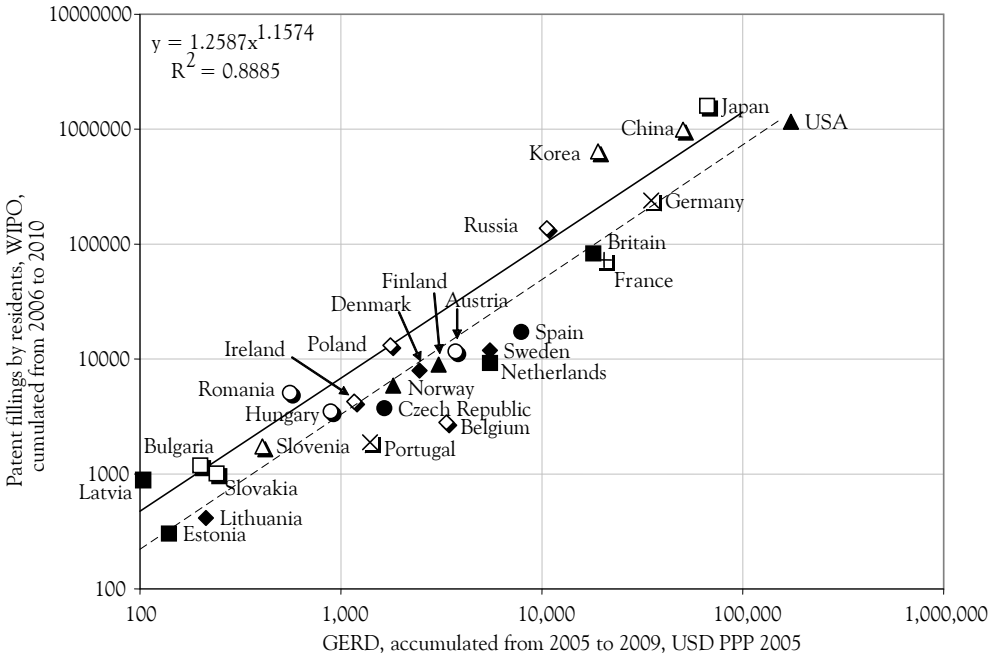
Inventions are an important part of the effects of research and development. Patent applications are widely recognized as a proper proxy measure of the results of R&D. For the purposes of this analysis, a specific measure of productivity of R&D outlays will be introduced: the number of patent applications per US$ 1 million spent on research and development in the year preceding application.

In order to make the analysis of productivity of R&D outlays more complete, Figure 10 was supplemented with Figure 11, which presents accumulated R&D and patent application data. This greatly diminished the impact of single-period fluctuations that could affect Figure 10. Figure 11 presents the linear dependence

between R&D expenditures accumulated over the 2005–2009 period and patent applications accumulated from 2006 to 2010.[17] The average expected effectiveness of patent expenditures is represented by the broken regression line, while the hypothetical effectiveness of Poland is marked as the solid thin line.TODO1 Chart 3

Figure 11

Dependence between accumulated R&D expenditures over 2005–2009 and resident patent filings accumulated over 2006–2010



Source: Authors' compilation based on data from Eurostat, OECD and WIPO.

A comparison and analysis of Figures 9, 10 and 11 makes it possible to make the following remarks:

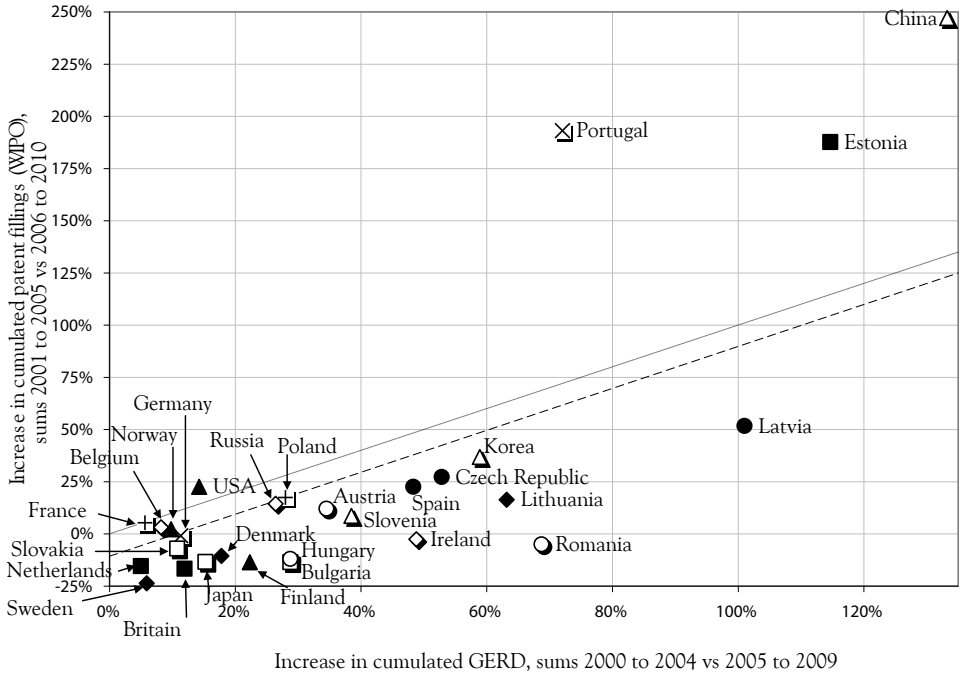
– Using the average number of patent filings per US$ 1 million of GERD to measure R&D efficiency, it is possible to note that Poland is either among the EU countries that make the most effective use of R&D expenditures or that Polish companies have concentrated their R&D activities in low-input R&D projects;

[17] In order to ensure comparability with the series provided by WIPO (Figure 9), the R&D expenditures were lagged by one year.

– Other EU10 countries such as Bulgaria, Latvia, Romania, Hungary, Lithuania, and Slovakia perform similarly to Poland, but only Poland and Slovakia managed to improve their patent effectiveness of R&D spending in the 2002–2010 period;
– In absolute terms, Poland spent more than any other EU10 economy on R&D in 2005–2009 and was more effective in allocating these expenditures than many other countries. For example, the Czech Republic and Norway, despite spending comparable amounts of money, failed to achieve as many patent filings by residents as Poland did. However, some transition economies, including Russia, Romania, Latvia, and Bulgaria proved more effective.

Figure 12

Increase in accumulated GERD (2000–2004 vs. 2005–2009) and increase in patent filings (2001–2005 vs. 2006–2010)



Source: Authors' compilation based on Eurostat, OECD and WIPO datasets.

Figure 12 shows the increase in patent applications between 2001–2005 and 2006–2010 and matches it with the increase in accumulated R&D spending between 2000–2004 and 2005–2009. The figure makes it possible to determine whether the additional R&D expenditures in 2005–2009 (compared with the 2000–2004 period) resulted in a significant increase of output measured by inventions (proxified by patent filings data) or whether they proved inefficient. The broken line represents

the no-effects-of-scale line (a 1 p.p. increase in GERD results in a 1 p.p. increase in patent filings).

Poland is among the countries in which an increase in GERD was accompanied by (and presumably produced) the highest growth proportionally in the number of patent applications (inventions). The picture, however, is far less favorable than in Figure 10. Additional expenditures on R&D proved not only far less productive than in China, Portugal, or Estonia, but also in countries that spend a much higher portion of their GDP on R&D, such as the United States, France, Belgium, and Norway. This proves there is still much room for improvement when it comes to efficiency. It is worth mentioning that all the transition economies that are a natural benchmark for Poland proved less effective (the solid thin line on Figure 12 represents the hypothetical line[18] of effectiveness for Poland; all the transition economies are below this line).

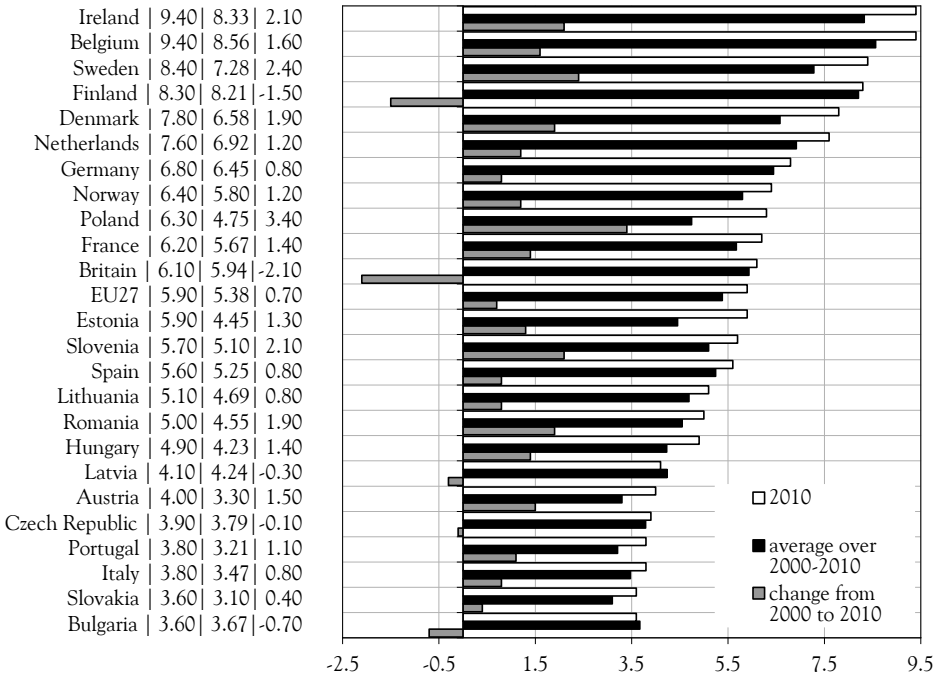
Human resources for research and development

Research and development activities require both considerable expenditures and qualified R&D staff. Structural changes in the innovation system of an economy should be visible as shifts in the proportion of R&D employees in total employment. The strategy of development pursued by a particular country (cost-of-labor-based or knowledge-intensive) should be determinable based on the proportion of researchers and engineers in total employment. Figure 13 shows the share of R&D staff in total employment (aged 25 to 64). On closer examination, it turns out that the increase in the proportion of scientists and engineers in total employment in Poland was the highest in the EU (an increase of 3.4 p.p. from 2000 to 2010). In 2010, Poland outperformed all other EU10 economies in terms of the share of R&D staff in total employment (6.3% of employment, but accompanied by a mere 0.74% share of GERD in GDP), ahead of Slovenia (5.7% of employment and R&D spending at 2.11% of GDP) and the Czech Republic (3.7% of employment and R&D outlays at 1.56% of GDP). Poland was ahead of Britain (6.1% of employment, 1.77% of GDP) and France (6.2%, 2.26%), but behind Norway (6.4%, 1.71%) and Germany (6.8%, 2.82%).

The above data raises the question of whether employing such a large part of the work force in R&D-related positions, accompanied by significantly lower spending than in other countries with a comparable proportion of employment in R&D (see Figures 8 and 14), could lead to relevant research and the creation of advanced technology in Poland.

[18] Assuming no effects of scale.

Figure 13
Scientists and engineers as a percentage of total employment (aged 25–64), 2000–2010



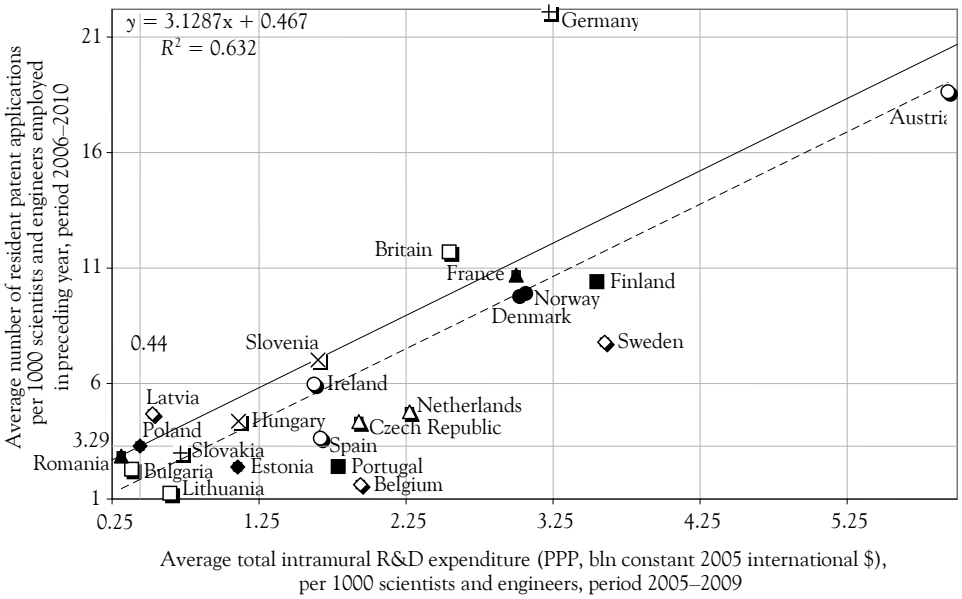
Source: Authors' compilation based on Eurostat data.

Figure 14 shows the relationship between GERD per 1,000 scientists and engineers and the number of patent filings by residents (WIPO) per 1,000 scientists and engineers.[19] Poland is among the countries with a low intensity of R&D activities (measured by spending per R&D employee). Only Romania and Bulgaria report lower outlays. From the output-effectiveness point of view, based on the number of patent applications per scientist or engineer, Poland proves to be more effective than not only low-input countries but also some countries with a higher input intensity of R&D, such as Slovakia, Estonia, Portugal, and Belgium. The inefficiency of Poland's innovation system (in terms of the utilization of human capital) is clearly visible in Figure 14 as the gap (measured along vertical axis) to countries that made R&D a priority in their development strategies: Finland, Sweden, Denmark, and France (not to mention exceptionally input-intensive Austria and output-efficient Germany; see Figure 8).

[19] Time series of scientists and engineers lagged by one year relative to patent filings, following the WIPO approach of one-year lagged inputs.

Figure 14

Intensity of research and development activities and its efficiency: average number of patent filings per 1,000 R&D employees (2006–2010) juxtaposed with GERD per 1,000 researchers and engineers (2005–2009)



Note: GDP and R&D expenditures in PPP-adjusted 2005 US$. The broken line represents average patent-effectiveness per 1,000 R&D employees given the GERD per 1,000 scientists or engineers (regression line); the thin solid line represents the hypothetical effectiveness of Poland's innovation system, assuming the relation between inputs and outputs holds for Poland.

Source: Authors' compilation based on Eurostat data.

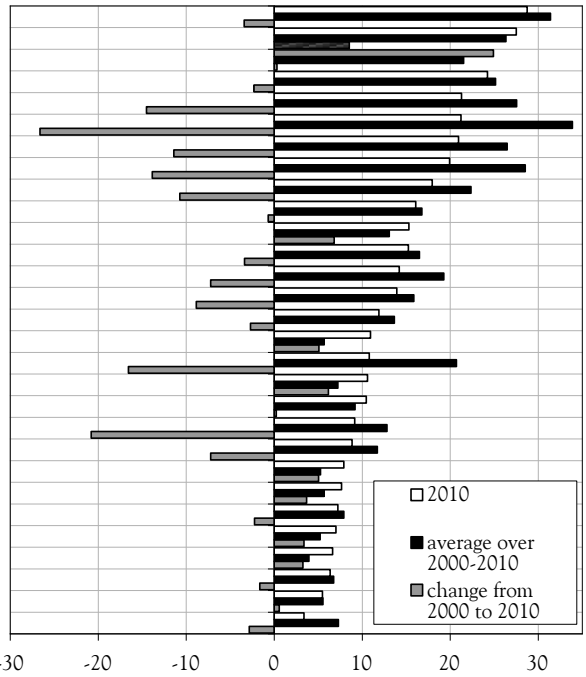
Exports of technologically advanced goods and services

Does R&D influence the structure of Poland's exports? In order to analyze the trends in exports of technologically advanced goods and services, Figures 15 and 16 were plotted. In 2010, hi-tech exports constituted 6.64% of Poland's manufactured exports, an increase of 3.28 p.p. from 2000.

Figure 15

Share of high-technology exports in manufactured exports: value for 2010, average from 2000 to 2010 and change since 2000 (in p.p.)

	2010	average over 2000-2010	change from 2000 to 2010
Korea	28.73	31.39	-3.41
China	27.51	26.33	8.53
France	24.92	21.53	0.31
Hungary	24.24	25.16	-2.30
Netherlands	21.29	27.54	-14.51
Ireland	21.23	33.88	-26.61
Britain	20.94	26.48	-11.40
USA	19.93	28.52	-13.85
Japan	17.96	22.37	-10.73
Norway	16.08	16.79	-0.68
Czech Republic	15.30	13.07	6.82
Germany	15.25	16.50	-3.37
Denmark	14.21	19.27	-7.23
Sweden	13.93	15.87	-8.85
Austria	11.91	13.65	-2.69
Romania	10.95	5.67	5.08
Finland	10.80	20.71	-16.57
Lithuania	10.61	7.23	6.15
Belgium	10.47	9.18	0.23
Estonia	9.15	12.82	-20.79
Russia	8.85	11.71	-7.22
Bulgaria	7.91	5.26	5.04
Latvia	7.64	5.68	3.69
Italy	7.24	7.91	-2.24
Slovakia	7.02	5.23	3.38
Poland	6.64	3.95	3.28
Spain	6.36	6.76	-1.63
Slovenia	5.49	5.54	0.58
Portugal	3.39	7.29	-2.84



Note: In the case of South Korea, due to missing data for 2010, the share from 2009 was used instead. In addition, the average and change were computed for 1999–2009.

Source: Authors' compilation based on World Bank data.

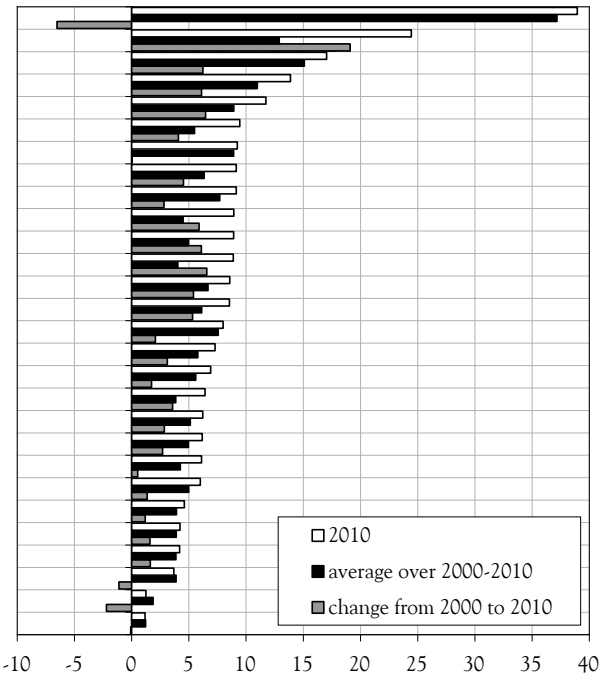
Technologically advanced products accounted for 3.95% of Poland's total manufactured goods exports in the 2000–2010 period, the lowest figure among the countries listed in Figure 15. In 2010, Poland reported a higher proportion of hi-tech exports than Spain (6.36%, down by 1.63 p.p.), Slovenia (5.94%, up by 0.59 p.p.), and Portugal (3.39%, down by 2.84 p.p.), but—given the data on the intensity of GERD (see Figures 8 and 14) and its dynamics (Figure 8) in Poland—it is worth considering whether the shifts in the structure of Poland's exports (an increase of 3.38 p.p. over 11 years) were due to domestic R&D or rather FDI and the accompanying technology transfer. The data in Figure 15 suggest that FDI was the predominant factor, but the issue requires further research.

Despite the marked improvement in the role of technologically advanced products in Poland's manufactured goods exports, Poland is a poor performer in comparison with other EU10 countries such as Hungary (where hi-tech goods account for 24.24% of total manufactured goods exports, down by 2.3 p.p.), the Czech Republic (15.3%, up by 6.28 p.p.), Romania (10.95%, up by 5.08 p.p.), and Lithuania (10.61%, up by 6.15 p.p.).

Figure 16

Share of ICT exports in total exports of services (%): level in 2010, average from 2000 to 2010 and change (p.p.) from 2000

Ireland	38.96	37.18	-6.52
Finland	24.46	12.91	19.10
Romania	17.05	5.10	6.23
Sweden	13.89	10.99	6.12
Netherlands	11.75	8.93	6.46
Norway	9.46	5.50	4.09
Belgium	9.25	8.92	0.03
Slovakia	9.15	6.35	4.54
Germany	9.15	7.70	2.83
Italy	8.94	4.50	5.90
Estonia	8.92	4.98	6.10
Bulgaria	8.89	4.05	6.58
Czech Republic	8.58	6.69	5.41
Hungary	8.55	6.13	5.34
Britain	8.00	7.57	2.08
Slovenia	7.29	5.80	3.12
Spain	6.91	5.61	1.74
Poland	6.42	3.87	3.58
Austria	6.22	5.13	2.87
Latvia	6.17	4.97	2.71
China	6.12	4.26	0.53
Russia	6.01	4.99	1.36
USA	4.61	3.93	1.19
Portugal	4.23	3.91	1.61
France	4.20	3.88	1.63
Lithuania	3.69	3.89	-1.11
Japan	1.26	1.88	-2.19
Korea	1.18	1.22	-0.08



Note: Due to missing data for 2000 and 2001, the average for Belgium was computed for the 2002–2010 period, and the change in the percentage share was computed using 2002 as the base year.

Source: Authors' compilation based on World Bank data.

Figure 16 makes it possible to formulate some interesting observations about Poland's activity in the export of ICT[20] services compared with strategies pursued by other countries. What might seem striking is that technology powerhouses such as Japan, South Korea, and the United States are not specialized in exporting ICT services. The most specialized exporters of such services are highly developed countries such as Ireland, Finland, Sweden, Norway, and the Netherlands. The high position of Romania in the league table may also be surprising, but it can be explained by the country's low labor costs and offshoring. Poland is outdistanced in this area by several other EU10 countries: Romania (17.05%), Slovakia (9.15%), the Czech Republic (8.58%), and Hungary (8.55%).

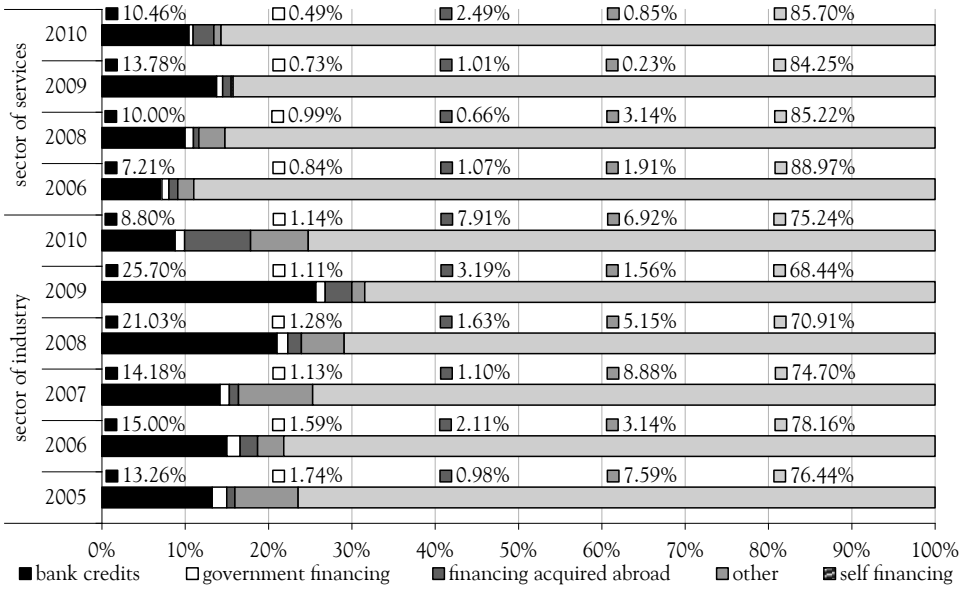
[20] According to a World Bank definition, ICT service exports include computer and communications services (telecommunications and postal and courier services) as well as information services (computer data and news-related service transactions).

Sources of financing innovation: the impact of the economic crisis on Polish companies

The global financial crisis that started in 2007 has considerably influenced the innovation-related activities of Polish companies. Regarding the methods of financing development and innovation, there has been a strong withdrawal from bank loans, which have been replaced by self-financing. The figures below clearly illustrate the magnitude of the trend. In 2010, industrial companies covered only 8.8% of their innovation-related expenditures with bank loans, the lowest indicator since 2005 (13.26%). This marks a decline by almost two-thirds compared with the highest level noted in 2009 (25.7%) and the starting point in 2005. The decline in the role of bank loans is accompanied by a similar fall in expenditures in zloty terms (from ZL 5.97 billion in 2009 to ZL 2.09 billion in 2010). Companies in the service sector also switched from bank loans to self-financing in 2010, but the change was much smaller than in industry (Figure 17).

Figure 17

Structure of financing of innovation-related activities by Polish companies in 2005–2010 as a percentage of total innovation spending



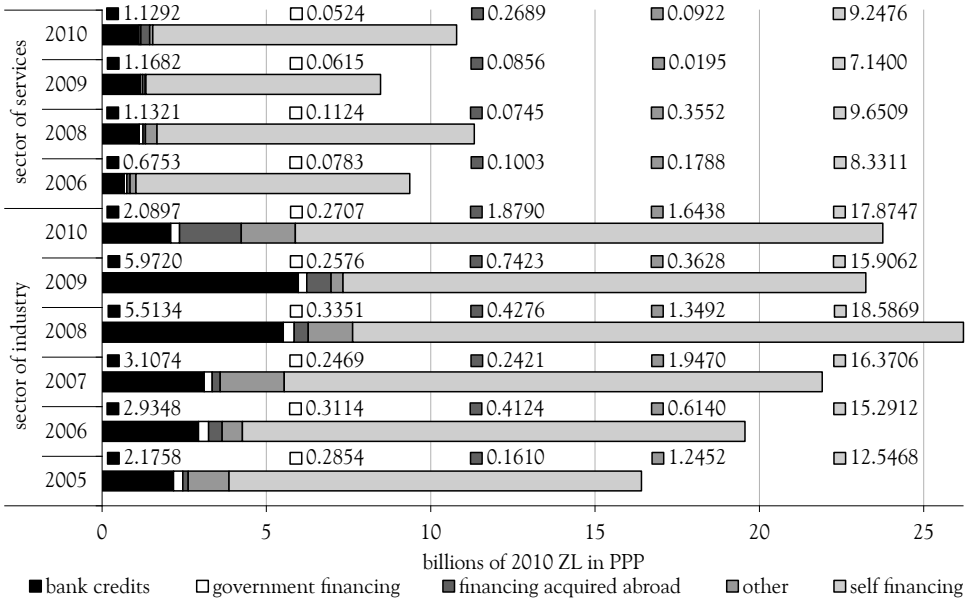
Source: Authors' compilation based on the Local Data Bank (*Bank Danych Lokalnych*) of Poland's Central Statistical Office (GUS), http://www.stat.gov.pl/bdlen/app/strona.html?p_name=indeks.

The trend could be attributed to either the policy of reducing excessive indebtedness (deleveraging) pursued by companies or the tightening of loan scoring criteria by banks. Yet another reason could be the pessimistic expectations of companies and resulting investment cuts and downscaling of investment plans. The deleveraging hypothesis can be supported by the trend observed in expenditures in zloty terms in 2010. Companies in both industry and the service sector spent more in 2010 than in 2009 (an increase by ZL 517 million and ZL 2.32 billion respectively; see Figure 18).

Figures 17 and 18 show a continuous increase in the role of foreign-obtained funds, but the growth did not balance out the decline in loan-based funding in 2010. It is also necessary to take a look at the situation in 2009. The sharp decline in expenditures recorded that year was due to a steep decline in self-financing (a decrease to ZL 15.9 billion from ZL 18.5 billion in 2008; Figure 18). The effect was only partially countervailed by an increase (by ZL 459 million) in loan-based funding of innovation-related activities. While the decline in self-financing was caused by uncertainty and the pessimistic expectations of companies, these factors were far less influential in 2010, judging by the investment decisions of enterprises in both industry and the service sector (Figure 18).

Figure 18

Sources of financing of innovation-related activities by Polish companies in 2005–2010 (in billions of 2010 ZL)



Source: Authors' compilation based on the Local Data Bank (*Bank Danych Lokalnych*) of Poland's Central Statistical Office (GUS).

Structure of expenditure on the innovation-related activities of Polish companies

Both industry and service-sector companies spent most of their funds allocated to innovation-related activities in 2010 on machinery and equipment (52.5% and 41.7% respectively; see Figure 19). Another highly fund-consuming area of expenditure was "buildings, premises, hydrological and engineering facilities" and "land" (22.8% and 7.7% in 2010 respectively). In industry, spending on machinery and equipment was the lowest since 2005, a fall of 9.82 p.p. from the peak level recorded in 2009. In the service sector, spending decreased by 13.22 p.p. from the all-time high recorded in 2008.

Table 5
Change in expenditure on innovation-related activities (from 2008 to 2010)

Expenditures by area	Industry	Service sector
Total	–9.36%	–4.72%
Fixed capital investment—machinery and equipment	–16.37%	–27.67%
Fixed capital investment—buildings and premises, hydrological and engineering facilities, land	–25.28%	–35.89%
Research and development (R&D)	57.36%	97.09%
Purchase of knowledge from external sources	217.45%	264.73%
Purchase of software	23.25%	42.34%
Marketing expenditure related to the introduction of new or significantly improved products	–28.52%	59.30%
Training and schooling of staff related directly to implemented product and process innovations	–52.27%	15.27%
Other	48.58%	2.32%
Fixed capital investment—total	–19.28%	–29.84%
Fixed capital investment—imported machinery and equipment	–16.26%	–77.49%

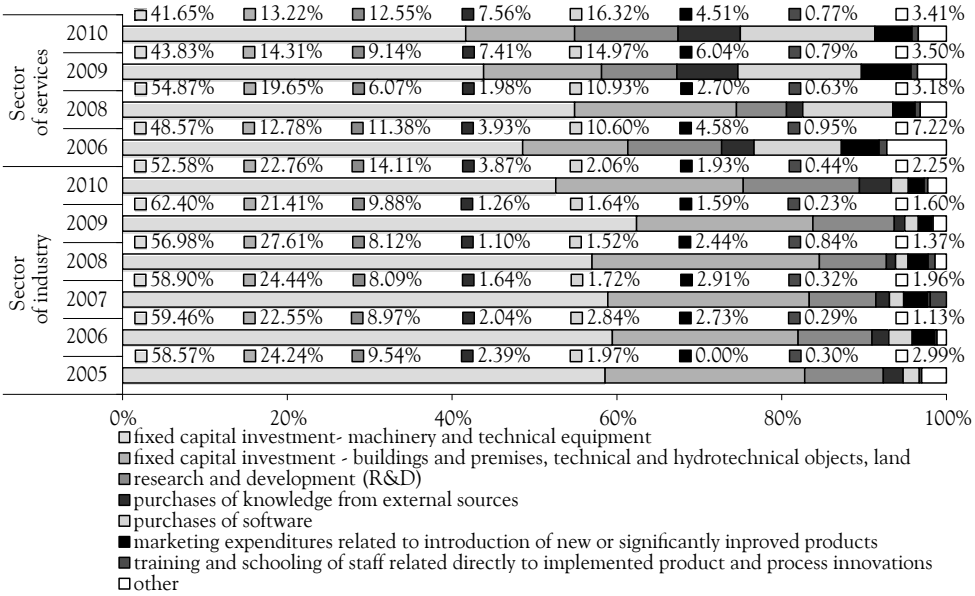
Source: Authors' compilation based on the Local Data Bank (*Bank Danych Lokalnych*) of Poland's Central Statistical Office GUS).

Spending on machinery and equipment purchases decreased in both relative and absolute terms. Enterprises have steadily reduced these expenditures since 2008

(Figure 19). Companies in the service sector reduced their expenditures by 27.67%, while the decrease in industry was 16.37% (Table 5).

Figure 19

Structure of expenditure on the innovation-related activities of Polish companies, 2005–2010

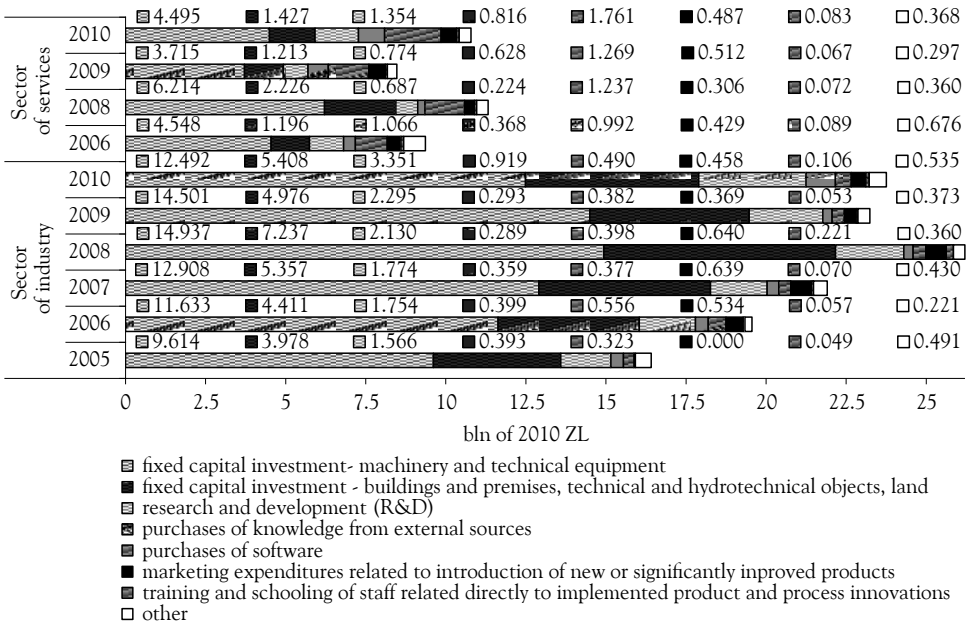


Source: Authors' compilation based on the Local Data Bank (*Bank Danych Lokalnych*) of Poland's Central Statistical Office GUS).

An even sharper decline was reported in spending on real estate (buildings and premises, and land): 25.28% and 35.89% respectively. The observed changes are typical of a time of crisis. While companies have not completely stopped spending funds on innovation, their activity seems to be shifting (Table 5) toward R&D expenditure as well as purchases of knowledge from external sources, and purchases of software. In industry, spending on staff training programs necessitated by introduced innovations has declined by 52.27%, which might imply a sharp reduction in the number, technical advancement and significance of implemented innovations (see the next section). In the service sector, a moderate growth in training expenditure was reported (15.27%).

Figure 20

Expenditure on the innovation-related activities of Polish companies in selected areas, 2005–2010 (in billions of 2010 ZL)



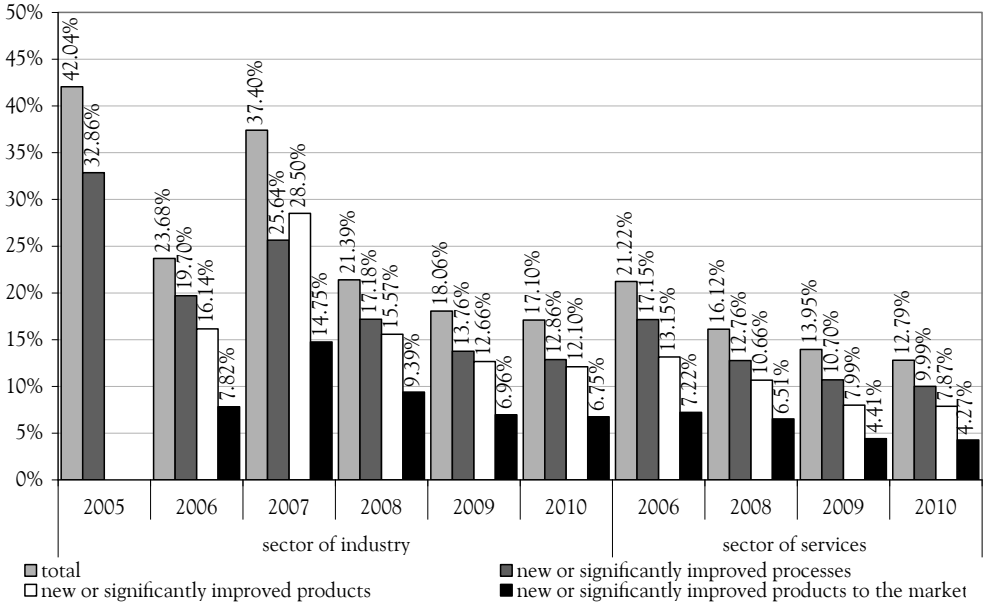
Source: Authors' compilation based on the Local Data Bank (*Bank Danych Lokalnych*) of Poland's Central Statistical Office GUS).

Results of the innovation-related activities of Polish companies

The data in Figure 21 show that the percentage of industrial companies implementing innovations has decreased steadily since 2005. Detailed data available since 2006 confirm that a downward trend in product and process innovations has been in place since 2007. Only 6.96% of industrial enterprises implemented new or significantly improved products in 2010, down from 7.82% in 2006 and 14.75% in 2007. In the service sector, the downward trend has lasted since 2006. These trends may explain the low shares of hi-tech and ICT exports in Poland's total exports shown in Figures 15 and 16.

According to the Community Innovation Survey (CIS) of 2008, Polish companies are not among the most innovative in Europe. The gap separating Poland and the most innovative EU economies is clearly visible in Figure 22. In countries leading the way in this area, the percentage of enterprises implementing product and process innovations is two to three times as high as in Poland. Poland's percentage of innovation-implementing companies is comparable to that of Slovakia, but only about half that of the Czech Republic. It is noteworthy that Romania, Bulgaria, and Lithuania seem to be rapidly modernizing their range of products and production technology—much more actively than Poland, despite their lower standings in terms of introducing new products to the market.

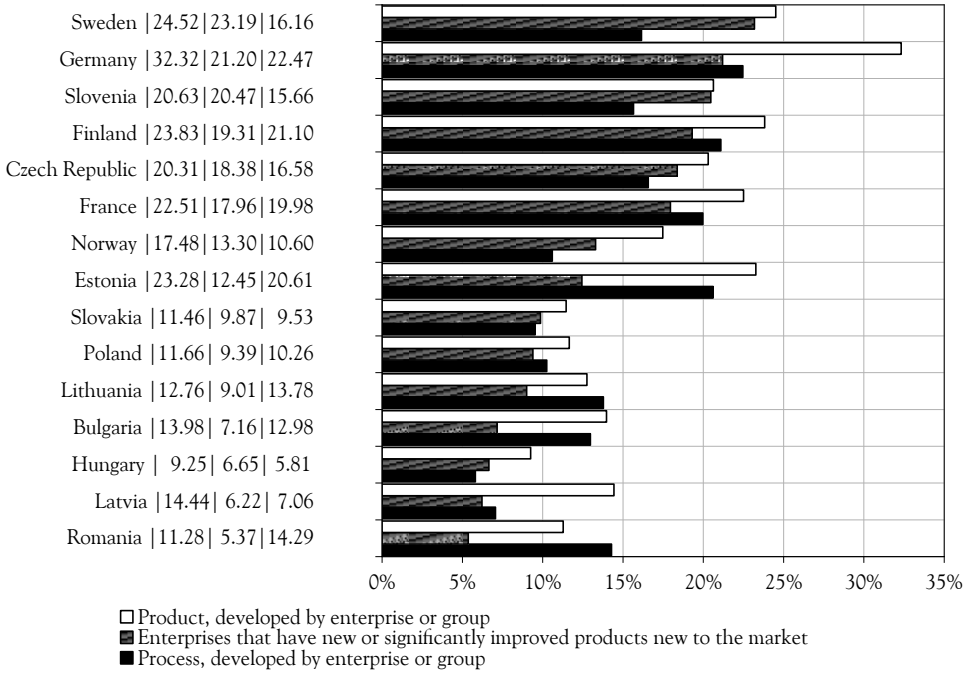
Figure 21
Percentage of Polish companies that introduced innovations in 2005–2010



Source: Authors' compilation based on the Local Data Bank (*Bank Danych Lokalnych*) of Poland's Central Statistical Office GUS).

Figure 22

Percentage of industrial companies (excluding those active in the construction sector) reporting product or process innovations in 2008 (Eurostat survey CIS 2008)

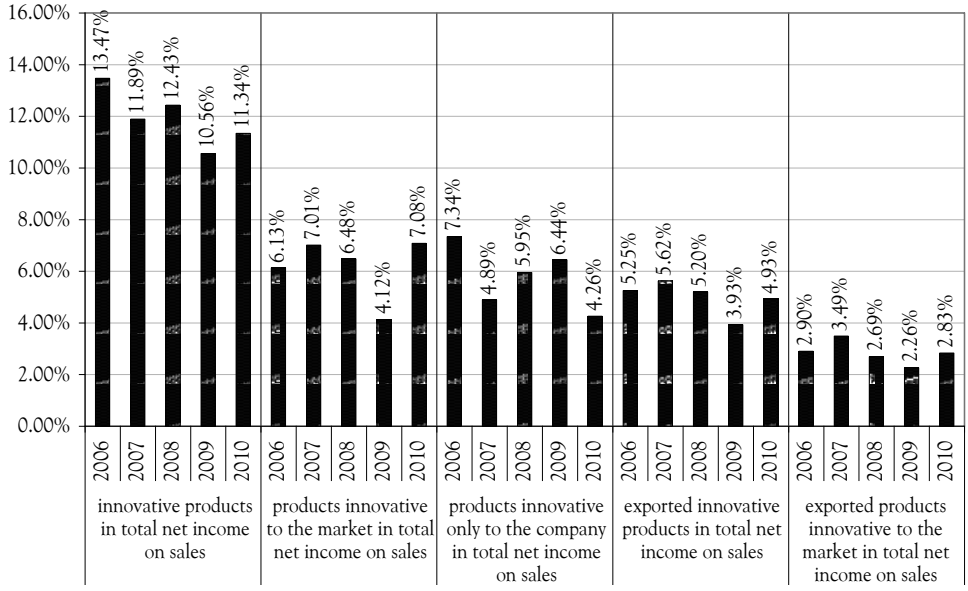


Source: Authors' compilation based on Eurostat data.

Economic significance of innovation for companies

The introduction of innovation is motivated by a desire to either increase or maintain the profitability of production. These objectives can be achieved, if new products constitute a substantial portion of total sales. Figure 23 has data on sales in industrial companies. The proportion of innovative products in total sales showed a downward trend in 2006–2010. On the other hand, innovative products new to the market have accounted for a growing portion of total sales. Data on the export of innovative products indicate that, after problems in 2009, sales improved, which may be a symptom of recovery, though not strong enough to see sales return to their 2006 level. Problems experienced by exporters are a sign of crisis on markets abroad.

Figure 23
Share of net revenues from sales of innovative products in Polish industrial enterprises, 2006–2010

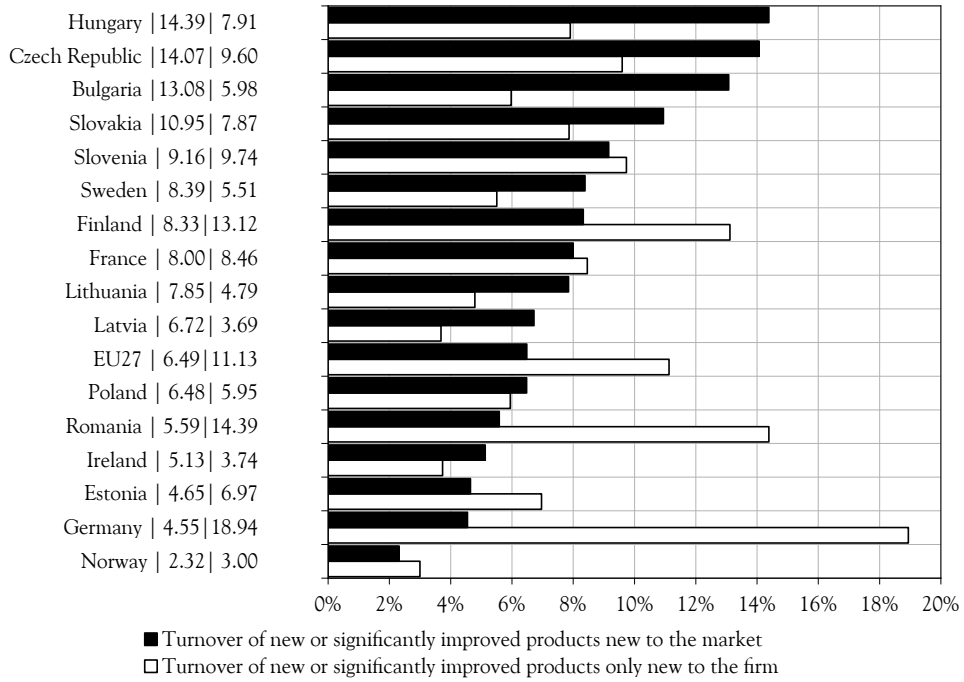


Source: Authors' compilation based on the Local Data Bank (*Bank Danych Lokalnych*) of Poland's Central Statistical Office GUS).

Figure 24 shows whether Polish companies are as effective at selling their innovative products as companies from other EU countries. It is evident that in Poland, products new to either a company or the market represent a far less significant portion of income than in other EU10 countries. In the Czech Republic, Hungary, Bulgaria, Slovakia, and Slovenia, the figure is much higher. In fact, Polish enterprises are relatively unsuccessful in selling products that are significantly improved or new to the company (though not new to the market). Companies in Germany, Romania, Finland, Slovenia, and the Czech Republic are far more successful in this area.

Figure 24

Share of innovative products in net income from sales in industrial companies (except the construction sector), 2008



Source: Authors' compilation based on Eurostat data.

Summary and conclusions

The Polish economy has a low level of innovation compared with other EU economies. Poland's poor performance in innovation and R&D is the result of its low spending on research and development. Insufficient spending, in turn, prevents advanced research. Poland's long-standing arrears in R&D are to a large extent a consequence of the country's painful transition to a market economy, which saw a massive liquidation of not only companies, but also research and development establishments, in addition to significant cuts in R&D spending by both the government and companies. These R&D arrears have hindered the expansion of Polish companies to markets with technologically advanced goods and services. In the context of all these setbacks, in particular the shortage of funds, it seems slightly paradoxical that Poland has an extraordinarily high proportion of scientists and engineers in total employment. There are, however, prospects for improvement as Polish companies move their innovative

activities from building up production capacity toward spending on R&D and buying knowledge from external sources. This should promote better utilization of the country's underfinanced researchers. In the long run, it could enable Polish enterprises to make better use of innovation as a source of competitive advantage.

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3.4. Total Factor Productivity

Mariusz Próchniak

The analysis of total factor productivity (TFP) is conducted using the growth accounting framework. Growth accounting is an empirical exercise aimed at calculating how much economic growth is caused by changes in measurable factor inputs and in the level of technology. The level of technology, which cannot be directly observed, is measured as a residual. This means that we define technical progress as that part of economic growth which cannot be explained by changes in measurable factor inputs. This residual technical progress is interpreted as the increase in the total productivity of the inputs, denoted as TFP.

The basic model of growth accounting, used in the earlier versions of the report[21], includes two measurable factor inputs: labor and physical capital. To calculate the TFP growth rate the following equation is used:

$$\text{TFP growth} \equiv \frac{\dot{A}}{A} = \frac{\dot{Y}}{Y} - \left[s_K \frac{\dot{K}}{K} + (1 - s_K) \frac{\dot{L}}{L} \right],$$

where Y – output (GDP), a – level of technology, K – physical capital, L – labor, s_K – physical capital share in income.

[21] This paper is a follow-up study to the author's previous analyses on the subject (see for instance: Próchniak, 2010, 2011, Rapacki and Próchniak, 2006). The methodology of the analysis is described in detail in the 2008 edition of the report (Próchniak, 2008).

Since the current version of the report focuses on education as the factor influencing the competitiveness level, we decided to extend the research so as to account for human capital. Hence, apart from the basic model of growth accounting, we also analyze its extended version with three factors: labor, physical capital, and human capital. The inclusion of human capital constitutes a novelty of this analysis and yields a large value added of the research. To calculate the TFP growth rate in the human capital-augmented model we use the following equation:

$$\text{TFP growth} \equiv \frac{\dot{A}}{A} = \frac{\dot{Y}}{Y} - \left[s_K \frac{\dot{K}}{K} + s_H \frac{\dot{H}}{H} + (1 - s_K) \frac{\dot{L}}{L} \right],$$

where H represents the level of human capital while s_H stands for the human capital share in income. According to the extended model, the growth of TFP is calculated as the difference between the GDP growth rate and the weighted average growth rate of three inputs: physical capital, human capital, and labor. So, both in the basic and extended model TFP is measured as a residual.

The analysis covers 10 Central and Eastern European countries, EU10 (Poland, Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Slovakia, and Slovenia) and the 2004–2011 period. The period includes the years of EU membership by most of the EU10 countries.

The following time series were collected for the purposes of our analysis: (a) the growth rate of GDP, (b) the growth rate of labor, (c) the growth rate of physical capital, (d) the growth rate of human capital. The data are derived from the following sources: the World Bank (World Bank, 2012), the International Monetary Fund (IMF, 2011), and the International Labor Organization (ILO, 2012a, 2012b). In this edition of the research, we updated all the time series of the analyzed variables, so the results of the basic model may differ from those presented in the previous editions of the report. Of course, the results based on the human capital-augmented approach are entirely new because the growth accounting exercise with human capital is carried out for the first time.

The rate of economic growth is the real annual GDP growth rate. The growth rate of labor is the change in total employed population (ageing 15+) according to the ILO data (since the figures for 2011 cover only three quarters, when calculating the 2011 employment dynamics we compare these figures with the figures encompassing also three quarters of 2010 so as to achieve the changes compared with the analogous period of the previous year).

The amount of physical capital is calculated using the perpetual inventory method with gross fixed capital formation measuring investment outlays. Moreover, we assume

a 5% depreciation rate and an initial capital/output ratio of 3.[22] (In the perpetual inventory method the initial year should be earlier than the first year for which TFP is calculated; in our analysis the perpetual inventory method starts in 2000 and this is the year for which we assume the capital-output ratio of 3).

The most difficult issue in selecting variables was a proper choice of the variable that measures the stock of human capital in the economy. The difficulty arises from the fact that there is no unique method of measuring human capital and in the literature there are many variables used, each of them having advantages and disadvantages, and a choice of a given variable depends to a large extent on data availability. School enrolment ratios (secondary or tertiary) are often used to account for human capital. In our analysis, which is based on the yearly data, the inclusion of school enrolment rates is not proper from the economic point of view because their impact on economic growth occurs with a delay (the number of children attending school or the number of students do not influence the current rate of economic growth). a better variable would involve the education level of those who are currently employed. It turns out that International Labor Organization provides us with data on the structure of education of the labor force (grouped into various educational levels). When comparing a homogenous group of countries, as in the case of EU10 economies, the best human capital variable would be the number of people with completed tertiary education. Hence, in our research we measure human capital stock by the number of persons (ageing 25+) with tertiary education belonging to labor force. (Better statistics would cover the number of those who are currently employed but such data are not available for us).

We also assume that all the factor shares in income are the same. This means that – in the basic model – labor and physical capital shares are equal to $^1/_2$ while – in the extended model – labor, physical capital, and human capital shares are all equal to $^1/_3$.[23]

[22] According to estimates by King and Levine (1994), the capital/output ratio for 24 OECD countries was around 2.5. Our assumption of 3 does not differ much from these estimates.

[23] Arbitrary values of factor shares are widely assumed in the empirical studies (King and Levine, 1994, Wang and Yao, 2003, Caselli and Tenreyro, 2005). Wang and Yao (2003) show that different assumptions about factor shares do not yield different outcomes. Caselli and Tenreyro (2005) obtain similar conclusions from models based on arbitrary and real factor shares. In most empirical studies, the physical capital share of 0.3 is assumed. However, for some countries (especially Poland), the physical capital share of 0.3 overestimates significantly the growth rate of TFP. Thus, according to the suggestion of Welfe (2001), this share for the basic model has been increased to 0.5 in order to fit better the real values.

Table 6
Labor, physical capital, human capital, and TFP contribution to economic growth, 2004–2011

		2004			2005			2006			2007			2008			2009			2010			2011		
		growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)
Bulgaria	L	3.3	1.1	16.1	0.4	0.1	2.1	4.3	1.4	22.0	4.6	1.5	23.7	3.3	1.1	17.9	–3.2	–1.1	19.4	–6.2	–2.1	–1371.5	–3.7	–1.2	–49.9
	K	2.5	0.8	12.2	3.3	1.1	17.3	5.5	1.8	28.2	6.3	2.1	32.4	6.8	2.3	36.9	8.5	2.8	–51.8	5.3	1.8	1168.7	3.1	1.0	41.8
	H	3.7	1.2	18.1	1.6	0.5	8.2	3.5	1.2	17.8	3.9	1.3	20.4	3.3	1.1	17.8	1.0	0.3	–6.1	–1.3	–0.4	–278.3	–1.3	–0.4	–16.7
	TFP	3.6	3.6	53.5	4.6	4.6	72.4	2.1	2.1	32.1	1.5	1.5	23.5	1.7	1.7	27.4	–7.6	–7.6	138.5	0.9	0.9	581.0	3.1	3.1	124.8
	GDP	6.7	6.7	100.0	6.4	6.4	100.0	6.5	6.5	100.0	6.4	6.4	100.0	6.2	6.2	100.0	–5.5	–5.5	100.0	0.2	0.2	100.0	2.5	2.5	100.0
Czech Rep.	L	–0.5	–0.2	–4.1	1.2	0.4	6.4	1.3	0.4	6.6	1.9	0.6	10.6	1.6	0.5	22.1	–1.4	–0.5	11.0	–1.0	–0.3	–14.1	0.5	0.2	9.0
	K	4.2	1.4	31.2	4.2	1.4	22.0	4.0	1.3	19.4	4.1	1.4	22.5	4.7	1.6	63.9	4.2	1.4	–33.4	3.1	1.0	43.9	2.6	0.9	43.9
	H	3.0	1.0	22.3	5.1	1.7	26.8	2.1	0.7	10.1	3.2	1.1	17.5	5.7	1.9	76.6	7.2	2.4	–57.8	7.3	2.4	103.9	7.3	2.4	123.0
	TFP	2.3	2.3	50.5	2.8	2.8	44.8	4.3	4.3	63.9	3.0	3.0	49.4	–1.5	–1.5	–62.7	–7.5	–7.5	180.2	–0.8	–0.8	–33.6	–1.5	–1.5	–75.9
	GDP	4.5	4.5	100.0	6.3	6.3	100.0	6.8	6.8	100.0	6.1	6.1	100.0	2.5	2.5	100.0	–4.1	–4.1	100.0	2.3	2.3	100.0	2.0	2.0	100.0
Estonia	L	0.2	0.1	0.9	2.0	0.7	7.1	6.4	2.1	20.2	1.4	0.5	6.7	0.2	0.1	–1.2	–9.2	–3.1	22.2	–4.2	–1.4	–44.9	7.7	2.6	39.4
	K	7.1	2.4	32.9	6.9	2.3	24.5	7.9	2.6	24.8	9.7	3.2	46.7	9.2	3.1	–60.5	6.1	2.0	–14.5	2.0	0.7	21.3	1.6	0.5	8.3
	H	4.0	1.3	18.5	6.4	2.1	22.7	3.1	1.0	9.8	–1.3	–0.4	–6.5	2.4	0.8	–15.9	5.3	1.8	–12.6	–2.5	–0.8	–27.2	–2.5	–0.8	–12.9
	TFP	3.4	3.4	47.6	4.3	4.3	45.8	4.8	4.8	45.2	3.7	3.7	53.1	–9.0	–9.0	177.6	–14.6	–14.6	105.0	4.7	4.7	150.8	4.3	4.3	65.2
	GDP	7.2	7.2	100.0	9.4	9.4	100.0	10.6	10.6	100.0	6.9	6.9	100.0	–5.1	–5.1	100.0	–13.9	–13.9	100.0	3.1	3.1	100.0	6.5	6.5	100.0

		2004		2005		2006		2007		2008		2009		2010		2011	
		growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)
Hungary	L	–0.5	–0.2	–4.0	0.0	0.0	0.3	0.7	0.2	6.7	–0.1	0.0	–4.3	–1.2	–0.4	–48.0	–2.5	–0.8	12.5	0.0	0.0	–0.4	0.7	0.2	12.6
	K	3.2	1.1	23.7	3.5	1.2	37.2	3.6	1.2	33.2	3.1	1.0	133.4	3.2	1.1	126.9	3.1	1.0	–15.6	2.0	0.7	56.1	1.2	0.4	22.5
	H	9.4	3.1	69.0	2.3	0.8	24.1	2.2	0.7	20.1	0.4	0.1	16.5	6.0	2.0	241.7	4.1	1.4	–20.4	3.4	1.1	93.6	3.4	1.1	62.4
	TFP	0.5	0.5	11.4	1.2	1.2	38.4	1.5	1.5	40.0	–0.4	–0.4	–45.6	–1.8	–1.8	–220.6	–8.3	–8.3	123.4	–0.6	–0.6	–49.3	0.0	0.0	2.5
	GDP	4.5	4.5	100.0	3.2	3.2	100.0	3.6	3.6	100.0	0.8	0.8	100.0	0.8	0.8	100.0	–6.7	–6.7	100.0	1.2	1.2	100.0	1.8	1.8	100.0
Latvia	L	1.1	0.4	4.1	1.8	0.6	5.6	5.0	1.7	13.6	2.9	1.0	9.6	0.5	0.2	–3.9	–12.6	–4.2	23.3	–4.3	–1.4	415.9	3.0	1.0	25.1
	K	5.2	1.7	20.1	7.0	2.3	22.1	8.9	3.0	24.2	9.8	3.3	32.9	9.5	3.2	–74.9	6.5	2.2	–12.0	1.8	0.6	–170.2	0.3	0.1	2.9
	H	13.7	4.6	52.5	0.4	0.1	1.1	4.8	1.6	13.1	6.4	2.1	21.4	14.0	4.7	–110.1	–0.7	–0.2	1.3	–1.2	–0.4	120.3	–1.2	–0.4	–10.4
	TFP	2.0	2.0	23.2	7.5	7.5	71.1	6.0	6.0	49.1	3.6	3.6	36.0	–12.3	–12.3	288.8	–15.7	–15.7	87.4	0.9	0.9	–266.1	3.3	3.3	82.4
	GDP	8.7	8.7	100.0	10.6	10.6	100.0	12.2	12.2	100.0	10.0	10.0	100.0	–4.2	–4.2	100.0	–18.0	–18.0	100.0	–0.3	–0.3	100.0	4.0	4.0	100.0
Lithuania	L	–0.1	0.0	–0.5	2.6	0.9	11.2	1.7	0.6	7.2	2.3	0.8	8.0	–0.9	–0.3	–10.5	–6.8	–2.3	15.5	–5.1	–1.7	–128.6	2.4	0.8	13.5
	K	3.4	1.1	15.4	4.4	1.5	18.8	5.0	1.7	21.3	6.4	2.1	21.6	8.2	2.7	92.9	6.5	2.2	–14.8	1.5	0.5	37.7	1.4	0.5	7.8
	H	–0.4	–0.1	–1.7	14.2	4.7	60.8	0.5	0.2	2.0	9.9	3.3	33.5	3.0	1.0	34.0	0.3	0.1	–0.7	7.1	2.4	179.5	7.1	2.4	39.7
	TFP	6.4	6.4	86.8	0.7	0.7	9.2	5.4	5.4	69.5	3.6	3.6	36.9	–0.5	–0.5	–16.3	–14.7	–14.7	100.0	0.2	0.2	11.4	2.3	2.3	39.0
	GDP	7.4	7.4	100.0	7.8	7.8	100.0	7.8	7.8	100.0	9.8	9.8	100.0	2.9	2.9	100.0	–14.7	–14.7	100.0	1.3	1.3	100.0	6.0	6.0	100.0
Poland	L	1.3	0.4	8.2	2.3	0.8	21.4	3.4	1.1	18.1	4.4	1.5	21.8	3.7	1.2	23.8	0.4	0.1	9.0	0.6	0.2	5.1	1.2	0.4	10.1
	K	1.3	0.4	8.0	1.6	0.5	14.8	1.9	0.6	10.3	2.8	0.9	13.8	3.9	1.3	25.5	4.4	1.5	91.6	3.9	1.3	34.3	3.6	1.2	31.1
	H	10.0	3.3	62.3	12.2	4.1	112.2	5.2	1.7	27.9	4.7	1.6	23.0	6.1	2.0	39.6	9.7	3.2	200.9	11.5	3.8	100.6	11.5	3.8	100.3
	TFP	1.1	1.1	21.5	–1.8	–1.8	–48.4	2.7	2.7	43.6	2.8	2.8	41.4	0.6	0.6	11.1	–3.2	–3.2	–201.5	–1.5	–1.5	–39.9	–1.6	–1.6	–41.6
	GDP	5.3	5.3	100.0	3.6	3.6	100.0	6.2	6.2	100.0	6.8	6.8	100.0	5.1	5.1	100.0	1.6	1.6	100.0	3.8	3.8	100.0	3.8	3.8	100.0

		2004		2005		2006		2007		2008		2009		2010		2011	
		growth (%)	contr. (% points)	growth (%)	contr. (% points)	growth (%)	contr. (% points)	growth (%)	contr. (% points)	growth (%)	contr. (% points)	growth (%)	contr. (% points)	growth (%)	contr. (% points)	growth (%)	contr. (% points)	contr. (%)
Romania	L	–0.7	–0.2	–0.1	0.0	1.8	0.6	0.4	0.1	0.2	0.1	–1.3	–0.4	0.0	0.0	–1.4	–0.5	–31.6
	K	2.7	0.9	3.3	1.1	3.2	1.1	3.7	1.2	6.0	2.0	7.3	2.4	5.2	1.7	4.9	1.6	110.0
	H	10.2	3.4	6.6	2.2	8.7	2.9	–0.4	–0.1	6.9	2.3	4.7	1.6	6.0	2.0	6.0	2.0	133.3
	TFP	4.4	4.4	0.9	0.9	3.3	3.3	5.1	5.1	3.0	3.0	–10.7	–10.7	–5.0	–5.0	–1.7	–1.7	–111.6
	GDP	8.5	8.5	4.2	4.2	7.9	7.9	6.3	6.3	7.3	7.3	–7.1	–7.1	–1.3	–1.3	1.5	1.5	100.0
	L	0.3	0.1	2.1	0.7	3.8	1.3	2.4	0.8	3.2	1.1	–2.8	–0.9	–2.1	–0.7	1.8	0.6	18.2
	K	3.4	1.1	3.5	1.2	4.7	1.6	5.1	1.7	5.5	1.8	5.0	1.7	2.7	0.9	3.4	1.1	34.9
	H	8.6	2.9	10.5	3.5	4.5	1.5	–1.7	–0.6	5.5	1.8	5.2	1.7	12.3	4.1	12.3	4.1	126.7
	TFP	1.0	1.0	1.3	1.3	4.2	4.2	8.6	8.6	1.1	1.1	–7.3	–7.3	–0.3	–0.3	–2.6	–2.6	–79.7
	GDP	5.1	5.1	6.7	6.7	8.5	8.5	10.5	10.5	5.8	5.8	–4.8	–4.8	4.0	4.0	3.3	3.3	100.0
	L	5.6	1.9	0.1	0.0	2.3	0.8	2.6	0.9	0.2	0.1	–1.5	–0.5	–1.5	–0.5	–3.1	–1.0	–54.4
	K	3.6	1.2	3.7	1.2	3.7	1.2	4.2	1.4	5.0	1.7	5.3	1.8	2.5	0.8	1.7	0.6	29.9
	H	9.1	3.0	8.2	2.7	9.2	3.1	3.4	1.1	3.1	1.0	5.4	1.8	4.8	1.6	4.8	1.6	84.6
	TFP	–1.7	–1.7	0.0	0.0	0.8	0.8	3.4	3.4	0.9	0.9	–11.1	–11.1	–0.7	–0.7	0.8	0.8	39.8
	GDP	4.4	4.4	4.0	4.0	5.9	5.9	6.8	6.8	3.7	3.7	–8.1	–8.1	1.2	1.2	1.9	1.9	100.0
		2004		2005		2006		2007		2008		2009		2010		2011	
		contr. (%)		contr. (%)		contr. (%)		contr. (%)		contr. (%)		contr. (%)		contr. (%)		contr. (%)	
Romania	L	–2.8		–1.0		7.7		2.3		0.8		6.3		1.2		–31.6	
	K	10.7		26.2		13.6		19.6		27.0		–34.5		–137.0		110.0	
	H	40.1		53.2		36.7		–2.3		31.2		–22.3		–156.8		133.3	
	TFP	52.0		21.6		42.0		80.4		41.0		150.5		392.7		–111.6	
	GDP	100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0	
Slovakia	L	1.8		2.1		3.8		2.4		3.2		–2.8		–2.1		1.8	
	K	22.5		17.7		4.7		5.1		5.5		5.0		2.7		3.4	
	H	56.7		52.7		4.5		–1.7		5.5		5.2		12.3		12.3	
	TFP	19.0		19.0		4.2		8.6		1.1		–7.3		–0.3		–2.6	
	GDP	100.0		100.0		8.5		10.5		5.8		–4.8		4.0		3.3	
Slovenia	L	42.3		0.9		13.2		12.6		0.2		–1.5		–41.3		–54.4	
	K	27.4		31.0		20.9		20.6		5.0		5.3		68.8		29.9	
	H	69.0		68.5		52.3		16.6		3.1		5.4		133.0		84.6	
	TFP	–38.7		–0.4		13.6		50.2		0.9		–11.1		–60.5		39.8	
	GDP	100.0		100.0		100.0		100.0		100.0		100.0		100.0		100.0	

Source: Author's calculations.

Before analyzing productivity in Poland and comparing Poland's performance with that of other new EU member states, some assumptions can be made about the expected outcomes. We suppose that most economic growth in EU10 countries is due to technological progress and does not result from changes in physical capital and labor inputs. Under central planning, the resources were fully exploited. Officially, unemployment did not exist and the total amount of physical capital was used in production. Transformation into a market-based system required a more efficient usage of factor inputs. As a result, despite the initial recession, rapid economic growth could be achieved along with a decrease in labor input and an only partial exploitation of physical capital. This means that TFP was probably the main source of economic growth. Nevertheless, the part of TFP due to higher labor productivity should be treated as the human capital contribution to economic growth and not that of TFP. That is why we expect that the human capital-augmented model will confirm a large impact of human capital on economic growth. However, we must be aware of the fact that the assumed measure of human capital, i.e. the level of education of labor force, is only one of many possible human capital indicators and one should take it into account when interpreting the results.

Table 6 shows the detailed breakdown of economic growth for the human capital-augmented model (the detailed results for the model without human capital were presented in an analogous table in earlier editions of the report). The values in the respective cells of the table show: (a) the growth rate of labor (*L*), physical capital (*K*), human capital (*H*), TFP, and GDP, (b) the contribution of labor, physical capital, human capital, and TFP to economic growth in percentage points, (c) the contribution of labor, physical capital, human capital, and TFP to economic growth in percent.

Table 7 lists the values of TFP growth rates in the basic model (i.e. in the model without human capital). The results shown in Table 7 present the standard estimates of TFP dynamics, like in the earlier editions of the report and in most empirical analyses. So, they are comparable to the figures presented in our previous studies on the subject. Tables 8 and 9 concern the model with human capital, showing the human capital contribution to economic growth (in percentage points) and the TFP growth rates in the extended model.

Tables 7–9 present the results for the individual EU10 countries in three different subperiods: (a) in the years after EU enlargement but before the global crisis (2004–2007), (b) in the period of crisis or economic slowdown (2008–2009), (c) in the years of recovery (2010–2011). We have divided the analyzed period into various subperiods because the global financial crisis and economic recession could disrupt the mechanisms driving the economy and lead to changes in trends and relationships of some macroeconomic variables. For example, in the years with negative GDP growth the changes in TFP affect economic growth in a different way than in the years with

positive GDP growth.[24] As a result, the statistics, which include both contractionary and expansionary periods, may be unrepresentative. This concerns mainly 2009, when the fall of GDP in some countries was enormous. a separate analysis for 2010 and 2011 allows us to assess the TFP dynamics after the peak of the crisis.

We start with the interpretation of results deriving from the basic model which does not include human capital. Then, we compare them with the results obtained from the model with human capital.

The basic model with two inputs

According to the basic model of growth accounting, which includes two factors of production: labor and physical capital, the EU10 countries recorded very high growth rates of TFP in the before crisis period. The highest growth rates of productivity were noticed by the Baltic states: Latvia and Lithuania, where TFP grew by 5.2% and 5.0% on average during 2004–2007. Rapid growth of productivity in this period was also noted by two other EU10 countries: Romania (4.9%) and Slovakia (4.5%). In the Czech Republic and Estonia, the TFP dynamics was slightly lower, amounting to 3.4% and 3.3% per annum. A similar outcome was achieved by Poland which noted the average growth rate of TFP at the level of 3.1% in the years 2004–2007.[25] In the remaining three EU10 countries the TFP dynamics was lower: 2.8% in Bulgaria, 2.0% in Slovenia, and 1.3% in Hungary.

The above data show that in the before crisis period the EU10 countries recorded high TFP growth rates, leading to rapid GDP changes. The TFP contribution to economic growth, expressed in percentage terms, was large. For example, in Poland during 2004–2007, TFP contribution to economic growth amounted to 56.3% on average while in Latvia and Lithuania, that is in the countries with the highest TFP dynamics, this contribution equaled 50.4% and 61.3% respectively. In the remaining countries, except Hungary, the average TFP contribution to economic growth stood at the stable level of 40–70% on average during 2004–2007. It was lower only in Hungary due to the fact that Hungary (like Slovenia) noticed a negative growth rate of TFP in one year. (Since TFP is calculated as a residual it is possible to achieve a negative growth rate of TFP).

The period of crisis and economic slowdown changed considerably the earlier and quite stable results of growth accounting. The global crisis negatively affected TFP dynamics of the EU10 group. All the Central and Eastern European countries noted a negative growth rate of TFP during recession. Moreover, a negative dynamics of productivity was observed not only in the contractionary periods. Poland in 2009, and

[24] For example, an increase in TFP has a positive impact on economic growth during an expansionary period but a negative impact during recession.

[25] For the TFP growth rates for Poland in the earlier years, see e.g.: Rapacki (2002).

Czech Republic, Hungary and Lithuania in 2008 also recorded the fall of TFP while their GDP increased in these years.

Table 7

TFP growth rates in the standard model with two inputs: labor and physical capital (%)

Country	Period before economic crisis (2004–2007)			Period of economic crisis or slowdown		Period of recovery	
	Mean	Min	Max	2008	2009	2010	2011
Bulgaria	2.8	1.0	4.5	1.1	–8.1	0.6	2.8
Czech Republic	3.4	2.7	4.2	–0.7	–5.5	1.3	0.4
Estonia	3.3	1.4	5.0	–9.8	–12.3	4.2	1.9
Hungary	1.3	–0.7	3.2	–0.2	–7.0	0.2	0.9
Latvia	5.2	3.6	6.2	–9.3	–14.9	0.9	2.3
Lithuania	5.0	4.3	5.7	–0.7	–14.6	3.1	4.1
Poland	**3.1**	**1.7**	**4.0**	**1.3**	**–0.8**	**1.6**	**1.5**
Romania	4.9	2.6	7.5	4.3	–10.1	–3.8	–0.3
Slovakia	4.5	3.2	6.8	1.5	–5.9	3.7	0.7
Slovenia	2.0	–0.2	3.4	1.0	–10.0	0.7	2.6

Source: Author's calculations.

The record results in terms of the deceleration of total factor productivity due to the crisis were noted by the three Baltic states as well as Slovenia and Romania. In these countries, the fall of TFP stood at two-digit levels in 2009: 14.9% in Latvia, 14.6% in Lithuania, 12.3% in Estonia, 10.1% in Romania, and 10.0% in Slovenia. In Bulgaria, Czech Republic, Slovakia and Hungary, TFP also recorded a considerable decline (by about 5–8%) but not so large as in the Baltics, Slovenia, and Romania. In 2009, the best results in terms of productivity changes were achieved by Poland where TFP dynamics was negative but very small: only –0.8%.

Comparing these results with the before crisis period we may conclude as follows. Namely, the countries in which economic growth was based mainly on the growth of TFP recorded in 2009 the deepest recession and the largest fall of TFP (however, it was not a strict rule). Hence, the recession caused by economic crisis resulted mainly from the collapse of the dynamics of those inputs which are included in TFP (as well as – although to a lesser extent – labor) while not from physical capital which, in 2009, increased in all the countries of the analyzed group (see: Table 7). In 2009 in Poland, physical capital revealed quite a high growth (4.4%) and the number of employed population raised by only 0.4% that – given a slight fall of TFP – yielded only the economic slowdown and not the recession.

In the 2010–2011 period, i.e. after the end of the crisis in most of the EU10 countries, TFP dynamics was rather positive. Only Romania recorded in both these years a negative change of TFP. During 2010–2011, the highest TFP growth prevailed in Lithuania (3.1% in 2010 and 4.1% in 2011), Estonia (4.2% and 1.9% respectively), and Slovakia (3.7% and 0.7%). The best outcomes were achieved by those countries that quite rapidly combated the recession caused by the crisis. Estonia and Lithuania in 2011 recorded economic growth rate of 6% or more while Slovakia during 2010–2011 saw a quite stable GDP growth amounting to 3–4% per annum. Poland with the GDP growth rate of almost 4% in the years 2010–2011 noted in this period the TFP dynamics of ca. 1.5% per annum that constituted about a 40-percent contribution to economic growth. The recovery of Poland's economy was mainly caused by the rise of physical capital stock and to a lesser extent labor: during 2010–2011 the stock of physical capital in Poland rose by 3.9% and 3.6% while the employment increased by only 0.6% and 1.2% respectively. Slovakia noticed a rapid TFP growth in 2010 (3.7%) but in the next year it decelerated to 0.7%. In the Czech Republic and Hungary, the changes in total factor productivity did not contributed much to economic growth (Czech Republic noted the TFP growth of 1.3% and 0.4% during 2010–2011 while Hungary – at the levels of only 0.2% and 0.9% respectively).

To wrap up, in 2011 the EU10 countries did not achieve, apart from some exceptions, the TFP dynamics noted in the years before crisis. Moreover, economic growth paths have not stabilized yet as reflected by large fluctuations in the TFP growth rates during 2010–2011. The further direction of changes is uncertain and will depend on many factors determining economic growth of the EU10 countries in the next years.

The augmented model with three inputs

A novelty in this edition of the research is the extension of the standard growth accounting methodology to include human capital, measured by the education level of the labor force. In this section we show how the introduction of the third input, apart from labor and physical capital, affects the TFP estimates. Since the current edition of the report focuses on education as the factor determining the level of competitiveness, at the beginning we analyze the impact of human capital on economic growth.

Table 8 shows the human capital contribution to economic growth expressed in percentage points in the years 2004–2010. The results are listed till 2010 because data on human capital are not available for 2011.[26] Since human capital share in income equals $^1/_3$, the results given in Table 8 after multiplying them by 3 represent percentage

[26] To calculate TFP growth rates based on the extended model in the whole analyzed period 2004–2011, for 2011 we have assumed the 2010 growth rates of human capital stock (see: Table 1).

changes of the human capital stock in the economy. As we mentioned earlier, human capital is measured by the level of education of the labor force (i.e. the number of economically active persons with completed tertiary education).

In the years before global crisis, i.e. in the 2004–2007 period, human capital in the EU10 countries was rising significantly and was responsible for a large share of these countries' economic growth. The situation of Poland should be pointed out. During 2004–2007, Poland revealed the highest dynamics of human capital implying that on average 2.7 percentage points of the increase of GDP resulted from human capital accumulation. Before global crisis, human capital played also an important role in Slovenia, Romania, Latvia, and Lithuania; in all these countries it contributed to at least 2 percentage points of the rate of economic growth. The slowest growth of the education level of labor force was recorded in Bulgaria, Czech Republic, Estonia, and Hungary; in these countries human capital accounted for only ca. 1 percentage point of economic growth. In the before crisis period, Poland noted the best outcomes not only in terms of the average growth rates of human capital but also it performed quite good in terms of minimum and maximum rates of human capital accumulation. Human capital stock, measured by the education level of labor force, was raising regularly in all the years implying that human capital contribution to economic growth in Poland was continuously positive ranging from 3.3–4.1% in the years 2004–2005 to 1.6–1.7% during 2006–2007. In Slovakia, Estonia, Romania and Lithuania, the number of persons with tertiary education belonging to labor force fell in some years that is interpreted as a negative human capital accumulation.

Table 8

Human capital contribution to economic growth in the augmented model with three inputs: labor, physical capital and human capital (percentage points)

Country	Period before economic crisis (2004–2007)			Period of economic crisis or slowdown		Period of recovery
	Mean	Min	Max	2008	2009	2010
Bulgaria	1.1	0.5	1.3	1.1	0.3	–0.4
Czech Republic	1.1	0.7	1.7	1.9	2.4	2.4
Estonia	1.0	–0.4	2.1	0.8	1.8	–0.8
Hungary	1.2	0.1	3.1	2.0	1.4	1.1
Latvia	2.1	0.1	4.6	4.7	–0.2	–0.4
Lithuania	2.0	–0.1	4.7	1.0	0.1	2.4
Poland	**2.7**	**1.6**	**4.1**	**2.0**	**3.2**	**3.8**
Romania	2.1	–0.1	3.4	2.3	1.6	2.0
Slovakia	1.8	–0.6	3.5	1.8	1.7	4.1
Slovenia	2.5	1.1	3.1	1.0	1.8	1.6

Source: Author's calculations.

During 2008–2009, despite the global crisis, human capital increased in all the EU10 countries with the only exception being Latvia in 2009. In the 2008–2009 period, the Poland's outcome should be also pointed out. In the period of worldwide economic and financial crisis Poland recorded the highest growth rates of human capital accumulation that yielded a high contribution of this input to economic growth: in 2008 and 2009 human capital in Poland explained 2.0 and 3.2 percentage points of the GDP growth rates. During 2008–2009, the stock of labor force with tertiary education increased considerably also in the Czech Republic, Hungary, and Romania. Latvia noticed a huge human capital accumulation in 2008 (by 14%) that contributed to 4.7 percentage points of economic growth. However, despite high dynamics of human capital, the EU10 countries (except Poland) did not avoid a recession.

In the period of recovery, Poland again reported one of the highest growth rates of human capital; only Slovakia had a better outcome. In 2010, human capital contribution to economic growth equaled 3.8 percentage points in Poland and 4.1 percentage points in Slovakia. In 2010 some EU10 countries revealed negative trends in human capital accumulation. In that year three EU10 countries, Bulgaria, Estonia, and Latvia, recorded a fall in the number of economically active persons with tertiary education, that means a negative dynamics of human capital. However, in some of the remaining countries (Czech Republic, Lithuania, and Romania) human capital accumulation stood at a decent level and its contribution to economic growth amounted to at least 2 percentage points.

TFP growth rates in the augmented model are on average lower than in the basic model without human capital. It is in line with the economic theory because the higher the number of variables included in the growth accounting exercise, the higher share of the GDP growth rate is explained by changes in measurable factor inputs. Of course, it may happen that TFP growth rate in the augmented model will exceed that in the basic model. For example, if there is a negative human capital dynamics, the TFP growth rate, calculated as a residual, will be higher than in the model without human capital. Differences between our two models result also from different weights: we assume that each input has the same share in income implying that in the model with two inputs the weights are equal to one-half while in the model with three inputs each factor of production (labor, physical capital, and human capital) has the weight of one-third.

According to the extended model, in the years 2004–2007 the highest TFP growth rate was recorded by the following countries: Latvia (4.8% on average per annum), Estonia (4.1%), and Lithuania (4.0%). As we can see, the top three countries are the Baltic states whose economies grew very rapidly before the global crisis. In the before crisis period, high growth rates of TFP were also noted by Slovakia (3.7%), Romania (3.4%), Czech Republic (3.1%), and Bulgaria (3.0%). In Poland, total factor productivity grew at the rate of 1.2% per annum. The case of Poland confirms that total factor productivity rose more slowly than in the basic model. It arises from the

fact that Poland recorded very high rates of human capital accumulation as proven by data in Table 9. Hence, a large portion of TFP growth rate in the basic model reflects the human capital contribution to economic growth. As the result, in the years 2004–2007 the average growth rate of TFP in Poland declined from 3.1% to 1.2% after the introduction of human capital. It also diminished in the respective years: from 4.0% to 1.1% in 2004, from 1.7% to –1.8% in 2005, from 3.6% to 2.7% in 2006, and from 3.2% to 2.8% in 2007.

Table 9

TFP growth rates in the augmented model with three inputs: labor, physical capital and human capital (%)

Country	Period before economic crisis (2004–2007)			Period of economic crisis or slowdown		Period of recovery	
	Mean	Min	Max	2008	2009	2010	2011
Bulgaria	3.0	1.5	4.6	1.7	–7.6	0.9	3.1
Czech Republic	3.1	2.3	4.3	–1.5	–7.5	–0.8	–1.5
Estonia	4.1	3.4	4.8	–9.0	–14.6	4.7	4.3
Hungary	0.7	–0.4	1.5	–1.8	–8.3	–0.6	0.0
Latvia	4.8	2.0	7.5	–12.3	–15.7	0.9	3.3
Lithuania	4.0	0.7	6.4	–0.5	–14.7	0.2	2.3
Poland	**1.2**	**–1.8**	**2.8**	**0.6**	**–3.2**	**–1.5**	**–1.6**
Romania	3.4	0.9	5.1	3.0	–10.7	–5.0	–1.7
Slovakia	3.7	1.0	8.6	1.1	–7.3	–0.3	–2.6
Slovenia	0.6	–1.7	3.4	0.9	–11.1	–0.7	0.8

Source: Author's calculations.

In the period of economic crisis and slowdown, the TFP growth rates were usually negative and lower as compared with the basic model. For example, in Poland total factor productivity increased by 0.6% in 2008 and decreased by 3.2% in 2009, that constituted a lower dynamics as compared with the TFP growth rates in the basic model (1.3% and –0.8% in the years 2008 and 2009 respectively). Similarly to the basic model, in 2009 two-digit drops of total factor productivity were recorded by all the three Baltic states as well as Romania and Slovenia. In these countries TFP fell in 2009 by 15.7% in Latvia, 14.7% in Lithuania, 14.6% in Estonia, 11.1% in Slovenia, and 10.7% in Romania.

Contrary to the basic model, in the period of recovery the TFP growth rates were often negative in the model with human capital. Negative changes of total factor productivity were noticed in 2010 by the following countries: Czech Republic,

Hungary, Poland, Romania, Slovakia, and Slovenia. In 2011, TFP declined in the Czech Republic, Poland, Romania, and Slovakia (but the figures for 2011 in the augmented model are preliminary estimates because they are based on the assumption that the 2011 human capital dynamics was the same as in 2010). Generally speaking, in the period of recovery the TFP growth rates in the human capital-augmented model were rather low. It is clearly visible in the case of Poland where TFP obtained from the model with human capital decreased by 1.5% in 2010 and 1.6% in 2011 while in the basic model it increased by 1.6% and 1.5% in the same period. This outcome confirms some views taken from the literature that TFP includes the impact on economic growth of many other factors of production among which pure technological progress need not be a dominant one. In many countries in many years, a large portion of TFP reflected human capital contribution to economic growth so that in the model with human capital TFP growth rates were considerably lower.

Summing up, in the analyzed period the changes in productivity and human capital played an important role in the economic growth of Poland and other EU10 countries. TFP growth rates in the EU10 countries are considerably higher than in high-income countries, as evidenced by some empirical studies. For example, in the second half of the 20th century, France, West Germany, Britain, Japan, and the United States recorded TFP contribution to economic growth lower than 50% (Kim and Lau, 1994). In 1980–1990, the TFP growth rate of 22 OECD countries stood at 0.8–1.0%, with an economic growth rate at 2.5–2.8% (Englander and Gurney, 1994). Barro and Sala-i-Martin (2003, pp. 439–440) show that TFP contribution to economic growth is usually less than 50% in the case of OECD, Latin American, and East Asian countries.

The differences in the TFP growth rates imply differences in the productivity of the inputs and differences in the competitive advantage of the economies concerned. In Poland and other new EU member states, which recorded a high TFP contribution to economic growth, the productivity of inputs grew more rapidly than in high-income countries. The stock of human capital, measured by the level of education of labor force, also revealed high growth. This can be interpreted as a sign of the improvement of competitiveness of Poland and other EU10 countries.

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Chapter 4

Policies and Institutions and Their Quality

4.1. Economic Reforms and Stabilization Policy

Jan W. Bossak

From the very beginning of the global financial crisis Poland quickly responded to the developments abroad by adjusting its policy to the new challenges. A characteristic feature of this adjustment was the lack of a financial rescue program for the banking sector. Such programs have been developed and implemented in Britain, Germany, France, Italy, Spain, the Netherlands, and Austria. They have put additional strain on these countries' budgets and public debts.

In contrast to the bailout policy that dominated European countries, Poland developed a stabilization plan and went ahead with a reform program. It has successfully maintained its positive GDP growth rate and retained the confidence of international financial markets.

Poland's public debt has been kept below 55% of GDP. In 2010 and 2011, the budget deficit was reduced in relation to GDP. Yet the public financial stress has not resulted in a deterioration of Poland's international financial credibility, unlike in the case of Mediterranean countries. Rating agencies have retained their positive investment ratings for the Polish economy, in contrast with the downward revisions for most other European economies.

Another difference in the government's reaction to the financial crisis is associated with monetary policy. Poland has decided not to reduce interest rates to provide additional financial liquidity to the banking sector. Instead, from 2009 until January 2011, the National Bank of Poland (NBP) kept interest rates at 3.5%. In 2011, the NBP interest rates were gradually increased to 4.5%.

In the 2009-2011 period, consumer demand was the main driving force behind economic growth in Poland, while most other European countries registered a GDP

contraction or stagnation. Investment and exports replaced consumer demand as the driver of Poland's economic growth in 2011.

Facing challenges and threats and moving ahead

In 2011, the turmoil on international financial markets and fiscal problems experienced by eurozone countries brought persistent uncertainty to the world economy. In the eurozone countries most severely affected by the sovereign debt crisis, there were still concerns over the debt sustainability of these economies and about the condition of the European banking sector. As a result, the yields and credit default swap (CDS) spreads on these countries' Treasury bonds remained high. In the second half of 2011, GDP growth accelerated in the United States, while remaining close to zero in the eurozone. In the largest emerging markets such as China, India, and Brazil, economic growth remained positive in annual terms, but at a slower pace. In January and February 2012, this problem was slightly mitigated by a more-favorable-than-expected situation in the U.S. economy and a lower uncertainty outlook in the eurozone. Stock market indices in the United States, Europe and South America continued to rise, supported by stable market expectations, while indices on Asian stock exchanges declined.

Despite some deceleration in Europe and worldwide, an improvement in business activity in Germany, Poland's largest trading partner, helped maintain economic growth at a fair level. Economic growth in Poland accelerated in 2011, spurred mainly by a rise in investment and exports. Consumer spending, which stimulated economic growth in 2010, increased moderately. Some modest progress was made in residential construction.

Poland's economic growth was mainly driven by internal factors in 2011. This supports the argument that economic reforms and stabilization policy have had a positive impact on the vitality and competitiveness of the Polish economy.

The global economy was under various strains in 2011. Despite a decrease in the prices of oil and gas as well as food on international markets, the prices of imported commodities in Poland increased following a depreciation of the zloty and added to the inflationary pressure. The growth of imports was moderate in 2011, while export growth was more dynamic. As a result, net exports contributed to GDP growth.

The depreciation of the zloty helped stimulate exports, income growth and employment. However, these positive developments were followed by a higher inflation rate, which exceeded 4.1% on an annual basis.

The high inflationary pressure was countered by the National Bank of Poland with an increase in the interest rate from 3.5% to 4.0%, followed by 4.25% and finally 4.5%. At the end of 2011, when the European Central Bank reduced its interest rate,

the gap between the interest rates in the eurozone and Poland increased to over 3 percentage points.

The zloty exchange rate plays an important role in the price adjustment process in Poland. It has been a decisive factor in a relative switch of domestic and international prices and reciprocal demand and supply between Poland and world markets.

A sharp, more than 35% depreciation of the zloty in the fall of 2008 radically changed the current-account balance. It also had a substantial impact on foreign capital flows to Poland, as well as on the country's debt and investment position. However, throughout 2010, the zloty appreciated chiefly against the dollar and more modestly vis-à-vis the euro. As a result, the price competitiveness of Poland's exports declined and that of imports increased.

At the beginning of 2011, the Polish currency traded at close to ZL 3.85 to the euro. In August, the zloty began to depreciate and in September, October and November it hovered around ZL 4.50 to the euro. In 2011, especially in the second part of the year, the exchange rate of the zloty against both the euro and the American dollar was volatile, mainly due to uncertainty on international financial markets. The NBP carried out some interventions to stabilize the exchange rate.

The flexible price of the zloty has helped the Polish economy adapt to changes in the international market environment. That would not have been possible without a supportive monetary and fiscal policy. But the main factor is the strength of the Polish economy based on a competitive environment, entrepreneurship and flexible markets buoyed by steady demonopolization, deregulation, and privatization processes as well as the country's investment appeal. All this is the basis for effective adjustment and development.

Sources of economic dynamics

Poland's GDP growth remained relatively stable and strong throughout 2011. At the beginning of the year, it was mainly consumption that contributed to GDP growth, with modest support from changes in inventories and an increase in fixed capital formation. By mid-year, gross fixed capital formation and growing net exports had replaced consumption as the main growth factor. At the end of the year changes in inventories had a negative impact on GDP growth.

The relatively sharp depreciation of the zloty against both the euro and the dollar—in both nominal and real terms—contributed to increased profitability of exports and boosted the price competitiveness of Polish goods and services abroad in 2011. At the end of the year and in early 2012, the zloty appreciated to 4.10 to the euro, but remained significantly weaker than in the first half of 2011. A weaker nominal exchange rate of the zloty against the euro and the dollar makes exports more profitable and offers a strong financial incentive for enterprises to expand

exports and limit imports at the same time. According to a survey conducted by the NBP, exports are profitable if the zloty trades within the 3.50-3.90 band against the euro.

Therefore, the current nominal price of the zloty, at ZL 4.20 to the euro, provides a clear premium for exporters while discouraging importers (NBP, 2012, p. 38).

In 2011, inflation worldwide was mitigated by slower growth in metal, food and energy prices. At the same time, in Central and Eastern European countries with a floating exchange rate regime, inflation was driven by depreciating national currencies.

In the first half of 2011, inflation in Poland rose above 4.0%. Following a deceleration to 3.9% from June to September 2011, consumer price growth accelerated again, reaching 4.6% year-on-year in December 2011. Therefore, the average inflation level remained markedly above the NBP target of 2.5% in 2011.

At the beginning of the global financial crisis, Poland was on track for high-speed development. The profitability of Polish companies was at an all-time high. After a decline in 2009, Polish companies, especially those in the banking sector, reported high net profits in 2010 and 2011. Poland's largest bank, PKO Bank Polski, recorded a double-digit increase in its credit activity and profits in 2010 and 2011. Its profit level was the highest in the bank's 90-year history. This upbeat performance of Poland's largest bank contrasts with the sagging profitability of most other banks in Europe and a sharp reduction in lending across the European Union. In stress tests conducted by the EU on 51 banks, PKO Bank Polski turned out to be one of the best banks in Europe on each count.

Table 1
Selected financial efficiency indices in the enterprise sector

	2004	2007	2008	2009	2010	2011
Return on sales	5.9	5.6	5.0	5.0	5.2	5.5
Net profitability	4.8	5.0	3.3	4.1	4.4	5.0
Cost level index	94.3	93.9	95.8	95.0	94.7	95.5
Liquidity ratio	30.3	33.7	33.6	38.5	39.7	37.9

Source: NBP, 2012, p. 41.

The financial efficiency indices of the enterprise sector remained positive in 2011. Return on sales in the sector continued at over 5%. Net profitability also approached 5%. Due to a higher cost of imported energy and commodities, combined with domestic inflationary pressures, the cost level index deteriorated slightly compared with previous years. Optimistically, however, the financial liquidity of the enterprise sector improved steadily. The sector's profitability and liquidity ratios remained relatively

high, with exporters enjoying a particularly comfortable liquidity position (Table 1). The sound financial position of enterprises, combined with declining inventories and high demand, encouraged investment expansion in the corporate sector.

In the first half of the year, growing employment helped reduce the unemployment rate. In the second half, however, employment growth decelerated. At the end of the year, Poland's labor force numbered 16.2 million, with employment in the private sector at 12.08 million. The public sector had 4.1 million employees. Employment in the service sector was 9.2 million; manufacturing and mining had almost 5 million workers, and agriculture 1.9 million. The labor activity ratio in Poland is 60.2%, below the EU average of 64.6%. The situation in this area did not change in 2011.

According to GUS data, wages and unit labor costs continued to show modest growth in nominal terms. At the same time, high inflation reduced real wage growth. After an increase in 2010, unit labor costs stabilized in the first half of the year and started to drop in the second half. This was the result of a reduction in the nominal growth of wages and rapid growth in labor productivity. Wage pressure remained relatively low in 2011.

No significant changes took place on the housing market in 2011. Prices declined slightly and sales increased. Profit margins in residential construction remained high, which encouraged property developers to start new investment projects. In 2011, the number of completed housing units declined despite a 7% increase in the second half of the year. In the fourth quarter, residential construction was boosted by relatively favorable weather conditions.

The currency structure of housing loans taken out by households indicates that most new loans were denominated in zlotys. This contrasts with 2009 and 2010 when loans in Swiss francs and euros accounted for 65% of all housing loans in Poland (NBP, 2012, p. 49). The new trend is partly a result of the Polish Financial Supervision Authority's recommendation to reduce loans denominated in foreign currency due to a high exchange risk.

In 2011, the high liquidity of enterprises led to a substantial increase in their bank deposits (by over ZL 20 billion). Higher enterprise deposits were accompanied by a relatively strong increase in household deposits (by over ZL 55 billion). The increase in deposits was stimulated by an increase in interest on them from around 4.4% at the beginning of the year to 4.7% at the end of 2011. Another reason was a falling share of more risky assets in the total financial assets of households.

The high financial liquidity and growing profitability of large enterprises, combined with inflationary pressure, growing export demand, and continued high investment in highway infrastructure, encouraged private investments. In 2011, major infrastructure projects were supported by EU funds, which had a positive effect on the country's economic growth and equilibrium.

Poland maintained its high investment attractiveness in 2011, as reflected by the relatively high level of foreign direct investment in Poland's manufacturing and service

sectors. European transfers and foreign direct investment helped offset the country's current-account deficit and increase its foreign currency reserves. At the end of 2011, Poland's currency reserves stood at € 75.7 billion.

The economic contraction in Western Europe forced many Poles working abroad to return to Poland in 2011. The opening of the German labor market to Polish workers has not resulted in a substantial increase in the number of Polish people looking for job opportunities in Germany. According to both Polish and German statistics, only about 30,000 workers from Poland took a job in Germany. As a result of these migration trends, private transfers from Poles working abroad declined in 2011, lessening the cushion they provided against external financial shocks in 2009 and 2010.

Poland's current-account deficit came to € 15.2 billion in 2011. Exports reached € 137.9 billion and increased by almost € 13 billion over 2010. Imports reached € 148 billion and expanded by € 14.3 billion compared with 2010. The trade deficit, despite an improvement at the end of the year, increased from € 8.9 billion in 2010 to € 10.3 billion in 2011.

Net service exports approached € 4.9 billion and positively contributed to a reduction in the current-account deficit. Service exports generated € 26.3 billion, while service imports brought in € 21.4 billion.

Poland's income account was strongly negative in 2011, with a balance of € -13.8 billion. The income inflow amounted to € 6.0 billion, while the income outflow reached € 19.8 billion.

Net transfers increased from € 2.8 billion to € 4.1 billion in 2011. This positive change was due to an increased inflow and reduced outflow of transfers. The net foreign investment inflow continued to be positive despite a reduction in FDI reinvestments and an increase in income transfers.

Institutions and reforms

Poland has successfully reformed its financial institutions, banking sector and capital market and also made progress in social security reforms. The constitution sets an upper limit for public debt at 60% of the GDP. Significantly, most banks are in private hands. This has an important impact on competition, efficiency and the adjustment capabilities of financial markets strengthened by the high quality of Poland's financial supervision system. After undergoing reform and consolidation, the national financial supervision authorities took a prudent approach to the safety of the financial sector.

The constitution guarantees autonomy for the monetary policy of the National Bank of Poland. The NBP interest rate and the market exchange rate are the key instruments for the price adjustment mechanism and the stability of the financial and capital markets.

The basic objective of the NBP's monetary policy is to maintain price stability. The bank's direct inflation targeting strategy has shaped monetary policy since 1999. The Monetary Policy Council defines the inflation target and then adjusts the NBP's key interest rates in order to meet this target. Since the beginning of 2004, the National Bank of Poland has pursued a continuous inflation target of 2.5% with a permissible fluctuation band of +/- 1 percentage point.

The money market rates influence the loan and deposit rates at commercial banks and thus the volume of loans as well as demand in the economy and the inflation rate. The set of monetary policy instruments used by the NBP includes open-market operations, reserve requirements and credit-deposit operations.

Open-market operations are transactions in which the central bank engages with commercial banks on its own initiative. Such transactions include the conditional and outright sale or purchase of securities or foreign currency, as well as the issue of debt securities by the central bank.

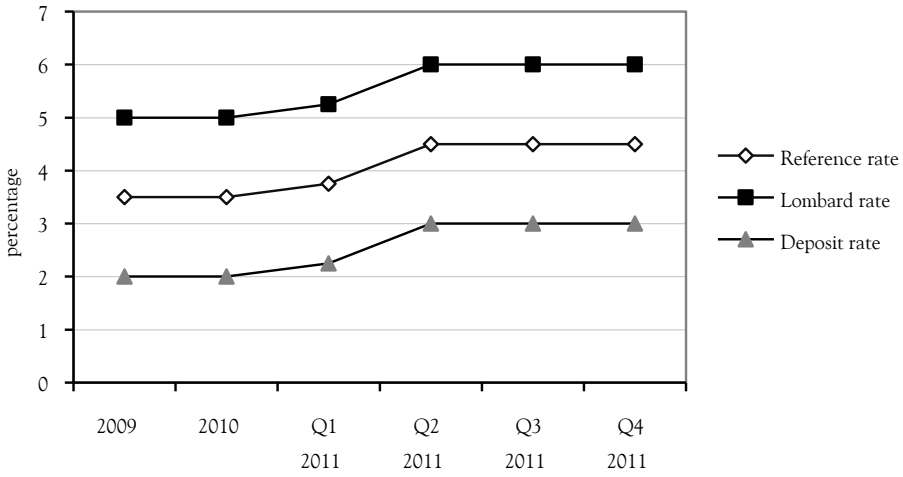
The central bank imposes on the banks the obligation of maintaining required reserves. Reserve requirements are set by the Monetary Policy Council. As of Dec. 31, 2010, the required reserve rate is 3.5% for all types of deposits, except funds obtained from repurchase agreements where the required reserve rate is 0%. Required reserve funds carry interest.

The NBP offers Lombard loans against the collateral of Treasury securities to commercial banks. Such loans enable banks to cover short-term liquidity shortfalls. The National Bank of Poland also offers banks the possibility of making short-term (overnight) deposits with the central bank to manage their liquid fund surpluses and prevent short-term interbank market interest rates from falling below the deposit rate.

From June 2009 to January 2011, the NBP interest rate was kept stable at 3.5%. This does not mean that the NBP was neutral in its activities. In 2010, the NBP continued its policy of increasing the financial liquidity of the banking sector. It reduced the obligatory reserves of commercial banks and also started open-market transactions to provide more liquidity to the inter-bank money market. In 2011, the interest rate increased to 4.0%, followed by 4.25% and finally 4.5% (Figure 1).

Since April 12, 2000, the zloty exchange rate has been a floating rate not subject to any restrictions. The central bank does not aim to set predetermined zloty exchange rates against other currencies. However, it reserves the right to intervene if it deems this necessary in order to achieve the inflation target.

Figure 1
Interest rates in Poland



Source: Data by the National Bank of Poland (NBP).

On its entry to the European Union, Poland undertook to join the eurozone. Consequently, in the future, the zloty will be replaced by the single European currency, and monetary policy will be shaped by the European Central Bank.

Exchange rate stability is one of the conditions for joining the eurozone. Therefore, prior to euro adoption, the zloty exchange rate against the euro must remain fixed for at least two years within the Exchange Rate Mechanism II (ERM II). This means that, during this period, Poland will maintain the market zloty exchange rate against the euro within the permissible range with regard to central parity.

Efficient and safe operations of the financial system, including the banking, capital and foreign exchange markets, depend not only on the NBP and its policy but also on the quality of the financial supervision system. In September 2008, the government approved a plan to set up a Financial Stability Committee (FSC). The committee includes the president of the National Bank of Poland, the chairman of the Polish Financial Supervision Authority (KNF), and the finance minister. The FSC was established to monitor domestic and international financial developments and propose legislative and regulatory measures to maintain financial stability in the country.

The Polish Financial Supervision Authority's prudent recommendation policy at the time of the global financial turmoil had a clearly positive impact on the stability of Poland's banking sector. The KNF recommended that banks introduce the Basel New Capital Agreement as soon as possible. It also requested banks to strengthen their capital base by retaining high profits and abstaining from paying dividends. Moreover, the KNF recommended that Polish banks introduce more conservative methods for

assessing client creditability and that they reduce the amount of residential loans denominated in Swiss francs and euros.

The NBP raised interest rates in 2011 in response to higher inflation, zloty depreciation and exchange rate instability. Meanwhile, in the United States, Britain, Switzerland, Sweden, and European Monetary Union countries, interest rates were cut to help banks maintain financial liquidity. The financial liquidity of banks had been reduced by extraordinarily large risk provisions (bad portfolios) and a decline in their stock prices, which automatically reduced their capital-asset ratio (CAR) and credit expansion and led to a contraction in demand and business activity. Many American and European banks had to ask their governments for financial support. This was a form of government rescue operation that resulted in a sharp increase in the budget deficits of many countries and an increased role of the state. Poland's banking sector did not require any government intervention.

Stabilization and Development Plan

Public finance policy is of key importance to stabilization and the country's development. Poland's public finance deficit is structural in nature and requires institutional reforms related to the expenditures and revenues of both central and local government authorities and key public agencies that are not formally part of direct government financing. Despite earlier promises to refrain from tax increases, there were some hikes in 2011. The most important was an increase in value added tax from 22% to 23% beginning February 2011. The government also increased excise tax on cigarettes, electricity and gas. In February 2012, the parliament decided to slap a tax on copper and some other minerals.

There were some cuts in spending. The Finance Ministry pressed ahead with a policy recommended by the European Union to limit the increase of expenditures to 1% (spending limit formula).[1] Most cuts were designed to streamline administrative and social expenditures. While the government continued to invest in highways and sports facilities, it either downsized or postponed social and educational infrastructure projects.

Despite restrictive policies and efforts to reduce expenditure and keep the budget deficit to a minimum, the government repeatedly reiterated its commitment to building highways. Poland's highway construction program is supported by EU funds and the European Investment Bank. The government authorized the Treasury Ministry to extend special guarantees to state-owned Bank Gospodarstwa Krajowego (BGK) and issue bonds to raise more money on capital markets for the National

[1] The Public Finance Consolidation Program is based on an "inflation + 1%" expenditure formula. In addition, moves including the introduction of mid-term planning are expected to make spending more efficient.

Highway Fund (NFD). BGK has signed agreements with commercial banks to provide state-guaranteed loans to small companies taking part in the highway construction program as subcontractors. The government revised a law on public tenders to make it more flexible for both businesses and the state administration. This was hailed as an essential change to speed up the process of building highways.

To meet the Maastricht fiscal criteria and start the ERM II procedure for joining the EBC, ESBC and the euro system, Poland has to carry out structural public finance reforms and reduce its public debt. In 2010, Poland submitted a Convergence Plan at the request of the EcoFin Council. In 2011, this program was implemented in line with the Excessive Budget Deficit Procedure.

Poland is a leading beneficiary of EU funds. The year 2011 saw a substantial improvement in the use of European funds following a simplification of procedures. Measures were taken to eliminate complicated administrative procedures. These included amendments to the public procurement law and environmental protection regulations. The use of EU funds improved with an anti-crisis package that provides for advance payments to businesses, swift disbursement of aid funds, and improved procedures for transferring subsidies to local governments.

Poland has initiated a debate on the common energy policy within the EU. Ensuring energy security is regarded as a strategic objective of the bloc. At the same time, the European Union's pressure for radical cuts in carbon dioxide emissions and related environmental fines has put Poland in an uncomfortable position. Most of Poland's energy is generated from coal, which is a major source of CO2 emissions. Poland relies heavily on its own coal and lignite deposits and also depends on crude oil and gas imported from Russia. Diversifying the sources of crude oil and gas supply is a strategic objective for the country. In 2011, the government continued its efforts to expand Poland's gas and oil storage capacity. Moreover, Poland invited foreign investors to explore new shale gas fields. Preliminary drilling work on shale gas in northern Poland seems to be promising. In April 2011, the U.S. Energy Information Administration (EIA) said that Poland has 5.3 billion cubic meters of shale gas, the largest deposit in Europe. The government has issued drilling licenses to both Polish and foreign companies.

Privatization, deregulation, competition and entrepreneurship

The growing public finance deficit and the government's determination not to raise taxes forced it to speed up privatization. The government's privatization revenue reached ZL 28 billion in 2010, which marked a sharp increase from previous years. In 2011, privatization revenue dropped to ZL 15 billion.

Privatization helps to not only raise revenue to balance the budget but also to make large Polish companies more flexible and market-oriented. Privatization makes them more attractive to investors. It also strengthens the capital market.

In 2011, the government took steps to bring market rules to the healthcare system, the culture sector, public television and radio broadcasters, and education. This policy and the way it was carried out aroused public criticism. Progress made in these areas has been astonishingly slow, largely because opposition parties and labor unions usually seek to derail the government's plans for these socially sensitive sectors.

In 2011, the government planned to reduce the state's role in firms such as PZU SA, PKO Bank Polski, and KGHM. However, due to unfavorable capital market conditions, these plans were temporarily shelved.

Despite bearish trends on the Warsaw Stock Exchange, the number of listed companies increased from 380 at the beginning of 2011 to 426 at the end of the year. As the market's key indices—the broad-market WIG and the blue-chip WIG20 index—declined, the capitalization of WSE-listed companies decreased to € 446 billion from € 537 billion. The Warsaw Stock Exchange was privatized in 2011.

Social security system reforms

The government made efforts to maintain a broader social consensus among the administration, employers' organizations and labor unions in 2011. The Anti-Crisis Pact signed by the parties to the Trilateral Commission in mid-2009 is still in force. The document authorizes the government to temporarily relax labor regulations with a view to enabling employers to introduce flexible work schedules and adapt work time to the actual needs of the enterprise. The Anti-Crisis Pact also granted enterprises the right to apply for subsidies to wages and salaries if employee incomes are reduced following work-time limitations.

The decision to relax labor regulations at a time of crisis was designed to increase the ability of enterprises to adapt to market changes.

In terms of the target set by the European Union for an increase in the labor activity ratio across the bloc to 70%, Poland is at the bottom of the list and has the longest way to go before it reaches this level. To a large extent, this is due to regulations introduced in the early 1990s that enabled many people to retire early. Some professions were offered especially generous benefits in an effort to stop unemployment from growing rapidly. However, these measures turned out to be more dangerous than the temporary adjustment problems they were meant to solve; many Poles stopped working and took advantage of the social security system instead. Until 2010 women in Poland could retire at 55 and men at 60. Generous provisions for those interested in early retirement had a negative impact on the labor activity ratio and public finances.

In 2010, Poland's early retirement regulations were modified to limit the number of those eligible and extend work time. It is expected that the reform will have a positive impact on the activity ratio and public finances in the long term.

In December 2011, Prime Minister Donald Tusk's renewed coalition government proposed an extension of the retirement age to 67 years for both men and women. The proposal was criticized by all parliamentary parties except Tusk's own Civic Platform (PO). The Polish People's Party (PSL), which is the junior coalition partner of the Civic Platform, came up with some counterproposals. Additionally, the PSL stubbornly refused to discuss ideas to reform the farmers' social security system KRUS. This reduces the positive impact of the reform on the budget and more generally on public finances.

Poland's pension fund system was rationalized and brought in line with EU standards in 2011. The reform was essential for an overall improvement in public finances. Previously, the government financed the social insurance system by issuing bonds and using credit lines. Pension funds soaked up these bonds, treating them as low-risk Treasury securities. A typical pension fund portfolio was roughly 70% made up of risk-free Treasury bonds.

Convergence program and its update

The Convergence Program Update is a document that outlines how Poland intends to prepare its economy to meet the Maastricht criteria. Poland's Finance Ministry has drafted a public finance reform program and a convergence plan. Under the public finance reform program, the country's GDP growth was expected to be 3.4% in 2010, 4.5% in 2011, and 4.2% in 2012.

The Convergence Program Update includes an "alternative" pessimistic scenario based on a slower growth outlook for countries that are Poland's major trading partners. Under this scenario, Poland's GDP growth rate was put at 2.7% in 2010, 3.7% in 2011 and 3.5% in 2012. Poland's public finance deficit was to be reduced to 5.9% in 2011 and 2.9% in 2012 under the convergence program. In the future, efforts to reduce the budget deficit are expected to continue, with the budget gap permanently kept below 3% of the GDP.

In its Convergence Program Update, the government stated that Poland's public debt, though growing, would not overshoot 60% of the GDP, thus meeting the Maastricht criteria for public debt.[2] The Convergence Program Update aims to create conditions for the Polish economy to return to a path of sustained and dynamic growth despite unfavorable developments in Europe and beyond.

[2] The public debt-to-GDP ratio, according to ESA95 methodology, was set at 53.1 % in 2010, 56.3 % in 2011, and 55.8 % in 2012.

In December 2011, the Finance Ministry published an updated strategy for public debt management in 2011-2015. The strategy is consistent with constitutional provisions on public debt management and public finance regulations.

In 2011, Poland's public finance debt reached ZL 812.3 billion. The debt-to-GDP ratio was 53.7%. In 2012, the debt is expected to increase to ZL 832.5 billion, but its relation to GDP is expected to be reduced to 52.4% (Table 2). The structure of Poland's public debt is characterized by a high component of zloty-denominated debt, which constitutes 72.7% of the total debt; 19.2% of the debt is denominated in euros and 8.1% in other currencies.

Table 2
Public debt and its servicing costs

	2010	2011	2012	2013	2014	2015
Public debt (in billions of zlotys)	747.9	812.3	832.5	846.9	864.8	902.2
Public debt as a percentage of GDP (%)	52.8	53.7	52.4	50.3	48.3	47.4
Costs of public debt service in billion zlotys	34.1	38.4	43.0	42.7	42.7	42.6
Costs of public debt service as a percentage of GDP (%)	2.4	2.5	2.7	2.5	2.4	2.2

Source: MF, 2011, p. 4.

The pension system is in need of further reform. The government decided against adopting a proposal from the Finance and Labor Ministries to reduce obligatory pension contributions to pension funds (OFE) from 7.3% to 3.0% and to transfer these payments to ZUS instead. This proposal was designed to bring Poland's system closer to the Eurostat definition of public finance debt. This simple accounting adjustment helped reduce the official budget deficit by 2 percentage points. However, pension funds and many economists criticized the new rules, saying they undermine social security reforms and hamper the development of the capital market.

Meanwhile, a proposal to reform the farmers' social security system (KRUS) was blocked by the PSL and a plan to do away with early retirement privileges enjoyed by the army and police was eventually reduced to some minor modifications too insignificant to help alleviate the country's fiscal problems.

As far as tax reforms are concerned, new regulations were introduced in 2011 that force doctors and lawyers to use cash registers so all transactions are recorded for bookkeeping and value-added tax (VAT). Moreover, VAT deductions were limited for taxpayers for some types of automobiles and fuel.

Poland benefits from a liberal policy in international trade and financial flows. Its EU membership provides the country with access to structural funds and investments.

Easy access to the most developed labor markets in Europe enables Polish workers to find employment and income abroad.

The Polish EU presidency and the Fiscal Pact

In the second half of 2011, Poland took over the rotating presidency of the EU Council. During its turn at the helm of the EU, Poland drafted measures to strengthen public finance policy discipline across the bloc. Moreover, the European Union began work on a more fundamental blueprint on tighter budget discipline referred to as the Fiscal Pact.

The Fiscal Pact was signed in January 2012 by 25 of the EU's 27 members and is scheduled to take effect on Jan. 1, 2013 on condition that at least 12 of the 17 eurozone countries ratify it by that time. Under this treaty, a country's annual structural deficit must not exceed 0.5 percent of its nominal GDP. Non-complying countries would be fined by the European Court of Justice, with a penalty equivalent to up to 0.1 percent of the country's GDP. France, where presidential elections will be held in April 2013, opted for tougher measures that would enable European Monetary Union authorities to impose more stringent budget requirements on EU members.

As part of the fiscal treaty, member states also reached a compromise on who will be able attend eurozone summits, the issue most disputed by France and Poland. It was decided that non-eurozone countries that ratify the treaty will be allowed to take part in eurozone summits at least once a year. Participation of non-eurozone countries in a specific summit would depend on the summit president.

Concluding remarks

The Polish economy's exceptional resilience to the global financial crisis has drawn attention and aroused debate abroad. Poland has benefited from its liberal policies in international trade and financial flows. EU membership provides the country with access to structural funds and investments. Easy access to the labor markets of the most developed countries in Europe enables Polish workers to find jobs and income abroad.

Reforms undertaken in the financial sector and a liberal approach to economic freedom, privatization, competition, entrepreneurship and the market exchange rate mechanism, accompanied by prudent economic, monetary, and fiscal policies, explain why Poland's economy has proved to be better prepared and managed than many other economies in Europe. The social and economic adjustment policies of the coalition government of the Civic Platform and the Polish People's Party continue to have a positive impact on the competitiveness of the Polish economy.

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4.2. Financial System and Capital Market Development

Oskar Kowalewski

An efficient financial system is a key factor in a country's competitiveness. The increased risk of a global economic slowdown evident since 2010, along with the fiscal problems of a number of EU member states, have resulted in continued tension on international financial markets. This tension affected the Polish financial system in two ways in 2011.

First, stricter EU and national regulations on risk in the banking sector as well as past financial losses forced some multinational banks to withdraw from emerging markets by selling their subsidiaries. As a result, Poland's financial sector witnessed a surge in the number of mergers and acquisitions in 2011. Moreover, as the prices of financial institutions remain depressed due to high risk, the number of companies put up for sale is higher than the demand, especially in the banking sector. As a consequence, another wave of M&A may be expected in the Polish financial system in 2012.

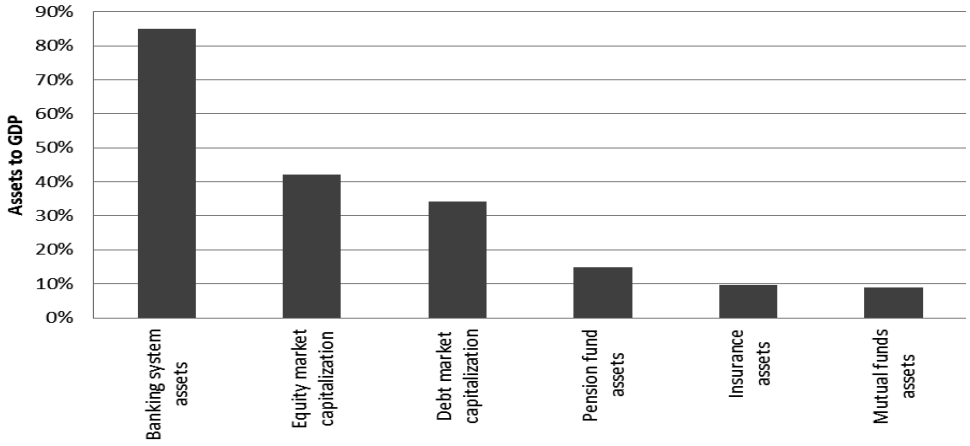
Second, weaker economic growth and fiscal stimulus packages during the 2007-2008 financial crisis resulted in an increased public budget deficit in many EU countries, including Poland. To lower public debt, the Polish government decided to increase the VAT tax rate and revise the pension system. In 2011, a new law was passed that significantly reduced transfers to private pension funds and increased the level of funding for the state-owned pension system. This significantly changed the structure of the Polish pension system. In the reformed version, contributions will again go mainly to the state-owned pension system, while the private part of the system will play a supplementary role. However, these changes may pose a burden on public finances in the future. Moreover, the reform will probably have a negative effect on the Polish capital market; private pension funds have been significant institutional investors on the Warsaw Stock Exchange (WSE).

The Polish financial system, however, continued to develop despite those changes and the economic slowdown in 2011. The financial system's assets represented an estimated 195% of the GDP in 2011, compared with 176% in 2010. The structure of the Polish financial system remains dominated by credit institutions. In 2011, the banking sector's total assets increased by more than 12% and accounted for 85% of the

country's GDP. As a result of economic recovery, the stock market expanded and other financial intermediaries, such as insurance companies and pension funds, increased their role. In 2011, the stock market's capitalization increased by more than 10% and accounted for more than 42% of GDP. At the same time, insurance sector assets as well as pension fund assets increased by 1% to 3% on average over the previous year. The assets of investment funds, however, declined slightly in 2011. The decline was related to unfavorable price developments on the equity market, which resulted in net outflows from equity and mixed investment funds. Figure 2 offers a broad overview of the structure of Poland's financial system at the end of 2011.

Figure 2

Assets of financial intermediaries as a percentage of GDP in 2011



Source: National Bank of Poland, Polish Financial Supervisory Authority.

Banking sector

As already shown, the Polish financial system is mainly bank-based due to the prominent role of commercial and cooperative banks. In 2011, however, the number of credit institutions declined to 639, from 646 in 2010. As a result, the banking sector consisted of 574 cooperative banks, 47 commercial banks and 19 branches of foreign banks in 2011. The decline was mainly caused by an ongoing consolidation process among smaller credit institutions, which was partially due to the sell-off of foreign-owned bank subsidiaries, whereas the process of withdrawing from the Polish banking market was a result of financial problems on the home market caused by the financial crisis (Hryckiewicz and Kowalewski, 2011).

Table 3
Number and type of credit institutions in Poland

	1993	1995	2000	2005	2010	2011
Credit institutions, of which:	1740	1591	753	649	646	639
Commercial banks	87	81	73	54	49	47
– state-owned	29	27	7	4	4	4
– foreign banks	10	18	46	50	45	43
Bank branches	–	–	–	7	21	19
Cooperative banks	1653	1510	680	588	576	573

Source: National Bank of Poland and the Polish Financial Supervisory Authority.

In Poland, as in other Central and Eastern European (CEE) countries, most of the credit institutions are foreign controlled. At the end of 2011, foreign-controlled credit institutions accounted for more than 60% of total banking assets. However, since the financial crisis began in 2007-2008, there have been significant changes in the ownership structure of the banking sector as multinational financial institutions withdrew from the financial intermediary market by selling their subsidiaries in Poland.

In 2011, Irish financial institution AIB decided to sell its Polish subsidiary BZ WBK to Spanish financial group Santander. Then, Santander was acquired Poland's Kredyt Bank from Belgian financial holding company KBC at the end of the year. By 2011, Santander had significantly strengthened its position in Poland and is now the third-largest foreign bank in this country. Meanwhile, Greece's EFG Eurobank converted its Polish branch into a subsidiary only to sell it later to Austrian banking group Raiffeisen. As a consequence, the ownership structure of Poland's banking sector changed significantly. Most foreign banks in Poland are now owned by European credit institutions. Recently Russian financial institutions have expressed an interest in acquiring subsidiaries from multinational banks in Poland. Moreover, a Chinese commercial bank has applied for a banking license. Consequently, the ownership structure of Poland's banks may become more diversified. Currently, foreign investors in Poland's banking sector hail from 18 countries and no country accounts for more than 12.5% of total assets (UniCredit, 2012).

A greater diversification of the ownership structure may be seen as a positive development. Recent studies showed that multinational banks that experienced financial problems on their home markets due to the 2007-2008 financial crisis, significantly decreased lending compared with domestic banks in Central and Eastern Europe in the 2007-2009 period (Popov and Udell, 2010). According to Allen et al. (2011), the decline in foreign bank lending was especially severe if a subsidiary was dependent on the interbank market. One explanation is that before the crisis, the

growth in lending in CEE countries was to a large extent externally financed. The crisis changed the situation and foreign-owned banks in CEE countries, including Poland, were forced to decrease lending due to a lack of funding from the multinational bank's home market. Foreign-owned banks tried to substitute the lack of international capital inflows with domestic deposits. Particularly those foreign banks that were characterized by strong imbalances, with loans-to-deposits ratios well above 100%, started aggressive deposit-collection campaigns in order to reduce their dependence on parent funding.

Nevertheless, in 2010 and 2011, the growth of deposits was lower than that of loans in Poland. However, as shown in Table 4, the loan-to-deposit ratio remained at a healthy level of below 110% in 2011. The relatively low reliance of subsidiaries on parent funding prevented a credit crunch in Poland during the crisis, yet a significant decline in loan growth has been observed since 2008. In 2011, however, loan growth increased for the first time since the crisis began, to 12.2% from 9.8% in 2010. Nevertheless, the research department of UniCredit (2012) expects a slowdown in loan volume in the next two years. According to UniCredit, the decline in loan growth will be the result of lower demand for credit from domestic companies and slower growth of household incomes. Consequently, the biggest slowdown is expected in the corporate segment, from 12.5% in 2011 to around 4% in 2012, as well as in mortgage loans, from 18.9% in 2011 to 9.1% in 2012. On the other hand, no significant changes are expected in loans for financing consumption in 2012.

Table 4
The development of Poland's banking sector in 2008-2012 (%)

	2008	2009	2010	2011	2012
Deposits growth	20.5	10.1	9.7	8.9	7.8
Lending growth	36.5	10.0	9.8	12.2	5.9
Loan to deposit ratio	108.1	107.9	108.1	111.4	109.5
Mortgages to GDP	15.2	16.1	19.0	21.1	21.6
FX lending to total lending	31.4	29.2	29.7	30.7	30.1

Source: UniCredit (2012).

Despite the expected decline in the volume of loans, the earnings and profitability ratios of Poland's banking sector continued to improve in 2011. Table 5 shows that the banking sector's net profits reached an all-time high in 2011 and surpassed the levels observed prior to the financial crisis. The improvement in the banking sector's earnings was mainly driven by a stabilization in the quality of the loan portfolio, expressed in a decreased value of charges to provisions for impaired loans. However, despite their record net profits, the banks' profitability ratios are still lower than in the

period prior to the outbreak of the crisis on international financial markets. In 2011, the return on assets (ROA) and equity (ROE) improved significantly, yet it remained substantially lower than in 2007 and 2008. Higher earnings were achieved thanks to a reduced cost of credit risk resulting from the stabilization of the loan portfolio quality in 2011, as well as continued credit growth and a small increase in the net interest margin (NBP, 2011).

Table 5

The profitability of Poland's banking sector in the 2005-2012 period (in ZL million and %)

	Net earnings	Total assets	Total capital	ROA	ROE
2005	9,110	586,426	54,969.6	1.55%	16.57%
2006	10,697	681,792	59,208.2	1.57%	18.07%
2007	13,642	792,774	68,343.3	1.72%	19.96%
2008	13,935	1,041,769	82,277.8	1.34%	16.94%
2009	8,278	1,057,376	103,800	0.78%	7.98%
2010	11,420	1,159,358	115,980	0.99%	9.85%
2011	15,693	1,295,063	129,035	1.21%	12.16%

Source: National Bank of Poland and Polish Financial Supervisory Authority.

The slight increase in the profitability ratios was also due to a minor increase in financial leverage by banks. However, the average capital adequacy ratio of the banking sector is still around 5 percentage points higher than the regulatory minimum. Moreover, the capital adequacy ratios of banks with an 81% share in the assets of domestic commercial banks were higher than 11% (NBP, 2011). Hence, the majority of commercial banks maintained high capital adequacy ratios, which made them resilient to outside shocks. Consequently, the Polish banking sector is well prepared and should withstand any further shocks should the global economic situation worsen in 2012.

Capital markets

Improving economic prospects in the global economy and a revival in the risk appetite in 2010 led to an increase in demand for financial assets on emerging markets, including Poland. The stock market improved significantly, but the recovery process was stopped by the financial problems of the eurozone countries. These problems led to elevated volatility and a decline in asset prices in Poland in the second half of 2011. The WSE's main index, the WIG, decreased by 20.83% by the end of 2011, while the WIG20 blue-chip index fell by 21.85%.

Nevertheless, the improved situation in the first half of 2011 resulted in a record number of initial public offerings (IPOs) on the WSE. In 2011, the WSE again topped the list not only in CEE, but also compared with established European exchanges such as NYSE-Euronext, Nasdaq-OMX and Deutsche Börse. The WSE has ranked high in this area since 2007, which is partially the result of a large number of new listings related to the privatization of and sell-off of minority stakes in former state-owned companies. In 2011, the government went ahead with the initial public offering of the Warsaw Stock Exchange Company and decided to sell minority stakes in the country's largest energy producer, PGE, as well as the largest insurance group, PZU, and the largest domestic bank, PKO BP. The government plans to carry out more privatizations through the WSE in 2012. At the beginning of 2012, the Treasury Ministry announced the sale of minority shares in companies from the chemical industry as well as the privatization of LOT Polish Airlines by floating its shares on the WSE. The total value of the LOT offering is estimated at ZL10 billion, which would further increase the WSE's liquidity and capitalization.

In 2011, a total of 426 companies, including 39 foreign-owned businesses, were listed on the WSE. Most of the listed foreign-owned companies are from neighboring countries, especially Ukraine. Moreover, the number of futures and options contracts increased last year in comparison with the previous period. Yet taking into account the market's shallowness, the stock exchange remains underdeveloped. Another major weakness of the WSE is its bond market, which is still dominated by government bonds.

In order to change the situation, a new bond market, called Catalyst, was launched on the WSE at the end of 2009. Catalyst comprises four trading platforms. Two platforms are dedicated to retail investors and are operated by the WSE. The other two platforms are dedicated to wholesale investors and are operated by the BondSpot market. In 2011, the Catalyst market continued to grow dramatically as companies increasingly decided to issue corporate bonds in Poland. Moreover, banks are also trying—to a much larger extent than in the past—to obtain funding through the issuance of long-term debt in order to diversify their sources of funding. In particular, domestic banks as Alior and Noble obtained additional funding by issuing debt securities on the Catalyst market. Consequently, the bond market is developing at a relatively fast rate, though tighter regulations are needed. Otherwise the market's growth may slow down in the near future, especially if the first defaults start to show up among the companies.

While the market's capitalization has increased in recent years, making the WSE the largest exchange in Central and Eastern Europe, the Polish stock market remains relatively small in comparison with its counterparts in developed countries. In 2011, the capitalization of the WSE was slightly higher than that of exchanges such as the Vienna bourse and the Irish Stock Exchange. But most these exchanges are in countries that are much smaller than Poland. At the same time, the capitalization

of stock exchanges in countries such as Spain, Italy, Germany, and Britain is 10 to 20 times greater than that of the WSE. Therefore, the independence of the WSE in the long term remains an unresolved issue. Moreover, the market may grow further if the WSE manages to acquire another stock exchange in the region and attracts more foreign companies to be listed in Warsaw.

Table 6
Market capitalization to GDP and number of instruments on the WSE at end of year (%)

	1991	1995	2000	2005	2010	2011
Market capitalization to GDP (%)						
Domestic listed companies	0.20	3.42	17.48	31.37	29.30	38.34
Foreign listed companies	–	–	–	11.85	12.92	17.93
Domestic bonds		3.92	9.96	29.19	34.27	34.37
Foreign bonds	–	–	–	0.11	0.01	0.04
Number of listed instruments						
Companies	9	65	225	255	400	426
of which: foreign	–	–	–	7	27	39
Bonds	–	33	48	76	50	51
of which: foreign	–	–	–	4	3	2
Futures	–	–	16	54	55	79
Options	–	–	–	122	106	122

Source: Warsaw Stock Exchange.

Insurance sector

At the end of 2011, 29 life insurance and 33 non-life insurance companies were operating in Poland. Most of these insurers are owned by universal insurance companies that offer products in both market segments. In the past, the country's economic development and the large potential of the market encouraged many foreign insurers to enter the Polish market. As a result, almost all insurance companies in Poland are foreign owned. One exception is the majority state-owned universal insurance company PZU, which had a market share of 30.8% in the life insurance segment and over 32.6% in the non-life business in 2011. Consequently, the insurance market remains highly concentrated, though this is gradually changing as foreign companies aggressively challenge the leader with lower prices, better customer service and alternative sales channels.

Like the banking sector, the number of companies in the insurance industry declined in 2011 for the first time since 2000 as a result of the financial crisis. The decline was due to the consolidation of the smaller insurance companies, which was caused mainly by the withdrawal and sell-off of some foreign-owned insurance companies in Poland. As in the banking sector, the decision to sell insurance subsidiaries in Poland was to large extent a consequence of problems experienced by parent insurance companies on their home markets. Unlike the banking sector, the insurance industry in Poland has been strongly affected by the financial crisis because insurance companies are large investors in the capital market. In the 2008-2010 period, a large number of Polish insurance companies reported financial losses. This explains why the government and other market players encouraged large insurance companies to acquire weaker companies in Poland and other countries in the region. Belgian financial group KBC sold Poland's second-largest insurance company, Warta, to German insurance company Talanx in 2011. Consequently, as in the banking sector, the ownership structure of Poland's insurance market is changing dramatically.

Meanwhile, the risk faced by insurance companies remains low and their financial situation improved in 2011 as a result of increased insurance rates and reduced losses. The technical results of the insurance sector increased by 61% to ZL 3,773 million in 2011. However, the increase was mainly due to price rises for automobile insurance and property damage insurance. Non-life insurance companies reported a positive technical result of ZL 428 million in 2011, compared with a loss of ZL 1,276 million in 2010. Life insurance companies, on the other hand, reported a technical result of ZL 3,345 million in 2011, down by 7% from 2010.

In the past, the low insurance market risk and rapidly growing premiums attracted many new foreign investors to Poland. Over the past decade, the life insurance segment of the Polish market has grown at an average rate of around 20% per annum, while the non-life insurance business has grown at an average rate of 10%, faster than its counterparts in eurozone countries. Moreover, the Polish insurance market remains the largest in Central and Eastern Europe, with a total premium volume of over ZL 60 billion at the end of 2011.

In 2011, however, the gross written premium in the life insurance industry increased by only 1.6%, while in the non-life industry it increased by 11.26%. In the life insurance segment, the majority state-owned insurance group PZU remained the largest insurer, followed by TU Europa and Warta, which accounted for 8.05% and 7.8% of the gross written premium respectively. PZU was also the leading player in the non-life insurance industry, followed by Ergo Hestia and Warta, with 10.5% and 9.01% of the gross written premium respectively.

Poland's insurance sector, however, remains underdeveloped compared with those of developed countries. In 2011, insurance penetration, in the form of premiums as a percentage of GDP, was still considerably lower than in developed countries. Non-

life business penetration in Poland was at 1.8%, while the European average was 3.0%. Penetration in the life business was at 1.9%, while the European average was 4.5% in 2010 (SwissRe, 2011).

Table 7
Key characteristics of the Polish insurance market

	1991	1995	2000	2005	2011
Life insurance					
Number of companies	5	13	35	32	29
Total assets (in millions of zlotys)	18	2,372	20,391	53,476	89,859
Gross written premiums (in millions of zlotys)	208	1,852	8,335	15,336	31,848
Gross written premiums to GDP (%)	2.57	1.11	1.68	1.57	2.09
Non-life insurance					
Number of companies	19	27	33	37	33
Total assets (in millions of zlotys)	910	2,932	17,536	36,086	56,275
Gross written premiums (in millions of zlotys)	1,275	3,731	12,503	15,649	25,301
Gross written premiums to GDP (%)	1.57	0.55	1.12	1.60	1.66

Source: National Bank of Poland and Polish Financial Supervisory Authority.

The low insurance market penetration rate means that the Polish insurance sector has high growth potential. The mid-term growth rate forecast by SwissRe (2011) is still around 10% on average for life insurance and 5% for non-life insurance. But despite optimistic forecasts and large market potential, the economic slowdown may hamper the development of the Polish insurance sector in the near future. On the other hand, Poland's insurance market has returned to its pre-crisis level in terms of growth, while its counterparts in most developed countries are still below that level. Moreover, new health and medical insurance products are still undeveloped in Poland and may lead to further development of the insurance market in the near future.

Investment funds

In 2011, the net assets of Poland's investment funds decreased to ZL 114.65 billion, from ZL 116.14 billion in 2010. The decline was due to unfavorable price developments on the equity market and net outflows from investment funds, especially equity and mixed funds. Thus, in 2011, investment fund assets remained below their highest level of 2007, when Poland's investment fund companies managed over ZL 144 billion of assets between them, including ZL 63 billion allocated to equities.

Falling prices on the WSE were the key reason for the decline in the value of investment net assets. Since the beginning of 2011, investors have withdrawn over ZL 3.1 billion from mixed funds and ZL 2.8 billion from equity funds. Most investors, however, have decided to allocate some of their money to safer funds such as money market and bond funds. As a consequence of the persistent risk aversion among investors, money market funds reported an inflow of ZL 2.48 billion in 2011, while bond funds welcomed ZL 2.42 billion of new money. A net inflow was also recorded by non-public asset funds.

Table 8
Net assets value growth by investment fund type (in ZL million)

	Equity	Mixed	Bond	Money market
2005	7,271	29,427	10,244	7,465
2006	21,241	54,796	7,508	7,916
2007	44,094	66,040	6,611	8,724
2008	18,070	28,582	10,470	7,533
2009	27,627	32,230	11,072	8,726
2010	32,473	33,624	14,049	14,431
2011	17,611	23,301	11,563	15,691

Source: Analizy Online.

After a two-year period when revenues and earnings were falling, the financial standing of Poland's investment fund companies (TFI) improved significantly in 2011. The improvement in the financial situation of the TFIs was the result of a considerable increase in the value of investment fund assets and, consequently, a rise in the amount of management fees constituting the main source of revenue for TFIs. However, an increase in costs related to the distribution of investment fund units was recorded in 2011; in previous years these costs increased at a slower rate (NBP, 2011).

Pension funds

In 2008, private pension funds in OECD countries lost 23% of their value, or a hefty US$ 5.4 trillion (OECD, 2009). The largest loss of 37.5% was reported in Ireland, while the losses in the Czech Republic, Germany, and Mexico were below 10%. In Poland, pension fund assets declined by close to 15% on average in 2008. In 2011, the assets of Poland's private pension funds declined further, by more than 5%. As a result of these losses, policymakers in many countries including Poland

started paying attention to how private pension funds are managed (Rudolph *et al.*, 2010). However, only a few countries have reformed their pension systems, whereas in many cases the changes resulted in the closure of private pension funds. The most extreme examples were Argentina, Bolivia, and Hungary, which nationalized their private pension funds—Argentina in 2008 and Bolivia and Hungary in 2010. In 2011, the governments in Bulgaria and Poland decided to nationalize their pension systems by redirecting significant parts of the contributions from private funds to the state system. In Poland, a new law in 2011 reduced transfers to private pension funds from 7.3% to 2.3% of employees' gross salary, and increased funding to the state-owned pension system by the same extent.

The state-owned pension system is a reformed pay-as-you-go plan based on mandatory contributions to a public social security program designed to alleviate poverty. The reformed plan is based on the old pension system, and the managing institution is the state-run Social Insurance Institution (ZUS). All employees have individual accounts at ZUS, but these are virtual accounts. Employees' contributions to these accounts are not invested but increase yearly at a rate set by the state. Like the old system, social benefits are only guaranteed by the state. However, the eurozone crisis of 2010-2011, caused by increased public debt problems in some EU member states, revealed the risk of state guarantees.

Poland's pension system is supplemented by a second pillar based on mandatory funding and open pension funds (OFE) that are managed by private pension fund companies (PTEs). At the end of December 2011, OFE assets reached a record ZL 226 billion. As Table 9 shows, however, the return on OFE units was -4.7% in 2011. Consequently, the increase in OFE assets was exclusively due to member contributions. At the same time, pension fund companies reported an increase in profits and profitability ratios in 2011. This means that OFE assets do not guarantee profitability for the PTEs, since over 90% of their revenue depends on the value of assets managed and the number of members. In 2011, asset management fees accounted for 45% of the PTEs' revenue on average, while up-front fees from members contributed 39% of the revenue. While the up-front fee was important in the early years, its role is now diminishing as OFE assets grow.

PTEs gain new members in two principal ways. First, every month new employees join pension funds. Second, participants are allowed to change pension funds. However, if they do that in the first two years after joining a fund, they must pay a penalty fee. Hence, changing PTEs is not very popular, as members are not sensitive to the return on invested assets (Kowalewski, 2010). At the same time, the number of future pensions accumulated depends on an OFE's asset return and member contributions. At the moment, employees transfer only 2.3% of their gross salaries to OFEs.

The risk related to future pensions is therefore borne by pension fund members. PTEs only bear financial risk when they underperform relative to their sector's benchmark, which is based on a three-year adjusted average return for all funds. By

introducing a penalty for underperformance, the regulators tried to provide security to pension fund members so that the return on an OFE's assets does not fall significantly below those achieved by their peers. This rule, however, resulted in a "herding" effect among pension funds (Kominek, 2006). Moreover, restrictions on the composition of pension fund portfolios, especially on investments in foreign markets, result in similar asset compositions among funds.

Table 9

The profitability and assets of pension fund companies (PTE) and open pension funds (OFE)

	PTE		OFE	
	Net profit	ROE	Assets	Unit Return
2005	460.8	23.9%	85,925	15.0%
2006	604.5	27.2%	116,216	16.4%
2007	696.3	28.3%	139,594	6.2%
2008	730.9	23.9%	138,206	–14.2%
2009	762.3	23.7%	179,040	13.7%
2010	598.0	17.3%	221,462	11.2%
2011	616.0	19.4%	226,204	–4.7%

Source: National Bank of Poland and Polish Financial Supervisory Authority.

Since 2010, the investment strategy of pension fund management companies has not changed significantly. Most OFE assets have been invested in domestic government securities, accounting for more than 50% of OFE investment portfolios. The fall in the prices of shares in companies listed on the WSE in the second half of 2011 contributed to a decrease in the role of equities in OFE investment portfolio and was also responsible for a negative return on the value of OFE units at the end of the year.

The high profitability of the PTEs and the losses reported by the OFEs prompted the government to partially nationalize private pension funds in 2011. The reform significantly reduced transfers to private pension funds. Officially, the goal was to increase the return on investment in pension funds and, consequently, the value of their assets. While the reform helped the government lower the public debt, it did not improve the performance of Poland's private pension funds. Moreover, the reform may have a negative impact on the development of the WSE, because OFE pension funds were a driving force behind the development of Poland's capital market in the past.

The reduction in contributions to private pension funds will not be offset by the voluntary employee pension system, which was expected to take a large part of the responsibility for providing social security in the future. This part of the pension system remains insignificant in Poland and its assets accounted for less than 2% of the GDP at the end of 2011.

Conclusions

While Poland's banking system remains stable and well buffered, credit demand and quality represent the most immediate risks for the development and profitability of Polish banks in 2012. The proportion of non-performing loans is expected to rise further with slower economic activity and higher unemployment. Moreover, the slowdown of economic activity may have a negative effect on demand for loans in the near future. This, in turn, is bound to have a negative impact on banking sector profitability.

However, access to credit will likely still depend mainly on what happens abroad, because Poland's banking system is predominately foreign-owned. In addition, changes in regulations and the ownership structure of the banking sector may further restrict access to capital in Poland in the near future. Hence, with the prospect of reduced intermediation through banks, it should be a matter of priority to foster further development of Poland's capital market. The equity market has been growing in terms of market capitalization with an increasing number of IPOs in the last several years. Moreover, the corporate market has grown dramatically recently, especially since the introduction of the Catalyst market. However, the market remains shallow and its corporate governance standards are weak, while WSE management's actions are insignificant. As a consequence, the failure of companies and defaults on the bond market may soon have a negative impact on the development of Poland's capital market.

The development of the capital market has been weakened by changes in the pension system that have affected contributions to private pension funds. As a result, much remains to be done, because the imperfections of the financial system may constrain future economic growth and Poland's competitive position, while the scope for potential financial development remains huge.

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4.3. Quality of Business Environment

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Over the past quarter of a century, global ranking lists of economies, which measure the impact of the institutional environment on doing business, have become a serious transnational instrument of regulation. While these lists are not and cannot be "objective" and are subject to criticism and various periodic modifications, they remain ideological benchmarks for local public bureaucracies, the media and academic lobbies in the realm of economic reform, public relations and image management.

In this assessment of the quality of Poland's business environment and its role in shaping the country's competitiveness, we rely on two key sources: the Heritage Foundation and the World Bank. We leave the methodological and technical aspects of various compilations for the reader to look up in the works referenced below.

The quality of the business environment as an aspect of economic freedom

The Index of Economic Freedom (18th edition) is compiled by the Heritage Foundation/Wall Street Journal/Dow Jones and Co. (Center for International Trade and Economics). The Heritage Foundation score is based on around 50 variables packaged in 10 detailed freedoms: business freedom, trade freedom, fiscal freedom, government size, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, and labor freedom. The Index of Economic Freedom is a gross indicator and each factor is graded according to a unique scale. The scale runs in percentages from 0 (policies/environment least conducive to economic freedom) to 100 (most conducive).

In 2012, the average indicator of economic freedom in the world as a whole (184 countries) was 59.5%, down by 0.2% from 2011. The Polish business environment as approximated by the index was 64.2% and was ranked 64th (Table 10).

Table 10
Poland's position in the Heritage Foundation ranking of economic freedom

Year	'95	'96	'97	'98	'99	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12
Poland's rank	76	73	80	75	79	75	67	51	66	80	77	84	90	83	82	71	68	64

Source: Heritage Foundation.

Table 11
Overall score of economic freedom for Poland and its neighbors; Heritage Foundation

Year	Poland	Czech Republic	Estonia	Lithuania	Latvia	Slovakia	Hungary	Ukraine	Average 6 EU neighbors
2012	64.2	69.9	73.2	71.5	65.2	67.0	67.1	46.1	67.0
2011	64.1	70.4	75.2	71.3	65.8	69.5	66.6	45.8	69.8
2010	63.2	69.8	74.7	70.3	66.2	69.7	66.1	46.4	69.5
2009	60.3	69.4	76.4	70.0	66.6	69.4	66.8	48.8	69.8
2008	59.5	68.5	77.8	70.8	68.3	68.7	67.2	51.0	70.2
2007	57.4	67.8	78.0	71.5	68.3	68.4	64.4	51.5	69.7
2006	58.6	66.8	74.9	71.8	67.2	68.7	64.7	54.4	69.0
2005	58.8	64.9	75.1	70.5	66.4	65.6	63.2	55.8	67.6
2004	58.7	67.0	77.4	72.4	67.4	64.6	62.7	53.7	68.6
2003	61.8	67.5	77.7	69.7	66.0	59.0	63.0	51.1	67.1
2002	65.0	66.5	77.6	66.1	65.0	59.8	64.5	48.2	66.6
2001	61.8	70.2	76.1	65.5	66.4	58.5	65.6	48.5	67.1
2000	60.0	68.6	69.9	61.9	63.4	53.8	64.4	47.8	63.7
1999	59.6	69.7	73.8	61.5	64.2	54.2	59.6	43.7	63.8
1998	59.2	68.4	72.5	59.4	63.4	57.5	56.9	40.4	63.0
1997	56.8	68.8	69.1	57.3	62.4	55.5	55.3	43.5	61.4
1996	57.8	68.1	65.4	49.7	55.0	57.6	56.8	40.6	58.8
1995	50.7	67.8	65.2	–	–	60.4	55.2	39.9	–

Source: *Index of Economic Freedom*, Heritage Foundation. Reports for years 1995–2012 accessed Feb. 23, 2012. www.heritage.org.

The rankings show that Poland has always been in the middle of the pack in the race for reform. Poland's score has consistently been worse than the average for North America and Europe. It has also been lower than the scores for countries neighboring

Poland. Since 2007, an upward trend has been observed but this year's indicator has not yet caught up with its high mark in 2002. Table 11 shows the general trends in relative changes of the assessment of Poland's business environment. It shows a tilde-like pattern (~): rising steadily from 1995 to 2002, falling between 2002 and 2007, and rising ever since.

The individual freedoms are rated differently. The results for the last 18 years are summarized in Table 12.

Table 12

Poland: overall and partial indicators of economic freedom according to the Heritage Foundation

Yr	1	2	3	4	5	6	7	8	9	10	11
	IEF	Business freedom	Trade freedom	Fiscalism freedom	Big govt freedom	Monetary freedom	Investor freedom	Financial freedom	Property rights freedom	Freedom from corruption	Employer freedom
2012	64.20	61.40	87.10	74.40	40.30	79.10	65.00	60.00	60.00	53.00	61.30
2011	64.10	61.40	87.6	74.0	43.80	78.10	65.00	60.00	60.00	50.00	61.20
2010	63.21	62.20	87.48	74.93	46.83	78.15	60.00	60.00	55.00	46.00	61.53
2009	60.32	53.66	85.80	68.97	42.18	80.82	60.00	60.00	50.00	42.00	59.81
2008	60.29	54.24	86.00	68.56	43.49	82.26	60.00	60.00	50.00	37.00	61.32
2007	58.11	55.32	86.60	68.63	44.79	80.35	50.00	50.00	50.00	34.00	61.39
2006	59.29	56.51	82.40	68.69	39.52	79.61	50.00	70.00	50.00	35.00	61.19
2005	59.61	70.00	79.20	68.35	30.30	82.27	50.00	70.00	50.00	36.00	59.99
2004	58.73	70.00	70.40	64.88	35.13	78.13	50.00	70.00	50.00	40.00	–
2003	61.82	70.00	70.20	65.60	46.07	73.51	50.00	70.00	70.00	41.00	–
2002	65.01	70.00	78.80	65.27	49.57	70.43	70.00	70.00	70.00	41.00	–
2001	61.82	70.00	77.60	61.30	44.53	70.93	70.00	50.00	70.00	42.00	–
2000	59.95	70.00	74.80	58.08	33.73	66.95	70.00	50.00	70.00	46.00	–
1999	59.62	70.00	73.00	53.25	35.97	63.58	70.00	50.00	70.00	50.80	–
1998	59.23	70.00	73.00	51.62	33.16	59.61	70.00	50.00	70.00	55.70	–
1997	56.79	70.00	49.60	49.46	26.79	55.23	70.00	50.00	70.00	70.00	–
1996	57.78	70.00	57.00	47.99	32.60	52.41	70.00	50.00	70.00	70.00	–
1995	50.70	70.00	57.00	51.01	09.58	48.71	70.00	50.00	50.00	50.00	–

Source: *Index of Economic Freedom*, Heritage Foundation, as above.

During the analyzed period, policy aspects improved the Polish score. Institutional features tend to be seen as a burden for business and keep its overall score below that of its neighbors. However, the fall in property rights protection seems to have been reversed, and the continually low level of fiscalism is positively rated.

Environmental quality when doing business

A more disaggregated presentation of the qualitative aspects of Poland's business environment can be found in data compiled as part of the *Doing Business* project (Table 13). The summary characteristics of the Polish business environment rank it 62nd worldwide (up from 70th in 2011 and 72nd in 2010).

Table 13
Ratings of European Union member countries according to Doing Business 2012

Country	Position	Country	Position	Country (post-socialist countries)	Position
Singapore	*1*	Germany	19	Georgia	16
Hong Kong	*2*	Switzerland	26	Latvia	21
New Zealand	*3*	Belgium	28	Macedonia	22
Denmark	4	France	29	Estonia	24
Norway	6	Portugal	30	Lithuania	27
Great Britain	8	Holland	31	Slovenia	37
Iceland	9	Austria	32	Kazakhstan	47
Ireland	13	Cyprus	40	Slovakia	48
Finland	14	Spain	44	Hungary	51
Sweden	22	Luxembourg	50	Armenia	55

Source: *Doing Business*, World Bank, http://www.doingbusiness.org/ .

Table 14 shows details of the perception of the Polish institutional setup. The World Bank league table confirms Poland's last place in the region, behind Bulgaria and Montenegro. Poland has also been ranked among the bottom 15 countries in terms of progress shown, behind Uzbekistan but ahead of Nicaragua.

Table 14

Polish business environment indicators according to the World Bank's Doing Business in 2008, 2010 and 2012

Indicator	Poland 2008	Poland 2011	Poland 2012	Czech Republic 2012	Lithuania 2012	Poland's rank in 2012 (2011)
1. Starting a business	–	–	–	–	–	126 (113)
Procedures (number)	10	6	6	9	6	–
Time (days)	31	32	32	24	22	–
Cost (% of income per capita)	21.2	17.5	17.3	8.4	2.8	–
Min. capital (% of income per capita)	196.8	14.7	14.0	30.7	35.7	–
2. Dealing with permits	–	–	–	–	–	160 (164)
Procedures (number)	30	32	30	33	15	–
Time (days)	308	311	301	120	142	–
Cost (% of income per capita)	159.8	124.2	536	109	25.5	–
3. Employing workers	–	–	–	–	–	– (76)
Difficulty of hiring	11	11	–	–	–	–
Rigidity of hours index	60	33	–	–	–	–
Difficulty of redundancy	40	30	–	–	–	–
Rigidity of employment	37	25	–	–	–	–
Cost of hiring (% of wages)	21		–	–	–	–
Cost of redundancy (weeks of salary)	13	13	–	–	–	–
4. Registering property	–	–	–	–	–	89 (86)
Procedures (number)	6	6	6	4	3	–
Time (days)	197	152	152	25	3	–
Cost (% of property value)	0.5	0.4	0.4	3.0	0.8	–
5. Getting credit						8 (15)
Strength of legal rights	4	9	8	6	5	–
Depth of credit information	4	4	9	5	6	–
Public registry coverage (% of adults)	0	0	0	6.1	15.0	–
Private registry coverage (% of adults)	51.5	91.7	74.8	95.7	75.6	–
6. Protecting investors	–	–	–	–	–	46 (44)
Extent of disclosure	7	7	7	2	7	–
Extent of director liability	2	2	2	5	4	–
Ease of shareholder suits	9	9	9	8	6	–
Strength of investor protection	6.0	6	6.0	5.0	5.7	–

Indicator	Poland 2008	Poland 2011	Poland 2012	Czech Republic 2012	Lithuania 2012	Poland's rank in 2012 (2011)
7. Paying taxes	–	–	–	–	–	128 (121)
Payments (number per year)	41	29	29	8	11	–
Time (hours per year)	418	325	296	557	175	–
Total tax rate (% of profit)	38.4	42.3	43.6	49.1	44.9	–
8. Trading across borders	–	–	–	–	–	46 (49)
Documents to export (number)	5	5	5	4	6	–
Cost to export (US$ per container)	834	884	1050	1060	870	–
Time to export (days)	17	17	17	17	9	–
Documents to import (number)	5	5	5	7	6	–
Cost to import (US$ per container)	834	884	1000	1165	890	–
Time to import (days)	27	25	16	20	9	–
9. Enforcing contracts	–	–	–	–	–	68 (77)
Procedures (number)	38	38	37	27	30	–
Time (days)	830	830	830	611	275	–
Cost (% of claim)	10	12	12	33,0	23,6	–
10. Closing a business	–	–	–	–	–	(81)
Time (years)	3.0	3.0	–	–	–	–
Cost (% of estate)	22	20	–	–	–	–
Recovery rate (cents on the dollar)	27.8	31.3	–	–	–	

Source: *Doing Business*, World Bank, http://www.doingbusiness.org/ ; accessed March 23, 2012.

Among the eight aspects covered by the ranking (hiring and firing, electric energy security, and business closing were excluded in 2012), Poland moved up on four counts and went down on four. In none of the aspects was Poland listed among the most improved economies.

Corruption Index

Ethics in business is a regular component of institutional quality rankings. Table 15 provides illustrative data in this area compiled by the NGO Transparency International. The scale runs from 0 to 10; 10 is the maximum score indicating a corruption–free environment.

Table 15
Corruption Perception Index (CPI) according to Transparency International; rank in brackets

Year	Denmark	Czech Republic	Estonia	Lithuania	Latvia	Slovakia	Hungary	**Poland**
1999	10.0 (1)	4.6 (39)	5.7 (27)	3.8 (50)	3.4 (58)	3.7 (53)	5.2 (31)	**4.2 (44)**
2000	9.8 (2)	4.3 (42)	5.7 (27)	4.1 (43)	3.4 (57)	3.5 (52)	5.2 (32)	**4.1 (43)**
2001	9.5 (2)	3.9 (47)	5.6 (28)	4.8 (38)	3.4 (59)	3.7 (51)	5.3 (31)	**4.1 (44)**
2002	9.5 (2)	3.7 (52)	5.6 (29)	4.8 (36)	3.7 (52)	3.7 (52)	4.9 (33)	**4.0 (45)**
2003	9.5 (3)	3.9 (54)	5.5 (33)	4.7 (41)	3.8 (57)	3.7 (59)	4.8 (40)	**3.6 (64)**
2004	9.5 (3)	4.2 (51)	6.0 (31)	4.6 (44)	4.0 (57)	4.0 (57)	4.8 (42)	**3.5 (67)**
2005	9.5 (4)	4.3 (47)	6.4 (27)	4.8 (44)	4.2 (51)	4.3 (47)	5.0 (40)	**3.4 (70)**
2006	9.5 (4)	4.8 (46)	6.7 (24)	4.8 (46)	4.7 (49)	4.7 (49)	5.2 (41)	**3.7 (61)**
2007	9.4 (1)	5.2 (41)	6.5 (28)	4.8 (51)	4.8 (51)	4.9 (49)	5.6 (39)	**4.2 (61)**
2008	9.3 (1)	5.2 (45)	6.6 (27)	4.6 (58)	5.0 (52)	5.0 (52)	5.1 (47)	**4.6 (58)**
2009	9.3 (2)	4.9 (52)	6.6 (27)	4.9 (52)	4.5 (56)	4.5 (56)	5.1 (46)	**5.0 (49)**
2010	9.3 (1)	4.6 (53)	6.5 (26)	5.0 (46)	4.3 (59)	4.3 (59)	4.7 (50)	**5.3 (41)**
2011	9.4 (2)	4.4 (57)	6.4 (29)	4.8 (50)	4.2 (61)	4.0 (66)	4.6 (54)	**5.5 (41)**

Source: Transparency International, http://www.transparency.org/policy_research/surveys_indices/cpi, accessed Feb. 23, 2012.

Among the post-socialist countries not included in the table, only Slovenia appeared regularly in the top 30. Polish corruption has shown a U pattern, moving toward a more corruption environment after several years of backsliding. One hypothesis suggests this should be attributed to the nature of the ruling party and the overall political atmosphere.

Global Competitiveness Index

Among the competitiveness indices produced by the World Bank in association with the World Economic Forum, we will focus on the first pillar of the Global Competitiveness Index (GCI).

The GCI is a weighted average of several dozen variables grouped in 12 "pillars" of competitiveness. Institutions are listed as the No. 1 factor. The institutional aspects taken into account include: transparency of government policy-making, efficacy of corporate boards, wastefulness of government spending, organized crime, business costs of terrorism, burden of government regulation, property rights, efficiency of legal framework, public trust of politicians, business costs of crime and violence, protection

of minority shareholders' interests, judicial independence, reliability of police services, strength of auditing and reporting standards, diversion of public funds, intellectual property protection, favoritism in decisions of government officials, ethical behavior of firms, and (added or moved from other blocks in 2012) corruption level and investor protection.

Table 16

Global Competitiveness Index (GCI): Poland and other post-socialist countries in 2007–08, 2009–10, 2010–11, and 2011–12 (for 133, 133, 139 and 142 countries classified respectively)

Country	Rank 2007–08	Rank 2009–10	Rank 2010–11	Rank 2011–12	Country	Rank 2007–08	Rank 2009–10	Rank 2010–11	Rank 2011–12
Switzerland	*2*	*1*	*1*	*1*	Georgia	90	90	93	88
Estonia	27	35	33	33	Tajikistan	117	122	116	105
Slovenia	39	37	45	57	Romania	74	64	67	77
Hungary	47	58	52	48	Armenia	93	97	98	92
Uzbekistan	–	–	–	–	Serbia	91	93	96	95
Lithuania	38	53	47	44	Macedonia	94	84	79	79
Latvia	45	68	70	64	Moldova	97	–	94	93
Slovakia	41	47	60	69	Bulgaria	79	76	71	74
Croatia	57	72	77	76	Bosnia & Herzegovina	106	109	102	100
Czech Republic	33	31	36	38	Albania	109	96	88	78
Montenegro	82	62	49	60	Ukraine	73	82	89	82
Kazakhstan	61	67	72	72	Russia	58	63	63	66
Poland	**51**	**46**	**39**	**41**	Mongolia	101	117	99	96
Azerbaijan	66	51	57	55	Kyrgyz Republic	119	123	121	126

Source: http://www.weforum.org/en/initiatives/gcp/Global%20Competitiveness%20Report/index.html. accessed 19.03.2008. 02.01.2010 26.02.2011

Poland, among some other post-socialist economies, is classified as graduating from the second to the third stage of growth (where efficiency is being replaced by innovation as the primary driver). Since 2007, Poland has made progress among the new members, and is only behind Estonia and the Czech Republic today. The ratings of the post-socialist economies are notably worse in the institutional pillar than their overall ranking. Poland's improved results (Table 17) raised its rank to 52nd, behind Estonia and Montenegro.

Table 17

The first pillar of global competitiveness: institutions in Poland and other post-socialist countries (2007–08, 2009–10, 2010–11, and 2007–2012)

Country	Rank 2007–08	Rank 2009–10	Rank 2010–11	Rank 2010–11	Country	Rank 2007–08	Rank 2009–10	Rank 2010–11	Rank 2011–12
Singapore	*1*	*1*	*1*	*1*	Georgia	86	72	69	60
Estonia	34	31	31	29	Tajikistan	88	81	77	63
Slovenia	44	46	50	55	Romania	94	84	81	99
Hungary	54	76	79	73	Armenia	96	95	97	83
Uzbekistan	56	–		–	Serbia	99	110	120	121
Lithuania	58	59	60	62	Macedonia.	102	83	80	81
Latvia	59	65	75	66	Moldova	105	–	102	106
Slovakia	60	78	89	101	Bulgaria	109	116	114	110
Croatia	65	85	86	90	Bosnia & Herzegovina	113	128	126	109
Czech Rep.	69	62	72	84	Albania	114	87	63	57
Montenegro	78	52	45	42	Ukraine	115	120	134	131
Kazakhstan	80	86	91	94	Russia	116	114	118	128
Poland	**82**	**66**	**54**	**52**	Mongolia	120	121	122	119
Azerbaijan	83	55	71	68	Kyrgyz Republic	127	124	131	136

Source: http://www.weforum.org/reports/global-competitiveness-report-2011-2012 accessed Feb. 23, 2012.

A more precise dissection of the institutional environment (21 aspects in Table 18) reveals low trust in politicians, favoritism, wastefulness and impotence of legal protection, apart from the volatility of ratings. Nevertheless, Poland's position has deteriorated in only two aspects: burden of state regulations and legal protection.

Table 18
The first pillar of global competitiveness: institutions in Poland (2007-12)

No.	Item	07–08	08–09	09–10	10–11	11–12	Czech Rep.	/ Slovakia 2012	/ Lithuania
1	Property rights	90	94	76	59	54	78	/79	/64
2	Intellectual property protection	67	76	64	60	61	58	/54	/73
3	Diversion of public funds	70	72	50	43	44	124	/113	/76
4	Public trust of politicians	81	113	99	82	76	134	/132	/110
5	Bribes and irregular payments				41	39	73	/80	/54
6	Judicial independence	77	73	55	53	53	74	/116	/84
7	Favoritism of decisions of government officials	62	105	64	49	52	123	/135	/58
8	Wastefulness of government spending	102	115	94	76	76	117	/111	/104
9	Burden of government regulation	96	127	111	111	124	120	/115	/111
10	Efficiency of legal framework in settling disputes	89	109	114	106	97	113	/139	/83
11	Efficiency of legal framework in challenging regulation	–	–	106	95	83	108	/138	/63
12	Transparency of government policy making	113	128	127	113	93	96	/86	/46
13	Business costs of terrorism	96	85	69	59	43	16	/20	/14
14	Business costs of crime and violence	81	95	82	50	37	33	/59	/42
15	Organized crime	101	96	77	55	40	56	/92	/41
16	Reliability of police services	77	86	74	60	63	96	/85	/73
17	Ethical behavior of firms	61	47	50	54	53	109	/104	/66
18	Strength of auditing and reporting standards	77	74	60	46	41	48	/74	/47
19	Efficacy of corporate boards	107	101	85	73	79	60	/64	/42
20	Protection of minority shareholders' interests	77	76	62	60	79	87	/95	/89
21	Strength of investor protection	–	–	–	33	36	77	/93	/77

Source: : http://www.weforum.org/reports/global-competitiveness-report-2011-2012 accessed Feb. 23, 2012.

Foreign Direct Investment Confidence Index

As declared by AT Kearney, "the index, which first appeared in 1998, assesses the impact of political, economic, and regulatory changes on the FDI intentions and preferences of the leaders of top companies around the world."

Table 19

FDI attractiveness: Poland compared with other countries

Country	2007	2010	2012	Score 2012 (scale 0-3)
China	1	1	1	1.87
India	2	3	2	1.73
Brazil	6	4	3	1.60
United States	3	2	4	1.52
Germany	10	5	5	1.52
Australia	11	7	6	1.52
Singapore	7	24	7	1.47
Great Britain	4	10	8	1.47
Indonesia	21	19	9	1.45
Malaysia	16	20	10	1.41
South Africa	18	–	11	1.40
Russia	9	18	12	1.39
Turkey	20	23	13	1.39
Vietnam	12	12	14	1.38
UAE	8	11	15	1.38
Thailand	–	–	16	1.37
France	13	13	17	1.37
Taiwan	–	–	18	1.36
South Korea	24	–	19	1.35
Canada	14	9	20	1.34
Japan	15	–	21	1.31
Switzerland	–	–	22	1.30
Poland	22	6	23	1.30
Spain	–	–	24	1.29
Holland	–	–	25	1.27

Source: A.T. Kearney, *Foreign Direct Investment Confidence Index 2012*,
http://www.atkearney.com/index.php/Publications/foreign-direct-investment-confidence-index.html

For the past three years, Poland has been ranked near the top 20. The country's surprising sixth place in 2010 seems to have been the result of a corporate reaction to the global financial crisis.

To sum up, all the reports referred to in this subchapter, regardless of the sometimes faulty methodology applied, frequent doubtful measurements (and possible statistical errors) are in agreement as to the state of the Polish business environment. Poland's position is in the middle of the pack, usually between 40th and 80th place. The picture of Poland emerging from the league tables is consistently worse than that of its post-socialist neighbors, not to mention other EU members. The data on the past three years suggest a somewhat better marketing image, which, we hypothesize, is due to a more optimistic appraisal of the local results of the global financial crisis rather than an institutional breakthrough. The growing GDP, FDI inflow (infrastructure) and some other positive indicators described in other chapters of this report show that individual organizations, both Polish- and foreign-owned, are capable of benefiting from the business environment, despite its imperfections, and that they are in a position to build a competitive advantage.

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PART III

EDUCATION AND POLAND'S COMPETITIVENESS

Chapter 5

Poland's Education System in Transition

5.1. The Functioning of Poland's Education System

Stanisław Macioł

Education plays a key role in the modernization of societies and in building modern and competitive economies. This is reflected in the development strategies and education policies of countries and of groups of countries and international organizations. In individual, personal terms, education increases the chances of finding employment and of increasing the level of income. It also prevents social exclusion, promotes social advancement and fosters self-fulfillment.

This subchapter gives an overview of Poland's education system, including its structure, evolution and legal regulations governing its operations as well as financial expenditure on education. The analysis covers the period after 1995, to make sure that the changes in the education system are not associated primarily with the results of the country's transition to a market economy that began in 1989, and that the attained level of the system's development enables better international comparisons. Education systems in European countries have undergone some fundamental changes over the past decade in connection with the implementation of the objectives of the Lisbon Strategy in education and training, as well as the objectives of the Bologna Declaration in building a European higher education area.

Structure and basis of Poland's education system

Poland's education system is made up of the non-tertiary school system and the higher education system (Figure 1). The current arrangement and functioning of these two systems is regulated by the School System Act of 1991 and the Higher Education Act of 2005 along with subsequent amendments.

The most important part of the education reform was a shortening of the period of schooling in primary school from eight to six years and the introduction of a compulsory three-year lower secondary school beginning the 1999/2000 school year. This level of education did not exist in Poland previously. In 1999, a new administrative division of the country was also introduced and the management of education was decentralized.

In further changes, in the 2002/2003 school year, the first lower secondary school graduates went to vocational schools, general secondary schools and technical secondary schools.

Education in general secondary schools was shortened from four to three years, and in technical secondary schools from five to four years. Three-year specialized secondary schools (vocational secondary schools) were also introduced. These three types of secondary schools enable young people to take graduation exams to obtain a matriculation certificate (*matura*) that entitles them to enroll in a higher education institution.

In the 2004/2005 school year, two-year complementary general secondary schools and three-year complementary technical secondary schools began operating; they are intended for graduates of two- or three-year basic vocational schools. Beginning Sept. 1, 2005, a new range of post-secondary non-tertiary schools was launched for both young people and adults, including those undergoing special education. These schools replaced the previous post-secondary and upper post-secondary schools.

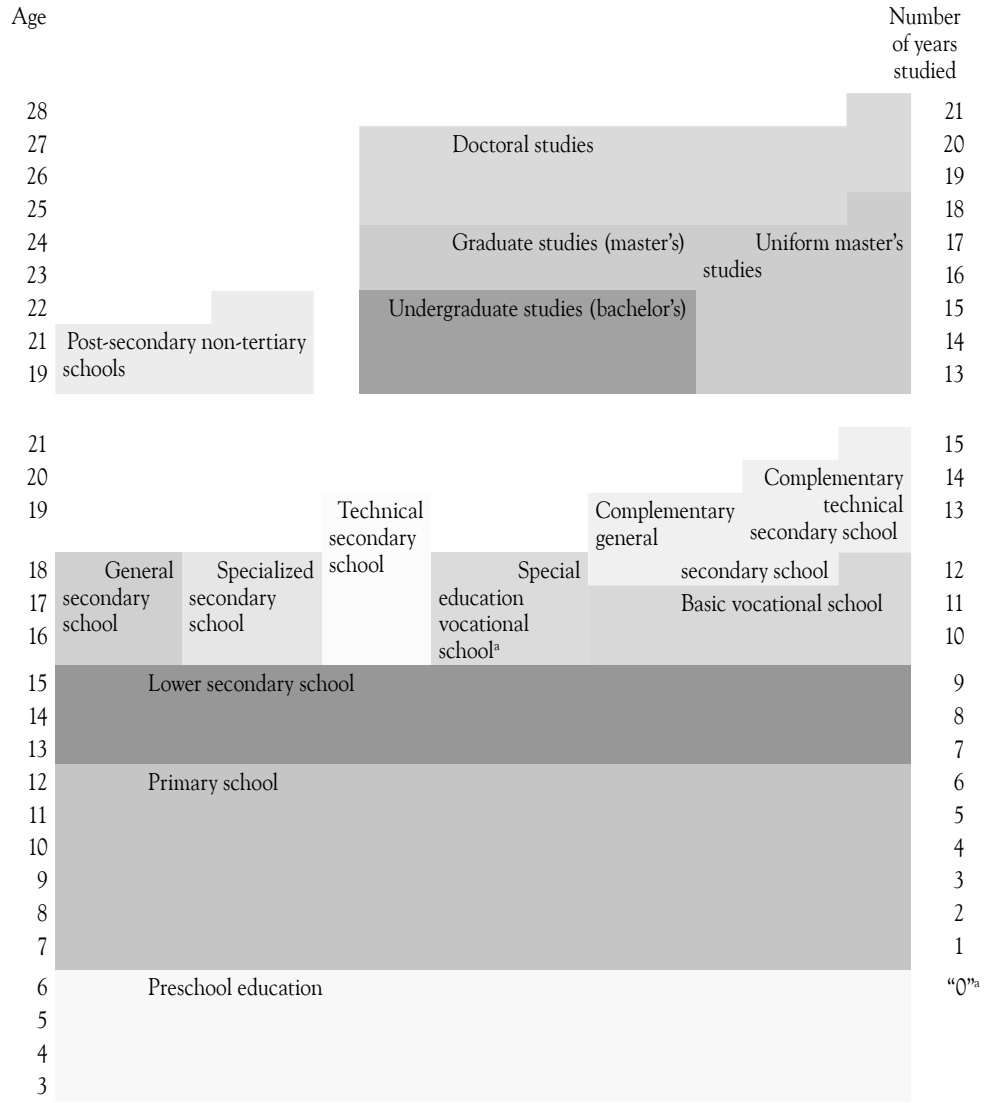
Changes in the higher education system began with the Higher Education Act of Sept. 12, 1990, which enabled the establishment of private universities and allowed state-run universities to charge tuition fees for part-time studies. The law on vocational colleges, dated June 26, 1997, introduced a new type of institution to provide training at undergraduate level to those studying to work in specific professions.

The regulations contained in the laws of 1990 and 1997 were replaced by the aforementioned Higher Education Act of 2005, which adapted Poland's education to the principles of the so-called Bologna Process. The Higher Education Act was amended on March 18, 2011, and its provisions will determine the development of science and higher education over the next decade. The aim of the changes is to markedly improve the quality of education, boost innovation and increase the effectiveness of research in order to make Poland's higher education system and science competitive internationally. This is expected to be achieved by guaranteeing autonomy for universities in shaping their course curricula and in managing their own resources, accompanied by new rules for financing (including subsidies depending on the services they provide, and the use of open competitions). The establishment of a special fund is recommended to promote quality in education by co-financing the best university departments with Leading National Scientific Center status (granted for five years following a competition). Finally, greater emphasis should be placed on the results achieved by universities and their ties with business.[1] From now on, the

[1] A broader analysis of these changes can be found in subchapter 6.1. of this report.

universities themselves will be responsible for their results, as Peter F. Drucker (1999, p. 170) put it.

Figure 1
Structure of Poland's education system



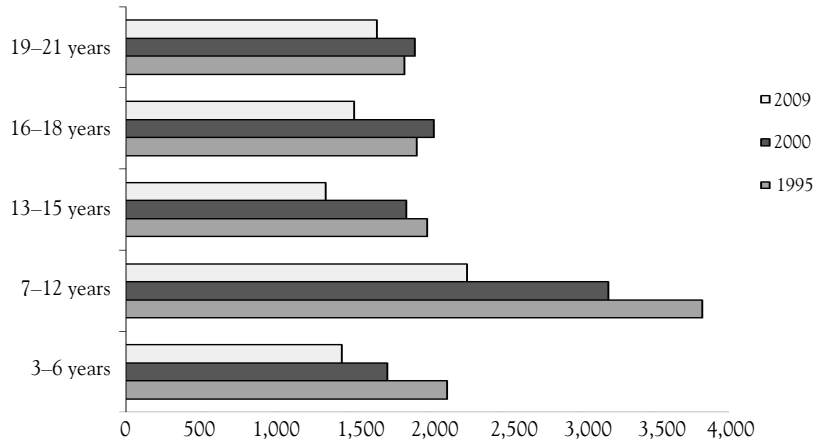
[a] Since Sept. 1, 2004, children at the age of 6 have been subject to mandatory year-long preschool education, referred to as "grade zero."

Source: Own elaboration.

Overall, the structure of Poland's education system is similar to those in other countries in Europe. This is shown by the compatibility of Poland's education system with the International Standard Classification of Education (ISCED), which is used in international education comparisons.

Selected characteristics of individual levels of education

Figure 2
Children and young people aged 3–21 in Poland in 1995–2009 (in thousands)



Source: Based on GUS data (2010b), p. 117.

Poland's education system is modern in terms of the way in which it is organized. The system ensures: advancement (the possibility of moving to a school with a higher level of education), universality of preschool education (especially for six-year-olds), and access to education and the use of a diverse range of programs for persons with disabilities. Moreover, there is no selection threshold at the primary school level. Schools at all levels are generally well computerized.[2] The private sector takes part in education along commercial rules. As a result, schools are divided into public (run

[2] GUS data show that the number of computers, including those with internet access, is steadily increasing in schools. In the 2009/2010 school year, the number of students per computer in individual types of schools was as follows: primary school—10 students (urban areas—15, rural areas—7); lower secondary school—12 (urban areas—14, rural areas—10), basic vocational school—15.4; technical secondary school—6.8; specialized secondary school—7; general secondary school—9.8 (GUS, 2010b, pp. 95–97). Universities had a total of 88,400 computers, including 85,900 with internet access. The availability of computers for use by students improved: there were 21 students per computer on average and 22 students per computer with internet access; in the 2005/2006 school year the figures were 28 and 38 respectively (GUS, 2010a, p. 38).

by the central government and local governments), non-public and non-public with public school status (granted by the education minister). Primary and lower secondary schools can only be public schools or non-public schools with public school status.

Since 1995 the development of Poland's education system has been strongly determined by demographic factors. a drastic decline of the population has been recorded in all age groups among children and young people (Figure 2). This was one of the factors that made it easier to introduce the education reform and improve the conditions of instruction.

Preschool education

In Poland, preschool education covers children aged 3–6 and is conducted in preschools and preschool divisions of primary schools, and since the 2008/2009 school year also in preschool education institutions and preschool centers (for children aged 3–5). Beginning with the 2004/2005 school year, six-year-old children were covered by a compulsory annual preschool preparatory program, carried out in either a preschool or a preschool division of primary school.

Over the past decade, the number of preschool education facilities has increased by only 260. In the 2009/2010 school year, there were over 18,000 preschool education facilities nationwide, with significant differences between urban and rural areas. In urban areas, the number of facilities has increased by nearly 1,100 over the past decade, while in the countryside it has fallen by more than 800. In urban areas, preschools dominate among preschool education facilities, while in rural areas preschool divisions of primary schools are in prevalence (Table 1).

Table 1

Preschool education facilities in the 2000/2001 and 2009/2010 school years

Centers	Total		Urban areas		Rural areas	
	2000/01	2009/10	2000/01	2009/10	2000/01	2009/10
Preschools	8,501	8,441	5,386	5,609	3,115	2,832
Preschool education institutions	x	112	x	8	x	104
Preschool centers	x	707	x	161	x	546
Preschool divisions of primary schools	9,502	9,003	1,379	2,073	8,123	6,930
Total	18,003	18,263	6,765	7,851	11,238	10,412

Source: Based on GUS data (2006), pp. 66–68, (2010b), pp. 147–148.

Despite an increased number of children covered by preschool education (994,000 in 2009/2010, 75,000 more than a year earlier), the percentage of children attending preschool education facilities is relatively low, especially in rural areas and in the 3–4 age group. The situation is better among six-year-olds. In urban areas, over 99% of six-year-old children pursue the compulsory "zero" level education program; the figure for the countryside is nearly 81%.

Table 2

Percentage of children covered by preschool education in the 2009/2010 school year by age and place of residence

Age of children	Urban areas	Rural areas
3 years	62.7	22.0
4 years	76.6	34.4
5 years	88.3	56.5
6 years	99.2	80.7

Source: Based on GUS data (2010b), p. 54.

The preschool education participation indicator in Poland, measured by the proportion of children covered by preschool education and aged between four years and the compulsory starting school age, is a far cry from the European Union average.

In 2008, the indicator for Poland was 67.5% (up from 58.3% in 2000), while in EU countries on average the figure was 92.3% (100% in France; and 99.5% in Belgium and the Netherlands). The benchmark—or reference level—adopted for Europe shows that by 2020 at least 95% of children aged between four and the compulsory starting school age should have taken part in preschool education (European Commission, 2011, p. 1). Poland has a chance to clearly improve its preschool education penetration indicator because children aged five are now covered by compulsory preschool education, while six-year-olds can attend the first grade of primary school together with seven-year-olds.

Compulsory primary and upper secondary education

In Poland, compulsory education for children starts at the beginning of the school year in the calendar year in which the child turns seven, and continues until the child finishes lower secondary school, but no longer than until the student turns 18.

In the 2001/2002–2010/2011 period, the population of primary school students and graduates as well as teachers decreased by almost 30%. At the same time, the number of schools shrank by more than 1,900, or about 12%. Schools are being closed mainly in small towns where there are too few children of school age and the costs of

operating schools are disproportionately high in relation to the financial capabilities of local governments.

Table 3

Students, graduates and teachers in primary and lower secondary schools in the period from the 2001/2002 school year to the 2010/2011 school year

Type of school	Schools		Students (in thousands)		Graduates (in thousands)		Teachers[a] (in thousands)	
	2001/02	2010/11	2001/02	2010/11	2001/02	2009/10	2001/02	2010/11
Primary school	15,836	13,922	3,105.1	2,191.7	548.3	395.0	242.4	176.3
Lower secondary school	6,423	7,278	1,743.1	1,261.4	573.5	438.4	123.9	109.4

[a] In terms of full-time employees; including schools for adults.

Source: Based on GUS data (2004a), pp. 232–233, (2011a), pp. 234–235.

In the same period, the number of students in lower secondary schools decreased by 27.6%, the number of graduates fell by 23.6%, and the number of teachers dropped by 11.7%. The lower student population, accompanied by an increase in the number of lower secondary schools by 855 (or 13.3%), had a positive effect on improved educational conditions in these schools.

Notably, the network of lower secondary schools does not match the network of primary schools; it is far less dense. Because lower secondary schools are often far from where their students live, a substantial proportion of students commute to their lower secondary schools. In the 2009/2010 school year nearly one in four students had to commute, and students from rural areas accounted for nearly 70% of those commuting (GUS, 2010a, pp. 206, 214). In the context of the quality of teaching, problems with commuting have called into question the very decision to establish lower secondary schools at the expense of shortening education in primary school by two years and in secondary school by one year.

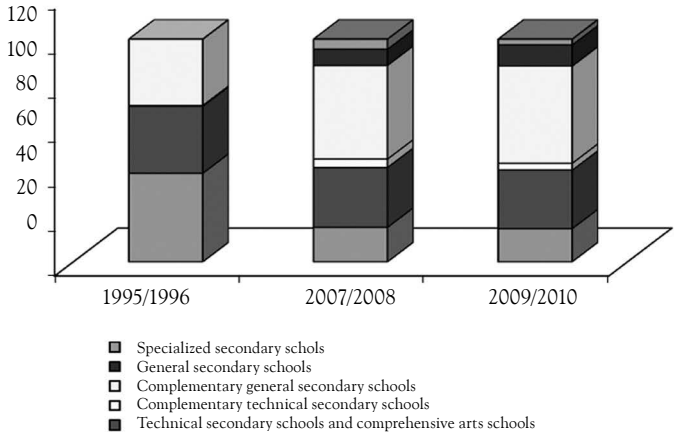
Education at the upper secondary school level

The new system of education, and chiefly the changes that took place in the Polish economy in the last decade of the 20th century, had a major influence on changes in the structure of education at the upper secondary school level. In the 1995/1996–2009/2010 period, in the distribution of students in grade one of upper secondary

schools, the proportion of students from basic vocational schools decreased from 39.8% to 14.9%. The proportion of students from technical secondary schools fell from 30.1% to 26.3%, while the proportion of students from general secondary schools increased from 29.1% to 43.7%, and the proportion of students from complementary secondary schools grew to 9.5%. In the last three years, the structure of grade-one students has been relatively stable.

Figure 3

Structure of students in grade one of upper secondary schools (not including special education schools) in the 1995/1996–2009/2010 period



Source: Based on GUS data (2010b), p. 62.

Among upper secondary schools, general secondary and technical secondary schools dominate. In the 2010/2011 school year, they numbered 2,360 and 2,102, respectively. Basic vocational schools, numbering over 1,760, make up another sizeable group. As a result of the education reform, beginning with the 2002/2003 school year, more than 1,500 specialized secondary schools were launched, of which only 438 are still in operation. From the very beginning of their existence, specialized secondary schools failed to attract the interest of young people, so the number of these schools is shrinking rapidly. The number of complementary technical secondary schools is also falling, as is the number of students attending these schools, while the number of vocational special education schools is rising, along with the number of students attending these schools (Table 4).

Table 4

Upper secondary schools, their students and teachers in the 2005/2006–2010/2011 period

Type of school	Schools		Students (in thousands)		Teachers[a] (in thousands)	
	2005/06	2010/11	2005/06	2010/11	2005/06	2010/11
Vocational special education school	286	428	4.8	9.8	12.4[b]	17.2[b]
Basic vocational school	1,778	1,763	232.5	224.9		
Technical secondary school	2,668	2,102	520.2	545.1	36.8[b]	49.7[b]
Complementary technical secondary school	234	102	8.2	3.6		
Comprehensive arts schools [c]	99	115[d]	13,2	12.8	1.3	
General secondary school	2,485	2,360	735.7	632.3	47.2[b]	50.3[b]
Complementary general secondary school	87	87	2.9	2.1		
Specialized secondary school	1,530	438	202.2	34.3	11.0[b]	2.9[b]
Post-secondary non-tertiary school	3,731	2,941	313.5	298.8	10.8	7.9

[a] in terms of full-time employees; in the 2005/2006 school year, not including teachers working in groups of schools
[b] including schools for adults
[c] providing their graduates with certified professional qualifications
[d] in addition to 166 arts schools that exclusively focus on arts training.

Source: Based on GUS data (2006), p. 386, (2011a), pp. 234–235.

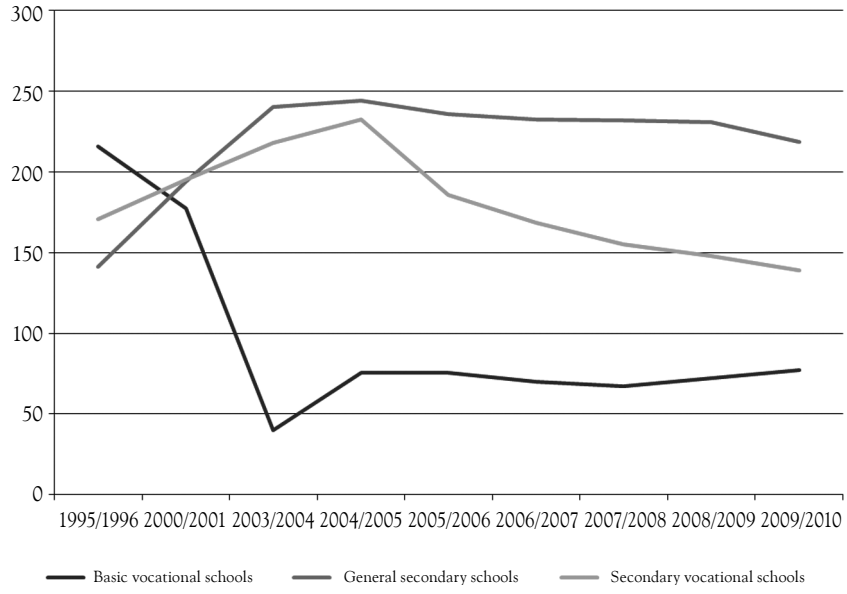
Changes in the structure of grade-one students in upper secondary schools led to changes in the structure of graduates of these schools. In addition, due to a demographic low, the total number of graduates of general secondary schools decreased from 244,000 in the 2004/2005 school year to 219,000 in 2009/2010, and the total number of graduates of secondary vocational schools fell from 233,000 to 139,000 in 2009/2010. This negative trend has already been reflected in a decreased number of students in university-level schools.

In a positive trend, the number of basic vocational school graduates has increased by almost 10,000 over the past two years, to 77,000. However, this comes after a steady slide in the number of graduates produced by these schools and a major decline in the first few years after the education system reform (Figure 4). The latest upsurge in vocational training, although small, was due to increased demand for skilled workers in technical occupations.

The popularity of individual types of schools among young people is reflected by the net enrollment ratios. They measure participation in education and show the percentage of those in a specific age group attending schools within the total number of individuals of this age. In the 2009/2010 school year, 89% of all young people aged

16–18 attended upper secondary schools; of this almost 75% attended schools other than basic vocational schools (Table 5).

Figure 4
Upper secondary school graduates in the 1995/1996–2009/2010 period (in thousands)



Source: Based on GUS data (2010b), p. 122, (2011), p. 254.

Table 5
Net school enrolment ratios in the 2009/2010 school year by type of school and age group (%)

School	Age group	Net school enrolment ratio
Basic vocational schools[a]	16 – 18	14.2
General secondary schools[b] and specialized secondary schools	16 – 18	46.7
of this: general secondary schools	*16 – 18*	*43.8*
Technical secondary schools[c]	16 – 18	28.1
Post-secondary non-tertiary schools	19 – 21	7.0

[a] including vocational special education schools
[b] including complementary secondary schools
[c] including other secondary vocational schools and complementary technical secondary schools.

Source: Based on GUS data (2010b), p. 52.

Post-secondary non-tertiary education

Post-secondary non-tertiary schools are intended for those with a secondary education, general or specialized. They provide their students with opportunities to obtain qualifications to work as either technicians or skilled workers in the following groups of occupations: medium-level technical staff, medium-level staff in biological sciences and health services, office workers, personal services and security staff as well as staff specialized in other areas. This last group includes professions popular on the market such as: financial and sales staff, social welfare and social workers, staff for archives, libraries and scientific information centers, as well as sales agents (GUS, 2010b, s. 85).

In the 2009/2010 school year, 7% of the total number of young people aged 19–21 attended post-secondary non-tertiary schools. Over the past five years the number of students in post-secondary non-tertiary schools has decreased by almost 5%, from over 313,000 to 299,000, while the number of schools decreased by more than 20%, from 3,731 to 2,941 (Tables 4 and 5).

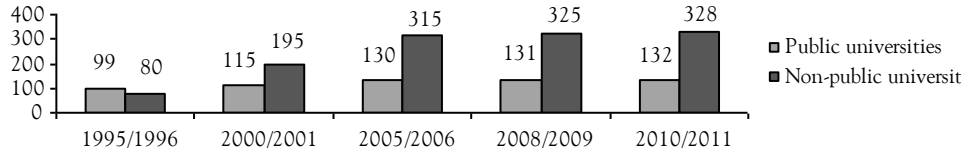
Post-secondary non-tertiary schools also include colleges for social services workers, as well as teacher training colleges and foreign-language teacher training colleges. Education in these colleges lasts three years. Graduates of foreign-language teacher training colleges can obtain a bachelor's degree.

The structure of entities operating post-secondary non-tertiary schools is different from the ownership structure of lower-level schools. In the 2009/2010 school year, local governments and the central government administration ran no more than roughly 26% of post-secondary non-tertiary schools between them (24.7% and 1.5% respectively), while private-sector entities operated 74% of schools (GUS, 2010b, p. 84).

Higher education

In the last 15 years higher education has developed rapidly in Poland. The number of university-level schools has increased more than two and a half times: from 179 to 460, including a more than fourfold increase in the number of private universities: from 80 to 328 (Figure 5). Most private universities can only train students at the undergraduate level. Institutions that have at least one authorization to confer doctoral degrees have so-called academic university status, while those that do not have such authorization have vocational college status. The network of higher education institutions is well developed, promoting a marked shortening in the distance between the student's place of residence and the university, especially in the case of non-public universities.

Figure 5
Public and non-public universities in Poland in the 1995/1996–2010/2011 period

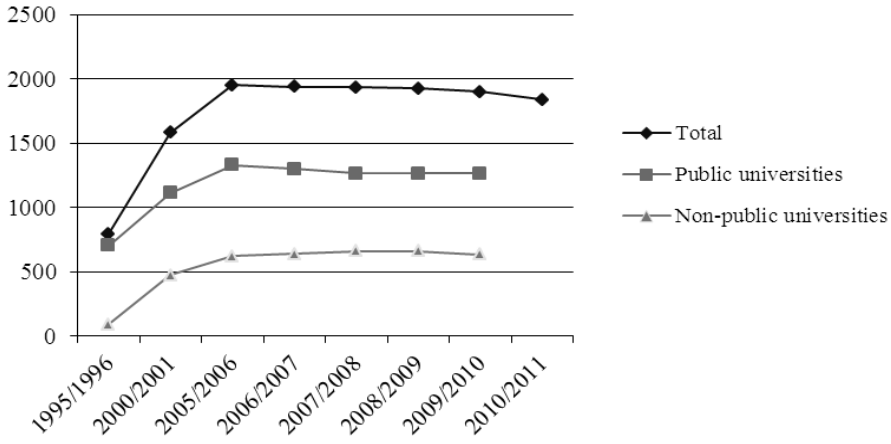


Source: Based on GUS data (2011c), pp. 27, 28.

According to the latest GUS data, Poland had 1,841,300 students in higher education institutions in the 2010/2011 academic year. Part-time students enrolled in paid programs accounted for more than half this number (51.6% of the total). Public universities had over two-thirds of all students (1,261,200), while non-public universities had less than a third (580,100). Women have dominated among students for years (accounting for 58.8% of the total number in the 2010/2011 academic year, up from 56.0% in 1995/1996). The predominance of women is also evident among students in other European Union countries (Komisja Europejska, 2009, p. 114).

The number of students at Polish universities peaked in the 2005/2006 academic year, at 1,953,800, nearly 2 1/2 times more than in 1995/1996 (794,600) and nearly four times more than in 1990–1991 (404,000).

Figure 6
Students in public and non-public universities in Poland in the 1995/1996–2010/2011 period (in thousands)



Source: Based on GUS data, (2010a), pp. 25, 27, (2011c), p. 28.

The number of students in Poland has decreased steadily over the past five years (Figure 6). GUS records show that in the last two years the number of students decreased by 86,500, including a decrease by over 79,000 in non-public universities. The trend is expected to gain momentum because, according to a demographic forecast by GUS, the population of young people in the 19–24 age group will decrease by 36.7%, or by more than 1,235,000 (from 3,370,900 to 2,135,400), between 2010 and 2025. After a further 10 years, the college-age population is projected to increase by only 281,000, to 2,416,500 in 2035 (GUS, 2009, p. 265).

In addition to demographic factors, other major causes of the decline in the number of students may include: a) increased interest among the best secondary school graduates in studying at foreign universities, b) young people leaving the country to work abroad, leading to a situation in which some of them give up university studies, especially at the graduate level.[3]

Notably, the number of university teachers in Poland has increased by only about 65% since the 1995/1996 academic year, from 67,300 to 103,400, which means even greater disparity in the student-teacher ratio. As a result, the indicator showing the number of students per academic teacher deteriorated significantly: from around 12 to over 18 (15 in public schools, 35 in non-public). The breakdown of teachers by age also changed for the worse. Unless younger groups of teachers speed up their scientific careers, a shortage of highly qualified staff may soon develop in some disciplines of science.

Another challenge for higher education is the need to reduce the number of jobs held by teachers at several universities at a time. The situation in which many teachers are excessively involved in teaching outside their alma mater not only supports the competition, but also limits their commitment to research and scientific development. However, moonlighting is in part due to relatively low wages in state-run universities and a substantial shortage of lecturers at private universities.

In recent years, Polish universities have expanded their range of foreign-language lectures and programs wholly taught in a foreign language. They have also introduced dual degree programs, thus increasing their level of internationalization. This is evidenced, for example, by an increased number of foreigners studying at Polish universities. In the 2010/2011 academic year, there were 21,500 foreign university students in Poland, an increase of 25 percent from the previous year and over four times more than in 1995/1996 (5,200). Despite this upsurge, however, foreigners

[3] In Western countries, undergraduate studies are most popular, while graduate studies draw a relatively small percentage of young people. Moreover, according to available data from 18 OECD countries, on average 31% of those starting undergraduate studies in these countries do not finish them. These people take up work, and some of them return to university later. Thanks to a credit system and study modules, previous achievements are taken into account when people resume their studies. Such an arrangement is followed in countries including Sweden and the United States (OECD, 2010, table A4.1, p. 76).

represent under 1.2% of all students in Poland, several times less than the OECD average.[4]

After 1990, higher education in Poland stopped being elite and became massive in nature. Over the past two decades, the net school enrollment ratio increased from 9.8% to 40.8% and the gross enrollment ratio grew from 12.9% to 53.8%.[5] In terms of both enrollment ratios and the number of students per 10,000 population, Poland has achieved one of the highest indicators in the EU, at more than 500 students (Table 6).

Table 6

Number of university students per 10,000 population in European Union countries in the 2008/2009 academic year

Country[a]	Number of students per 10,000 population	Country	Number of students per 10,000 population
Lithuania	627	Britain	364
Latvia	553	Denmark	363
Finland	549	Bulgaria	362
Estonia	510	France	360
Poland	**506**	Czech Republic	359
Slovenia	473	Portugal	350
Greece	457	Austria	336
Slovakia	427	Spain	329
Romania	414	Belgium	315
Ireland	403	Italy	309
Hungary	380	Malta	280
Sweden	378	Germany	247
Netherlands	366	Luxembourg	98

[a] not including Cyprus (data unavailable on the number of students in the 2008/2009 academic year).
Source: Own estimates based on: *Focus*, (2010), pp. 57–145; GUS, (2011a), pp. 536–537.

The development of education has resulted in changes in the structure of the population by education. According to GUS data, between 1988 and 2009, the

[4] On average in OECD countries, foreigners make up more than 6% of all students; in Australia, Austria, Switzerland and Britain foreign students account for more than 14% of the total number. In these countries as well as Canada, the United States and New Zealand, the proportion of foreigners among those studying advanced programs exceeds 20% (OECD, 2010, pp. 308–309).

[5] GUS, 2011c, p. 26. The gross school enrollment ratio is the percentage ratio of the number of students at a given level of education (regardless of age) to the total size of the population in the age group corresponding to this level of education. The net school enrollment rate is the percentage of students at a given level of education in a given age group.

percentage of the Polish population aged 15 and over that had a higher education almost tripled: from 6.5% to 18.3%. The percentage of the population with a secondary and post-secondary non-tertiary education also increased significantly (from 25.6% to 33.6%). Considering the changes made in Poland's education system, including the introduction of lower secondary schools, and the shortening of education in primary schools, the percentage of the population aged 13 and over with an education below the basic vocational level decreased from 43.9% in 1988 to 24.1% in 2009.

Table 7
Poland's population aged 15[a] and over by level of education in the 1988–2009 period

Education	Year		
	1988	2002	2009[a]
Total	100.0	100.0	100.0
Higher education	6.5	10.2	18.3
Post-secondary non-tertiary	1.6	3.3	33.6
Secondary	24.0	29.4	
Basic vocational schools	23.6	24.1	22.1
Lower secondary school	–	–	5.4
Primary	38.8	28.1	18.7
Incomplete primary	5.1	2.8	1.9
Unspecified	0.4	2.1	

[a] Data on population aged 13 and over for 2009. National census data for 1988 and 2002.
Source: Own estimates based on GUS data (2004b), p. 109, (2011a), p. 121.

The increased educational level of society is reflected in league tables and international comparisons. In 2010, Poland was 41st among 169 countries in terms of the Human Development Index (HDI). The index is used by the United Nations Development Program for international comparisons involving the socioeconomic development of countries. The ranking list of countries by HDI is important in that it takes into account three areas of key importance to society: health, education and standard of living.[6]

[6] Health is measured by life expectancy; education is reflected by the mean of years of schooling for adults aged 25 and expected years of schooling for children of school entering age; the standard of living is measured by GDP per capita at purchasing power parity in U.S. dollars. Source: http://hdr.undp.org/en/statistics/hdi/. For more, see Chapter 1 of this report.

The structure of training in higher education institutions

Higher education in Poland is provided for fields of study whose names and educational standards are subject to approval by the science and higher education minister. The national list includes 119 fields of study, 11 of which are only available in the form of uniform master's programs, and five as either undergraduate and graduate studies or uniform master's programs. Some universities have permission from the minister to provide unique fields of study not included on the national list (in the 2009/2010 academic year there were more than 40 such fields), and—following a resolution by their governing bodies—they may also provide so-called macrocourses (a combination of several fields of study with similar standards of education) and interdepartmental studies.

It is worth noting that the Polish notion of "field of study" does not strictly correspond to the idea of bachelor's or master's degree programs available in many Western countries. Study programs/subjects offered by Western universities have a varying degree of specialization as part of a discipline or two or more disciplines. This means that some of these programs correspond to the Polish field of study, others to the macrocourse, and still others are equivalent to the Polish major (Macioł, 2009).[7]

The amendment of March 2011 grants autonomy to Polish universities in developing fields of study and programs (also in consultation with employers).

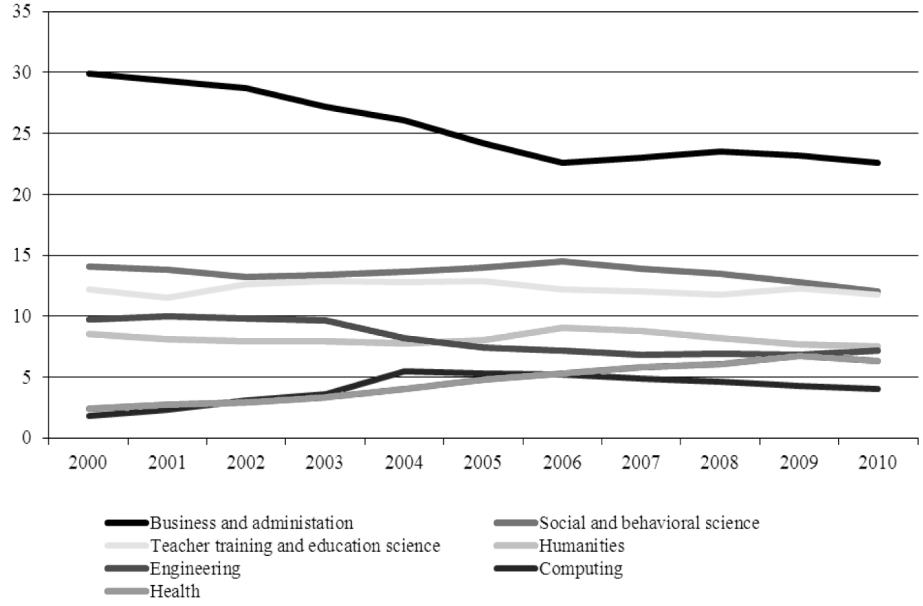
In recent years, the structure of education by field of study has changed significantly in Polish universities as a result of factors including the introduction of market economy principles to a growing number of business sectors, the development of new technology, the emergence of new professions, and Poland's entry into the European Union.

In the 2010/2011 academic year, the largest proportion of university students was in a group of fields covering social sciences, business and law, according to the ISCED'97 classification. Within this group, the largest percentage (22.6%) was students of business and administration, a subgroup of fields that includes, for example, finance, accounting, management, and administration. Over the decade, the percentage of students in these fields decreased by more than 7%. Management is the most popular field of study among students; it is also provided by many university-level schools that do not specialize in economics and business.

7 Because the definition of the field of study is ambiguous, for comparative purposes, the ISCED international classification (developed by UNESCO in 1997) is used, in which the basic unit of classification is the education program. In line with the ISCED'97 guidelines, Polish fields of study are classified by the Central Statistical Office (GUS) into eight groups (broad fields) and more than 20 subgroups (narrow fields) of programs (see GUS, 2010a, from p. 348).

Figure 7

Students of selected groups of fields (according to ISCED'97) in the 2000–2010 period; % of the total number of students



Source: GUS (2011b), p. 26.

The second-largest group of fields in terms of the percentage of students is social sciences (12%)—covering chiefly economics, psychology, political science and sociology—though the proportion of students in these fields has shrunk by more than 2% since 2000/2001.

Teacher training studies are still popular among young people (11.8%) as are the humanities (7.5%, including theology), despite the fact that graduates in these fields find it increasingly difficult to get a job. Most universities, especially private ones, provide courses in business and administration, social sciences and teacher training. This is mainly because of demand for candidates for this type of studies as well as lower costs of education in these fields.[8]

[8] In 2010, the costs of training, including the costs of teaching incurred by universities and financial support for students, together with a university scholarship fund, were ZL 10,643 per student on average; for public universities of economics, the figure was ZL 8,798, and for non-public universities of economics it was ZL 7,420 (GUS, 2011c, p. 366).

Table 8

Types of university-level schools and their students and graduates in the 2000/2001–2010/2011 period

Type of university	University-level schools			Students (in thousands)			Graduates (in thousands)
	2000/01	2005/06	2010/11	2000/01	2005/06	2010/11	2009/10
Total	310	445	460	1,584.8	1,953.8	1,841.3	478.9
Non-technical	15	18	19	443.3	563.1	526.8	140.9
Technical	23	22	23	318.4	331.1	318.7	59.3
Agricultural	9	9	7	85.6	107.7	80.5	19.4
Business and economics	94	95	79	369.5	407.8	278.4	88.4
Teacher training	19	16	18	148.3	111.8	102.5	33.3
Medical	10	9	9	29.5	48.8	62.0	13.3
Maritime	2	2	2	10.1	11.5	10.4	2.2
Physical education	6	6	6	22.2	28.2	27.6	8.9
Arts	21	22	22	12.8	15.4	16.4	3.9
Theological	15	13	14	9.3	10.4	6.8	1.7
Vocational[a]	61	195	…	57.4	224.7	...	...
Universities overseen by the Defense and Interior Ministries	10	7	7	12.2	14.0	27.3	4.4
Other institutions of higher education	25	31	254	123.6	79.5	387.4	103.2

[a] established on the basis of the law of 1997; since 2006 classified as "other institutions of higher education."

Source: Based on GUS data (2001), p. XVI, GUS (2007), p. 21, GUS (2011c), pp. 26, 30, 143.

Students of engineering and technical fields play a relatively small role in the structure of education, accounting for less than 10% of the total number in 2000/2001, and about 7% in 2010/2011. In the last five years, the percentage of those studying computer science has not increased, either; it stands at 4%. This is expected to change with the "customized courses" program launched by the Ministry of Science and Higher Education a few years ago. The program aims to train tens of thousands of graduates in fields of study of strategic importance to Poland's economic development, which

include engineering programs, computer science and mathematics. The ministry plans to set aside ZL1 billion for the "customized courses" program by 2013.[9]

Over the past decade, the percentage of students pursuing medical studies in the overall student population has increased from 2.8% to 6.3%; the number of students in medical universities doubled from 29,500 to 62,000. This trend may be due to increased demand for medical services and healthcare in the broad sense in Poland's aging society.

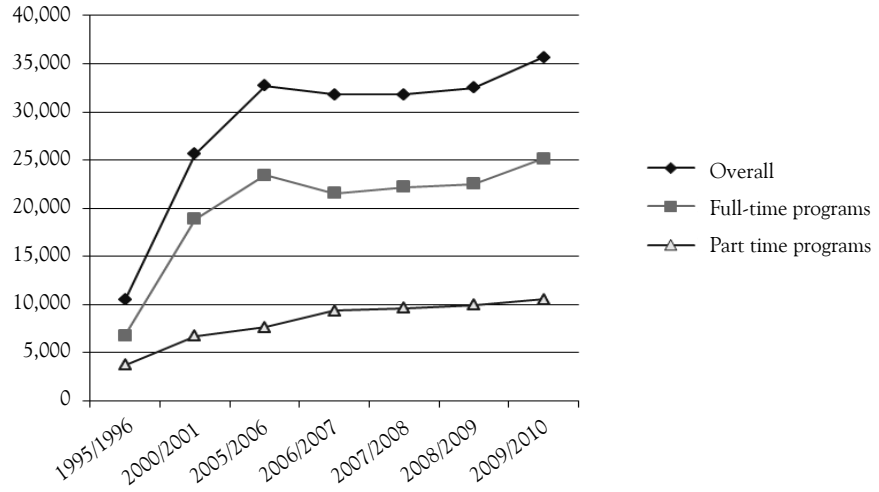
In recent years, about 400,000 people graduated from Poland's university-level schools each year on average. In the 2009/2010 academic year, there were 478,900 graduates; more than half of them (254,400) finished studies at undergraduate level. More than 52% of the graduates were from paid part-time studies (Table 8).

Doctoral studies

Doctoral studies, or education at the Ph.D. level, are dynamically developing in Poland. In the 1995/1996–2010/2011 period, the number of doctoral students nearly quadrupled: from 10,500 to 37,500, including an increase from 3,700 to 10,400 in part-time programs. In the 2010/2011 academic year, doctoral studies in the humanities were the most popular, with 10,200 students, followed by engineering with 6,100, and business with 4,700 (GUS, 2011c, pp. 34, 35).

[9] The following were classified among strategic fields: automation and robotics, biotechnology, construction, chemistry, energy, physics/technical physics, computer science, materials engineering, environmental engineering, mathematics, mechanics and mechanical engineering, mechatronics, environmental protection and design. In the second round of the customized courses program, new "unique" fields were added, along with macrocourses and interdepartmental studies based on the fields from the main list.

Figure 8
Doctoral students in the 1995/1996–2010/2011 period



Source: Own elaboration based on GUS data (2011c), pp. 34–35.

It seems that doctoral studies are treated in Poland more as a form of gaining access to the latest in a specific field and an opportunity to come into contact with academic teachers of the highest caliber than as a way of actually obtaining a doctoral degree. This appears to be confirmed by a decrease in the percentage of doctoral students formally in the process of seeking a Ph.D. degree in the 2004/2005–2009/2010 period: from 27% to 20%, and especially by a relatively small percentage of doctoral students actually earning a doctoral degree. In 2009, a total of 4,659 individuals earned a Ph.D. degree in Poland, but not all of them took part in doctoral studies (GUS, 2010a, p. 282).

Postgraduate studies

Postgraduate studies are a form of professional specialization offered by the higher education system.

Between 1995/1996 and 2010/2011, the number of postgraduate students more than tripled: from 56,200 to 185,400 (despite a drop by 8,800 in the last year of the period). Women clearly dominate among the students, accounting for 70% of the total. Postgraduate studies in business and administration are the most popular, with 54,700 students, followed by teacher training and education sciences, with 47,900 (including nearly 20,000 in teacher training), and medical programs with 24,400 (GUS, 2011a, p. 33).

Many universities offer postgraduate studies in response to demand from the labor market in a trend that fits into the Lisbon Strategy and the concept of lifelong learning. This explains why some types of studies are co-financed from EU funds.

Besides typical postgraduate studies, some universities offer Master of Business Administration (MBA) programs. There are several dozen such programs, and some of them are provided in collaboration with foreign universities. The main limitations to the development of MBA studies in Poland include the fact that the status of the MBA degree is not clearly defined under law. There is also a shortage of lecturers with sufficient business experience and the costs of training are high in relation to the quality of the education offered.

The financing of schools and the higher education system

Ensuring stable financing for education is one of the priorities of economic policy in most countries. Public funds invested in education not only enhance the potential for modernization, but also bring tangible benefits for the government from taxes on higher income, among other sources.[10] Investment in education also benefits the labor market because it increases employment opportunities for graduates and keeps them professionally active for a longer period of time (OECD, 2010, p. 101).

Public funds are the main source of funding for education in Poland. In 2009, spending on education and the school system totaled ZL53.1 billion, accounting for 3.9% of GDP. The government spent ZL35.7 billion, including ZL33.2 billion in an educational subsidy for local governments to operate schools. Since this subsidy was insufficient, an additional ZL18.2 billion was spent on schools, education and educational services by municipalities, counties and provinces (GUS, 2010b, p. 49).

According to 2007 data, spending on primary, secondary and post-secondary non-tertiary education in Poland represented 3.4% of GDP and was slightly lower than the OECD average of 3.6%, while the growth of this expenditure in the 2000–2007 period was faster: 27% against 24%. Despite this positive trend, the growth of expenditure on education in Poland was not directly proportional to GDP growth, which totaled 32% during the studied period and was one of the fastest among OECD countries (Table 9).

[10] It is estimated that across the OECD a male with a university degree will generate $119,000 more in income taxes and social contributions over his working life than someone with only a secondary school education. Even after taking the cost of university education into account, the net public return from investment in tertiary education is US$ 86,000 in generated income taxes and social contributions over the working life of a male in the OECD. For women the figures are US$ 84,400 and US$ 52,400 respectively. Overall, the return from investment in higher education is more than triple the public funds invested (OECD, 2010, pp. 144–145).

Table 9

Expenditure on primary, secondary and post-secondary non-tertiary education as a percentage of GDP in selected OECD countries in 2007 and its growth in the 2000–2007 period

Selected OECD countries	Expenditure as % of GDP			Growth of total expenditure in 2000–2007 (2000 = 100)	GDP growth in 2000–2007 (2000 = 100)
	Total	of this			
		public	private		
Iceland	5.1	4.9	0.2	149	136
Denmark	4.3	4.2	0.1	120	112
Britain	4.2	4.1	0.1	135	120
United States	4.0	3.7	0.3	127	118
Sweden	4.0	3.5	0.5	120	121
Poland	**3.4**	**3.4**	**–**	**127**	**132**
Italy	3.1	3.0	0.1	101	108
Germany	3.0	2.6	0.4	105	109
Spain	2.9	2.7	0.2	128	127
Czech Republic	2.8	2.5	0.3	149	136
OECD average	3.6	3.3	0.3	125	124

Source: Based on OECD data, (2010), tabl. B.2.4, B2.5.

In the case of higher education in OECD countries, public and private expenditure on basic educational services (except research and development and related services) averaged 1.5% of GDP in 2007; of this, private spending represented 0.5% of GDP. Total expenditure on higher education in Poland was 1.3% of GDP, with expenditure from private sources representing 0.4% of GDP. The greatest spending on higher education in relation to GDP was recorded in the United States, at 3.1%, followed by South Korea, with 2.4%, mainly due to a large contribution from private funds, while the smallest figure was recorded in Italy, 0.9% of GDP.

Spending on higher education in Poland grew a healthy 72% between 2000 and 2007, far above the OECD average of 36%. Among OECD countries, the Czech Republic showed the fastest growth in expenditure, doubling its spending on higher education (Table 10).

It is worth noting that the dynamic development of Polish higher education was made possible by the involvement of private funds. These funds almost entirely financed the development of private university-level schools and to a large extent also the development of state-run universities (a third of all students at public universities are part-time students paying for their studies).

Table 10

Expenditure on higher education in selected OECD countries as a percentage of GDP in 2007, and the growth of this expenditure as well as GDP growth in the 2000–2007 period

Selected OECD countries	Expenditure as % of GDP			Growth of total expenditure in 2000–2007 (2000 = 100)	GDP growth in 2000–2007 (2000 = 100)
	Total	of this			
		public	private		
United States	3.1	1.0	2.1	134	118
South Korea	2.4	0.6	1.9	150	138
Denmark	1.7	1.6	0.1	123	112
Netherlands	1.5	1.1	0.4	122	114
France	1.4	1.2	0.2	117	114
Poland	**1.3**	**0.9**	**0.4**	**172**	**132**
Britain	1.3	0.7	0.6	150	120
Czech Republic	1.2	1.0	0.2	205	136
Spain	1.1	0.9	0.9	126	127
Germany	1.1	0.9	0.2	109	109
Italy	0.9	0.6	0.3	112	108
OECD average	1.5	1.0	0.5	136	124

Source: Based on OECD data, (2010), table B.2.4, B2.5.

The number of students has decreased in Poland over the past several years and funds generated from tuition fees now account for a smaller portion of university revenues. For demographic reasons, the intensification of this process is inevitable, posing a threat not only to the proper functioning, but also the very existence of many universities, especially private ones. In an attempt to remedy this situation, more higher education institutions are offering courses from outside their main focus, in addition to launching distance learning programs and studies via the internet (see Macioł, 2010, pp. 204, 212).

National testing in the school system

To measure and monitor the quality of education, national testing, or "the national administration of standardized tests and centrally set examinations," are increasingly used in Europe (Eurydice, 2010, p. 7).

All school students are given two such examinations: a competency test at the end of their six-year schooling process in primary school and a lower secondary school exam at the end of their three-year education in lower secondary school. Whether a student successfully finishes primary school and is admitted to lower secondary school does not depend on the results of the former test, but students who do not take this test have to repeat the last grade of primary school. Similarly, students who did not take the lower secondary school exam must repeat the last grade of lower secondary school.

Primary school pupils score about 60% of a maximum 40 points in the competency test on average (CKE, 2010a).

The lower secondary school exam consists of a humanities part and a mathematics and natural science part, and as of 20010/2011 it also includes a foreign language part. Each part is rated on a scale of 0 to 50. Generally, students cope relatively well with the foreign language exam and with the humanities part of the exam (scoring about 60% of the maximum number of points on average), while they tend to be much worse in the mathematics and natural science part (the average score is below 50% of the maximum number of the points—CKE, 2010b).

In secondary schools, students seeking to graduate with a matriculation certificate have been subject to a central matriculation exam since the 2004/2005 school year. The exam is made up of written and oral parts covering the Polish language and a modern foreign language, and, as of the 2009/2010 school year, a written exam in mathematics. The score for the matriculation exam is the only criterion for admission to a higher education institution. Around 80% of students pass their matriculation exams on average, with the highest percentage of those passing in general secondary schools, at more than 90% (CKE, 2010c).

National testing is also used in basic vocational schools, technical secondary schools, specialized secondary schools, complementary general and technical secondary schools and post-secondary non-tertiary schools. These exams are designed to check the students' job qualifications.

Ensuring quality in higher education

As higher education becomes widespread, it is particularly important to ensure an adequate quality of education, and to eliminate unfair competition on the education market. In Poland, this problem is largely related to an excessive number of students enrolled in paid part-time studies and to the rules of these studies. More than 50% of all students study part-time, almost double the OECD average (26% of the total number of students at the undergraduate level in 2008; OECD, 2010, p. 75). In Western universities, full-time and part-time programs follow the same curriculum, and part-time studies last much longer. In Poland, educational standards require part-

time programs to provide at least 60% of the total number of hours taught at full-time studies, and universities rarely step beyond this minimum. In addition, individuals studying part-time, especially at undergraduate level, are usually those who failed to get into full-time studies or were less qualified for university studies in general.

This clearly shows that part-time programs do not provide students with opportunities to obtain a quality education on a par with full-time studies. a reform is consequently needed for part-time programs, especially as the population of young people in the 19–24 age group is shrinking steadily.

The transformation of higher education was accompanied by the establishment of special accreditation committees. In 1998, the Accreditation Committees for Higher Vocational Education was established, which in 2002 was replaced by the newly established State Accreditation Committee, now called the Polish Accreditation Committee (PKA). The PKA makes a compulsory assessment of education in all university-level schools in a given field and level of studies, and in the event it makes a negative evaluation, the higher education minister issues a decision to revoke or suspend a university's right to train students. In 2010, the committee produced 629 ratings of the quality of education and issued the following grades: excellent—14, positive—554, conditional—41, and negative—20. Eighteen of the 20 negatively evaluated courses were run by private universities. On the other hand, only one of the 14 courses rated as excellent was run by a private university (GUS, 2011c, p. 43).

To ensure the quality of education, community accreditation committees also operate for various types of higher education institutions or their associations, in which accreditation is voluntary. Some higher education institutions are also accredited by international institutions.

Poland's achievements in putting the Bologna Process and the Lisbon Strategy into practice in education

Over the past decade, Poland has made demonstrable progress in achieving the objectives of the Bologna process. In terms of higher education the country has introduced a three-tier system of studies, in addition to the European Credit Transfer and Accumulation System (ECTS), and the so-called Diploma Supplement, a document accompanying a higher education degree aiming to improve international transparency and facilitate the academic and professional recognition of qualifications. Moreover, internal quality assurance systems have been launched in education, the mobility of students and staff has been increased, and a National Qualifications Framework has been developed. On the other hand, Poland has failed to introduce flexible and modern curricula fully meeting the needs of the economy and the job market. Another problem is posed by poorly developed relations between universities, on the one hand, and their graduates and business partners, on the other. Polish

universities may also find it difficult to achieve an international student mobility rate of 20% by 2020. Following the recommendations of the Bologna Process, at least 20% of students should go abroad for a semester of study or internship in the course of their studies.[11]

On the plus side, Poland has made substantial progress in attaining the Lisbon Strategy objectives as part of the Education and Training 2010 program (Table 11). Poland has managed to achieve four of the five benchmarks—European reference levels—set for 2010. In fact, the results are so good that they already meet the 2020 reference levels. This applies to:

– reducing, to under 15%, the proportion of young people aged no older than 15 years who are low achievers in reading, mathematics and natural sciences—based on OECD/PISA research among 15-year-olds. In 2009 the average proportion of such people in the EU18 was 20%, Poland reported 15%, while Finland had only 8.1 %;
– decreasing, to below 10%, the proportion of early school leavers in the 18–24 age group. In 2009 in Poland, only 5.3% of people at this age did not continue their schooling, and only Slovakia had a better indicator in this area, at 4.9%;
– increasing, to 85%, the number of people with an upper secondary education in the 20–24 age group; Poland and Slovakia had the best score: 93.3% of young people in these countries had a secondary or basic vocational education;
– increasing the number of graduates in mathematics and other exact sciences and technology by 15% (to 789,000)—this goal was achieved in 2006: the number of graduates in these fields has increased by 29% in the EU since 2000, to 886,000, and in Poland, their number rose from 39,200 to 85,400 (European Commission, 2008).

As other EU countries, Poland has not managed to increase the participation of adults aged 25–64 in the process of lifelong learning to at least 12.5% (this involves those covered by the process of learning in the last four weeks preceding the Labor Force Survey). In Poland, less than 5% of adults were covered by education or training, while the EU average was more than 9%. Denmark (31.6%), Sweden (22.2%) and Finland (22.1%) stand out in this area. It should be noted that the Education and Training 2020 program assumed at least 15% participation of adults aged 25–64 in lifelong learning.

In addition, two new benchmarks have been adopted involving:

a) higher education—at least 40% of those aged 30–34 should have a university degree; in 2009, the figure for Poland was 32.8%, while the EU average was 32.3% of those aged 24–65;

[11] The number of students choosing to study in another country is rapidly increasing Worldwide. In 2008, there were more than 3.3 million such students, roughly 700,000 more than in 2005 and around 1.1 million more than in 2002. More than half these students took up education in Australia, France, Germany, Britain and the United States. By far the largest number of foreign students come from China and India, and this trend is expected to continue in the future. OECD, (2010), pp. 308, 313.

b) preschool education—at least 95% of children between four years old and the starting age of compulsory education should participate in early childhood education. As mentioned earlier, only 67.5% of children in Poland were covered by preschool education in 2008, while the EU average was over 92%.

Table 11

Poland compared with European Union countries most advanced in carrying out the Lisbon Strategy in the area of education and training in terms of the adopted benchmarks, i.e. reference levels for Europe for 2010 and 2020

Benchmark	Reference level for Europe in:		Progress in implementation since 2000		
	2010	2020	Country	Year	
				2000	2009
1. 15-year-olds with low achievements in reading, mathematics and sciences	Reduce the number of such individuals by at least 20% (i.e. down to 17%)—based on the OECD/PISA study among 15-year-olds	The percentage of such individuals should be brought under 15%—based on the OECD/PISA study among 15-year-olds	Finland	7.0	8.1
			Estonia	–	13.3
			Netherlands	(9.5)	14.3
			Poland	**23.2**	**15.0**
			EU18	21.3	20.0
2. Early school leavers in the 18-24 age group	Reduce the number of such individuals to 10%	The proportion of such individuals should be brought under 10%	Slovakia	6.7[a]	4.9
			Poland	**7.4b**	**5.3**
			Czech Republic	5.7[a]	5.4
			EU27	17.6	14.4
3. 22-year-olds with a secondary or vocational education	At least 85% of 22-year-olds should have such an education	At least 85% of 22-year-olds should have such an education	Slovakia	94.8	93.3
			Poland	**88.8**	**93.3**
			Czech Republic	91.2	91.9
			EU27	76.6	78.6
4. Graduates in mathematics and other exact and technical sciences	To increase the number of graduates in these fields by 15% (to 789,000)		Country	Growth in the 2000–2008 period	
			Portugal	193.2	
			Slovakia	185.8	
			Czech Republic	141.3	
			Poland	**100.0**	
			EU27	37.2	

Benchmark	Reference level for Europe in:		Progress in implementation since 2000		
	2010	2020	Country	Year	
				2000	2009
5. Adults in lifelong learning (in the 25–64 age group) – Learners in the last four weeks preceding the Labor Force Survey	Increase the number of adults in education or training to 12.5%	At least 15% of adults should take part in education or training	Denmark	27.4	31.6
			Sweden	17.4	22.2
			Finland	23.5	22.1
			Poland	**4.9**	**4.7**
			EU25	9.8	9.3
6. 30- to 34-year-olds with tertiary educational attainment		Such individuals should represent at least 40% of all those in this age group	Country	2000	2009
			Ireland	27.5	49.0
			Denmark	32.1	48.1
			Luxembourg	21.2	46.6
			Poland	**12.5**	**32.8**
			EU27	22.4	32.3
7. Children between four years old and the age for starting compulsory primary education		At least 95% of children in this group should participate in early childhood education	Country	2000	2008
			France	100.0	100.0
			Belgium	99.1	99.5
			Netherlands	99.5	99.5
			Poland	**58.3**	**67.5**
			EU27	85.6	92.3

[a] 2002. [b] 2001.

Source: Based on European Commission data, 2011.

Concluding remarks

Over the past decade or so, Poland's education system has undergone substantial systemic and structural changes. A full-fledged education market has emerged, and the school infrastructure has improved markedly. Most schools now have new or upgraded educational facilities and libraries, and are generally well equipped with computers with internet access.

It should be emphasized that numerous EU education programs—including Comenius, Tempus, Socrates, Erasmus Mundus, Leonardo da Vinci, Grundtvig, and Jean Monnet—have contributed immensely to upgrading Poland's school and higher education system, along with structural funds and framework and operational programs.

In terms of curricula, teaching methods and educational achievement, Poland's education system has yet to be fully adapted to modern requirements and become competitive internationally. School curricula in Poland are still inflexible, overloaded with mandatory subjects and a large number of exams; there are too few classes and courses that focus on practical skills, applying information in practice, interpersonal skills, and developing self-learning abilities.

It seems that the functioning of universities—under the new regulatory and legal as well as financial conditions, at a time when the surrounding world is rapidly changing, knowledge is increasingly used for commercial purposes and student preferences are changing, accompanied by strongly negative demographic trends—will require a new, more comprehensive approach to managing universities and their intellectual and physical resources.

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5.2. Vocational Education in Poland in a Competitive Environment: Basic Problems and Directions of Reform

Elżbieta Drogosz-Zabłocka, Barbara Minkiewicz

This subchapter focuses on vocational training at different levels of the education system: basic vocational school, secondary school, and higher education. The aim is to discuss the models functioning in Poland and identify the directions of reforms carried out over the past decade. In the report, we attempt to take a comprehensive look at vocational education and training, which covers various forms and levels of education, with a particular emphasis on those offered by schools.

The functioning of vocational education in Poland needs to be evaluated by placing it within the overall context of the national education system and by identifying the relationships between vocational education and the surrounding world, including the labor market and the economy as a whole.

In debates and reforms focusing on education, in both Poland and elsewhere, of special note is a thesis confirmed by research findings that vocational training is second-choice training, an alternative to general and academic education. Vocational schools usually attract lower-achieving young people from families with lower social status (Białecki, 1998, 2010; Domański, 2000; Dolata, 2008, KRM, 2011).

In recent years, as Europe took steps to overcome the economic and financial crisis, efforts have intensified to upgrade vocational training and make this segment of education more flexible and marked by high quality (Tessaring, Wannan, 2004, *Komunikat z Brugii*, 2010).

Poland's experience from the last two decades shows that, after more than a decade of stagnation, vocational training is regaining its position in educational policy. At the tertiary education level, some changes were introduced on Oct. 1, 2011; other major changes in the structure of education at the lower secondary school level will be introduced in 2012, and program reforms are in progress. All these changes are part of efforts toward closer European cooperation in vocational education and training, called the Copenhagen Process, which was launched in a declaration dated Nov. 29–30, 2002.

In this section, initial vocational education and training (IVET) will be characterized as well as terminological problems associated with this segment of education. Due to the nature of both levels of education, vocational training at the upper secondary and higher level will be discussed separately. In each part, we will discuss the structure of vocational training in Poland, as well as the objectives and scope of the reforms being introduced in this area.

Vocational training: its role in the Polish education system

One of the levels of vocational education and training in Poland is training offered by vocational schools beyond the lower secondary school level. There is a clear distinction between general and vocational schools in the Polish education system; there is also a wealth of reliable statistics on these schools (GUS data, SIO data).[12] The most recent studies on this subject were conducted in 2011 by the Ministry of Education (MEN, 2011). However, vocational training is offered not only by schools beyond the lower secondary school level, but also by higher education institutions (though additional research is needed on vocational training at this level). Vocational training can also be part of lifelong learning. For the purposes of this report, we adopt the following assumptions:

1. Vocational opportunities in academic universities and non-public vocational colleges (even if they are authorized to provide graduate studies and confer doctoral degrees) are available through three-year undergraduate programs and four-year engineering programs. The main criterion is not the nature of the university (academic or vocational), but its educational product.
2. Vocational training opportunities in State Higher Vocational Schools (PWSZ), as in the case of the universities listed in item 1, are available through three-year undergraduate programs and four-year engineering programs.
3. Vocational training opportunities at universities and other educational institutions (for example, foundations) also include postgraduate programs and MBA studies.

[12] Poland also has one of Europe's highest formal education participation rates among those aged 5–24.

Moreover, an important area of vocational education and training is continuing education. Research in this area about Poland is fragmentary. It shows this segment of education is not very well developed: less than 5% of the population in all age groups, 15–24, 25–29, and 30–54, participated in such training in 2007 (compared with the EU27 average of almost 10%), and the same is true of vocational training programs, especially in the domain of small and medium-sized enterprises (EC, 2009, p. 98).

At the upper secondary school level, a total of 6,908 vocational schools operated in the 2010/2011 school year (basic vocational schools, technical secondary schools, complementary technical secondary schools, and post-secondary non-tertiary schools), handling a total of 1,072,800 young people. a separate role is played by vocational special education schools. In Poland, there are 428 such schools, with 9,800 students. At the higher education level, there were over 1,841,000 students (including foreigners) in 460 university-level schools. All university-level schools under law provided studies leading up to at least one professional degree: bachelor's, engineering, master's, or an equivalent degree.

Different models of initial vocational education and training (IVET) at the upper secondary school level and in higher education[13]

The Lisbon Strategy and further work related to putting it into practice paid special attention to initial vocational education and training in European Union countries.[14] IVET reforms in Europe are designed to change this segment of education and make it more attractive with a view to increasing the number of those interested in it. This does not apply to Germany and Northern European countries, where vocational training is still treated as an attractive form of education offering definite employment prospects (Cedefop, 2008, p. 7).

[13] The term Vocational Education and Training (VET) is often used in the literature. Based on the definition of vocational education adopted by Manfred Tessaring and Jennifer Wannan, (*Vocational education and training – key to the future*, Cedefop, 2004, p. 13.), in documents related to the Lisbon Strategy, it can be assumed that vocational education and training covers activities organized at different levels leading to the acquisition of knowledge, skills and competencies required to practice a profession or a group of professions and obtain formal qualifications. VET may cover different groups of people, be organized in different ways (as part of a school, company, or a dual school-and-company system) and be aimed at obtaining qualifications at different levels.

[14] Vocational school graduates following up with engineering studies will not treat these studies as initial vocational training, while general secondary school graduates will probably do so. Thus, the difference is rather between individual people and their experiences rather than between different types of vocational training programs.

Taking into account different historical paths as well as socioeconomic and political differences, it is possible to identify three basic types (models) of school systems in Europe. In the first, the classic model, children aged 10-11 attend primary school and then continue on to secondary school, with secondary schools diversified in terms of their main focus, level and prestige (as exemplified by Germany). The second model is based on compulsory education in primary and lower secondary school, followed by deeper diversification. After graduating from lower secondary school, students can choose either vocational training or general education, possibly with some professional specialization (as exemplified by France and Poland). The third model combines primary and secondary school into a single whole (Scandinavian countries) (Váňová, 2006, p. 79).

An in-depth look at vocational schools and the development of vocational education and training in Europe makes it possible to distinguish three "classic" models: a liberal market model (exemplified by Britain), a state-regulated model (France), and a dual corporate model (Germany). These models were distinguished on the basis of criteria describing the organization of education, the venues where it is provided, the content of training, the financing, and participant qualifications (Wollschlager, Reuter-Kumpmann, 2004, p. 9). These examples show that the typology of school models depends on the adopted criteria and that there is no single universal model.

An in-depth look at initial vocational education and training (IVET) in European countries in 2011 reveals its complexity and comparison problems. Comparisons are especially difficult at the university level, due to the inclusion of vocational education in the Bologna Process. The chief cause of these difficulties is a series of terminological problems stemming from the ambiguity of the notion "vocational" and the different ways in which it is understood across Europe. Experience shows that the use of Bologna Process tools such as the ECTS, the Diploma Supplement and the National Qualifications Framework can contribute to greater transparency of systems, and facilitate descriptions and comparisons (Eurydice, 2010). It may also help make this segment of education competitive.

The objective of IVET is to equip learners with the skills and competences to work in a specific sector of the economy or profession. IVET is no longer seen in terms of a vocational career path, but as an alternative to an academic path, though one containing many elements of academic education.

Overall, training paths can be classified as follows, depending on the program rather than the type of school or university:

- academic (general),
- vocational (vocational schools),
- internship/apprenticeship,
- special programs (targeted at those subject to and at risk of social exclusion).

There is a distinct division into general and vocational schools in the Polish education system. Alongside general schools there are now four types of vocational

schools: basic vocational schools, which aim to train skilled workers; technical secondary schools for graduates of lower secondary schools; supplementary technical secondary schools for graduates of basic vocational schools—enabling their students to obtain professional qualifications after passing a vocational exam; and post-secondary non-tertiary schools enabling students to obtain qualifications after passing a professional exam. Do Polish secondary vocational schools also prepare their students to take the matriculation exam (*matura*) and continue their education on at the tertiary level? The assumption is that the secondary vocational school should prepare students to take a professional exam as well as the matriculation exam. Surveys among technical secondary school students show that preparing for the matriculation exam is just as important for them as acquiring professional skills. More than three-quarters of technical secondary school students surveyed said that preparing for the matriculation exam was a very important task of the school; this task is considered to be especially important by the highest-achieving students (MEN, 2011, p. 21). Among those seeking admission to the Warsaw University of Technology, the percentage of secondary vocational school graduates decreased from 26.5% in 2001 to 7.0% in 2007, and among those admitted it dropped from 21.1% to 5.2%. Data on recruitment at this university shows that the easier it is to get into a given field of study (a low ratio of the number of applicants to the number of places), the more technical secondary school graduates are found among those seeking admission to the university. In 2005–2006, nearly one-third of technical secondary school graduates either dropped out in the course of their studies or gave up their education at the Warsaw University of Technology, whereas the overall average for all students was 18.6%. Statistically, technical secondary school students find it much harder than general secondary school students to complete their first year of study because they have poorer educational achievements in mathematics and physics (as confirmed by the results of the matriculation exam in mathematics). The analyzed data shows that the more difficult it is to get into university (according to those surveyed, only those applicants who did well on their matriculation exam can meet high recruitment requirements), the easier it is for students to complete their studies.

As education at the tertiary level expanded, universities were increasingly expected to play a greater role in preparing their students for their future jobs. This goal was to be attained in cooperation with employers and local communities (OECD, 1999; Dietl, Sapijaszka, 2000). In the last two decades, ties between higher education institutions and business have strengthened, as confirmed by factors including the participation of employers' representatives in the councils of university-level schools and greater use of universities' educational and research services by companies. In another significant trend, more students are doing internships in companies as a mandatory part of their education process.

Vocational education in Poland at the upper secondary school level: Debates, reforms and problem areas

A look at education policy in Poland since 1990 reveals that there has been no lack of ideas on how vocational education should be modernized, but there is a lack of possibilities for carrying out these plans. In the 1980s and 1990s, numerous studies indicated that young people graduating from upper secondary schools were poorly prepared for either further education or work (Lumby, Fockett, 2004, Pring, 1990).

Vocational training was not a central issue in the education reform launched in 1998. The main assumptions of the reform involved making secondary and higher education more widespread, in addition to equalizing educational opportunities and improving the quality of education understood as an integral process of instruction and upbringing (WSiP, 1998, p. 10). The reform fundamentally changed the structure of education (a new type of school was introduced—lower secondary school), but changes in vocational training failed to produce the expected results. In the initial assumptions of the reform, the authorities planned to depart from dual-track training at the upper secondary level (general versus vocational education) and leave only two-year vocational schools in the system in order to enable graduates to obtain the status of skilled worker. Arguments in favor of adopting the reform in such a shape focused on promoting secondary education as the primary objective of changes in education. The way to achieving this goal was to be the specialized secondary school, diversified in terms of the curriculum, but uniform in terms of organization. The objectives of vocational training were to be continued by specialized vocational secondary schools, post-secondary non-tertiary vocational schools and the aforementioned two-year vocational schools. However, the original concept was not put into practice because the plan to transform vocational education was abandoned as a result of changes in the corridors of power. Among schools at the upper secondary level, four-year technical secondary schools continued to operate. Moreover, to ensure educational advancement for students graduating from basic vocational school, complementary general and technical secondary schools were introduced; education in these schools lasts two and three years respectively. Moreover, the original name of the vocational school training skilled workers was reinstated—basic vocational school. Specialized secondary schools were also left in the system, but these turned out to be schools without a future. Their number decreased each year. In the 2005/2006 school year, 1,530 specialized secondary schools were in operation, with a combined 202,200 students, while in 2010/11 they only numbered 438, and their student population shrank sixfold, to 34,300. Another minus was that their graduates did poorly during the matriculation exam, according to statistical data. Under the amended law on the education system, as of Sept.

1, 2012, grade one of specialized secondary school for young people is due to be abolished, followed by the phasing out of the next grades in the following years until these schools disappear altogether.[15]

In 2011, a certain stage of work on modernizing vocational training was completed with the amendment to the Education System Act. Complementary technical secondary schools are to be closed down, and education in basic vocational schools will last three years (previously it lasted two or three years depending on the occupation). Training in some selected occupations, both at the level of basic vocational and technical secondary school, will also last three years. Special qualifying training courses were introduced to the education system; they offer core training in each occupation, focusing on a specific single qualification. Completion of such a course is designed to enable a student to take an exam confirming their professional qualifications in the area of a specific single qualification. This arrangement is expected to contribute to making vocational education more flexible and more competitive as a result. The changes also apply to professional examinations.

Instruction in technical secondary and basic vocational schools will be the follow-up stage to general education started in lower secondary school. In the first grade of upper secondary school, regardless of its type, the same core general education curriculum will be taught. In vocational schools, students will acquire skills required in specific occupations or skills necessary to hold specific jobs. The acquisition of these skills will be confirmed by a certificate. If a given profession involves several qualifications, only a confirmation that the student has acquired each of them will entitle him/her to obtain a certificate confirming the acquisition of skills required in this profession. Acquiring professional qualifications, not just learning a trade, will be the primary purpose of this type of education. This will also be reflected in the classification of occupations covered by vocational education in which qualifications will be assigned to specific occupations. Regulations have already been drafted to put these changes in effect. Schools will train their students to acquire more than 240 qualifications in all.

Upper secondary schools: vocational training opportunities

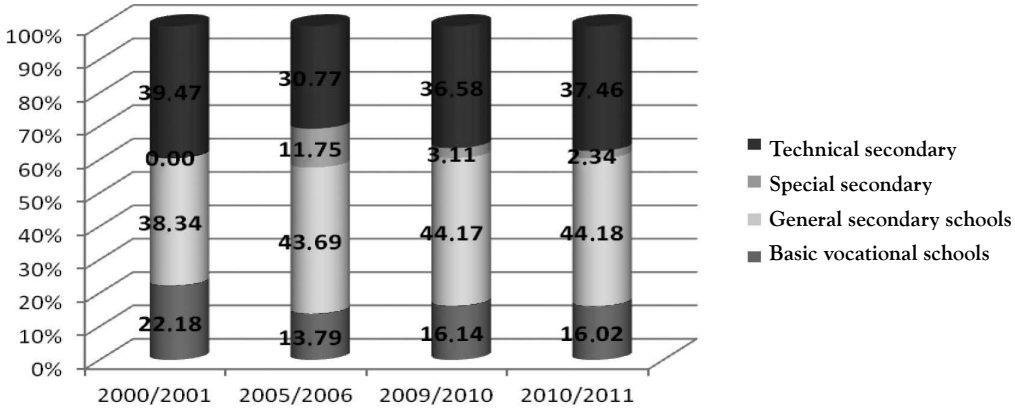
In the Polish education system, students can choose to take the vocational training path after undergoing compulsory general education in lower secondary school.

[15] *Ustawa z 19 sierpnia 2011 r. o zmianie ustawy o systemie oświaty oraz niektórych innych ustaw*—an Act of Parliament of Aug. 19, 2011 amending the Education System Act and several other laws. The law has been signed by the president but at the date of publication had not yet been promulgated in the *Dziennik Ustaw* journal of laws.

In the context of the available vocational education models, the Polish system combines the model based on compulsory education in primary and lower secondary school followed by deeper diversification afterward with the state-regulated model (whereby the central government is responsible for the curricula of both general and vocational schools at the upper secondary level, while the local government is responsible for the establishment and operation of public schools). However, the Polish system also has some features of the dual corporate model involving occupational training provided by the employer.

Figure 9

Distribution of students in upper secondary schools for young people in the 2000/2001–2010/2011 period (not including post-secondary non-tertiary schools)



Source: *Mały rocznik statystyczny Polski 2011*, GUS, Warszawa.

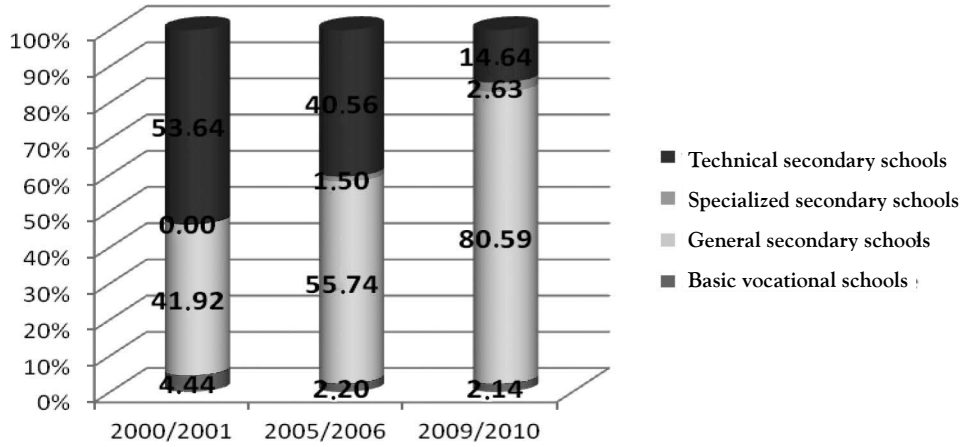
Under existing law, vocational and continuing training is organized and provided in upper secondary public and non-public schools for both young people and adults. Such training is also available on an extramural basis in facilities other than schools. Public schools for young people and adults may be founded and operated by local governments, other institutions as well as individuals. Non-public schools are organized and run by institutions and individuals (including social organizations and associations, religious organizations and so on). In the 2010/2011 school year, in all types of vocational schools for young people (except post-secondary non-tertiary schools), there were over 780,000 students pursuing their education and professional qualifications; their number decreased by more than 2% from the previous year. Post-secondary non-tertiary schools had 298,800 students. Post-secondary non-tertiary schools are intended for those holding a certificate of graduation from secondary school or a matriculation certificate and are expected to prepare their graduates to work in their profession; they also prepare students to have their qualifications evaluated in

a professional exam. Taking into account the age of those taking up training, these schools are intended for adults.

Schools and institutions offering continuing education include schools for adults (both public and non-public), institutions of continuing education, practical training centers, and training and professional development centers. Vocational schools for adults had 58,600 students acquiring qualifications in the 2010/2011 school year. To compare, general secondary schools for adults and complementary secondary schools had a combined 218,400 students, or three times as many. On this basis, it is possible to conclude, with some caution, that early school leavers more often choose general than vocational schools if they decide to resume their education in the school system. This may be due to the shorter learning period in general secondary schools and a better chance of preparing for the matriculation exam (Figure 10).

Figure 10

Distribution of graduates from upper secondary schools for adults in the 2000/2001–2010/2011 period



Source: *Mały rocznik statystyczny 2011*, GUS, Warszawa.

Data comparing vocational school students by type of occupational training show that engineering and technical occupations as well as services for the population are best represented in basic vocational schools offering occupational training to those interested in becoming skilled workers. These fields accounted for more than 60% of the students trained in the 2010/2011 school year, and for more than 59% of graduates in the 2009/2010 school year. In technical secondary schools, the range of training opportunities by field was wider, but analysis reveals a pattern similar to that for basic vocational schools. The largest number of students in the 2010/2011 school year

were in services for the population and engineering and technical fields, at 44.7%, production and processing, at 14.4%, and social services, at 10.5%.

Research conducted in 2011 in schools offering vocational training shows that the choice of occupation, not the school itself, is the main factor determining the choice of education path (82% vs. 18%). Among the dozen or so options that the respondents could choose from, identification with a profession and a desire to work in it turned out to be the most important factor for 62% of students, followed by employment opportunities resulting from working in a specific profession, which collected 50% of responses. Financial motivation and the respondents' belief that the profession of their choice will guarantee them good earnings was the third most important factor, with 45% of responses (MEN, 2011). At the same time, panel research among experts accompanying the surveys of students reveals that, in choosing a specific profession, students are not fully knowledgeable about what this profession really involves. They tend to be guided by the name, which may prove misleading, because the name of the profession may sound either encouraging or discouraging.

While assessing the competitiveness of students and graduates of vocational schools and other school institutions in Poland, it is worth highlighting statements made by students about the style of education and learning. In this evaluation, two indexes are helpful: the willingness to learn and educational commitment. The first index is 55 on average on a 100-point scale, and the second is 48. The ratings show that basic vocational and complementary technical secondary school students are the least willing to learn, with indexes of 54 and 49 respectively. Similarly, basic vocational school students have the lowest level of educational commitment, at 47. Technical secondary school students come next with 48, while post-secondary non-tertiary school students lead the way in this group, with the highest indexes of the willingness to learn and educational commitment: 57 and 50 respectively.

Vocational training in higher education: debates, reforms and problem areas

Many conceptual ambiguities and problems—including those related to an answer to the question about the scope of vocational education—stem from a lack of transparency of the existing structure of higher education. This lack of transparency is due to the overlapping of the so-called academic and non-academic sectors. And it is not entirely clear whether this blurring of the differences between them is the result of their own policies (including the efforts of vocational colleges to obtain academic university

status) or is caused by the lack of strong political will among decision makers over how higher education should be structured (coupled with inconsistent legal provisions).[16]

The two-level study system has drawn some criticism in academia. Its introduction was imposed by law in many countries, although some courses are still run as single-stage programs (in Poland, these include medical studies, psychology, and law). The two-stage structure (3 + 2 academic years) dominates in the education systems of 17 Bologna Process signatory countries (including Denmark, Finland, Poland, Slovakia, Sweden and Italy), and a further 22 countries use it as a supplemental model (for instance, 4 + 1 academic years in Scotland or 4 + 2 academic years in Lithuania) (Eurydice, 2010). The two-stage model has been expanded to include doctoral studies now treated as third-stage studies (Berlin Communiqué 2003).

Can vocational studies be two-stage studies as well? It is possible to assume that the emergence of state vocational colleges opens a new chapter in Polish higher education. The establishment of state vocational colleges was determined by five key factors that could determine the future competitiveness of these universities. The first factor was the creation of opportunities for young people living in the immediate vicinity of such a college to study for free. The second factor was close cooperation with an academic university (usually the nearest one); third, adapting the range of courses (majors) offered by universities to the needs of the local labor market; fourth, ensuring adequate physical conditions for the establishment and functioning of the university; and fifth, the involvement of local authorities, employers and other parties in the process of establishing a university. The order in which these factors are listed does not necessarily reflect the importance attributed to them (Drogosz-Zabłocka, Minkiewicz, 2006).

University-level schools: vocational training opportunities

As of Nov. 30, 2009, 1.9 million people (including foreigners) studied at both public and non-public universities, almost 65% at the undergraduate level[17] (46% pursuing a bachelor's degree and just over 18% an engineering degree). Foreigners represented only 0.68% of this subpopulation.[18] The distribution of students in the two types of university-level schools differed significantly (Table 12).

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16 Should these two sectors remain separate on account of their different tasks and diverse relationships with the surrounding world as well as their different social functions and obligations with regard to the economy, or rather should they have similar status now that education has become a mass phenomenon? (for more on this, see: M. Wójcicka, *Studia zawodowe w Polsce*, CBPNiSzW UW, Warszawa 2002, p. 21).

17 The number of graduates of undergraduate studies was almost 10% less (at about 54%), which may show that two-stage studies are gaining popularity.

18 0.7% in graduate studies and just over 1% in uniform master's programs.

Table 12
Distribution of students in public and non-public university-level schools (by type of studies) in the 2009/2010 academic year

Students	All university--level schools	Public universities	Non-public universities
Total	100.00	100.00	100.00
Graduate studies leading to a master's degree (including medical studies)	35.50	40.11	26.27
Undergraduate studies leading to an engineering degree	18.37	22.77	9.56
Undergraduate studies leading to a bachelor's degree	46.13	37.12	64.17

Source: GUS, 2010, p. 62 et seq.

In public universities, the number of students in master's programs was roughly equal to the number of undergraduate students pursuing bachelor's degrees, with the master's students slightly more numerous. In non-public universities, undergraduate students pursuing bachelor's degrees dominated (more than 64% compared with over 26% in master's programs). As far as engineering programs are concerned, these are clearly more numerous in public institutions, partly because these studies are more expensive, require appropriate equipment and staff and need an adequate level of skills in mathematics and physics.

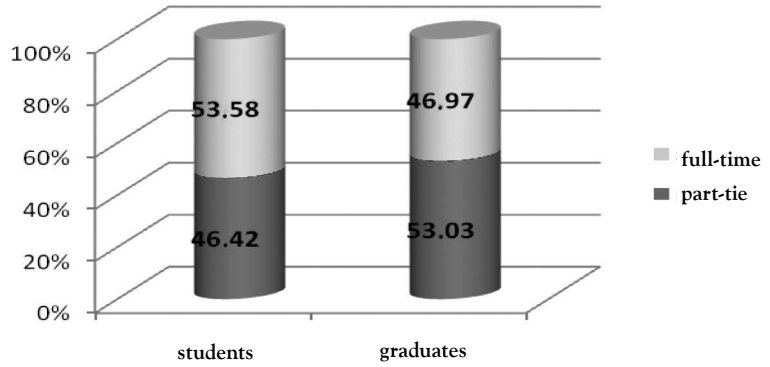
The area of education analyzed in this subchapter applies to undergraduate studies. Statistics show that students from public universities account for nearly 62% of all students at undergraduate level pursuing their bachelor's and engineering degrees (compared with 38% for students from non-public universities).

Several conclusions about education at the undergraduate level can be drawn from annual reports submitted by universities (2009/2010) to the Ministry of Science and Higher Education. About 90% of the market can be described on the basis of these reports.

First, as a result of a decreasing number of those seeking admission to university, the proportion between full-time and part-time students is changing; the percentage of the former is growing, at both the undergraduate and graduate levels.[19]

[19] The percentage of full-time students in uniform master's programs is falling.

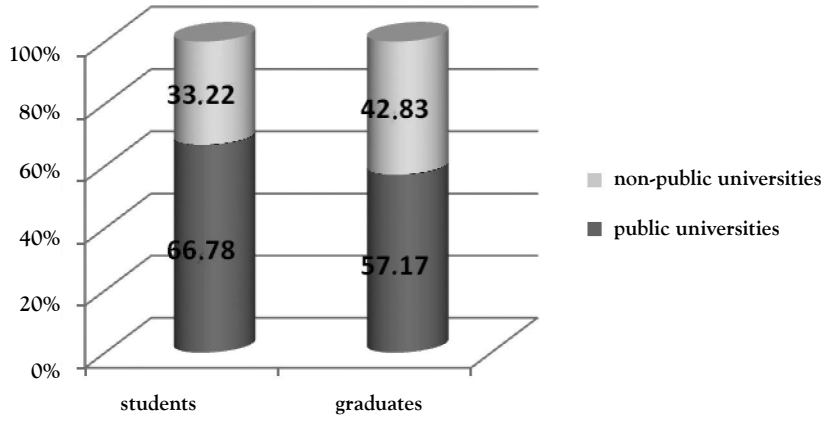
Figure 11
Distribution of students and graduates at the undergraduate level by mode of study



Source: Own calculations based on university annual reports 2009/2010.

Second, demographic changes have changed the preferences of those seeking to enroll: interest in studying full-time increased (Figure 11), primarily in public universities (Figure 12).

Figure 12
Distribution of students and graduates at the undergraduate level by form of university ownership

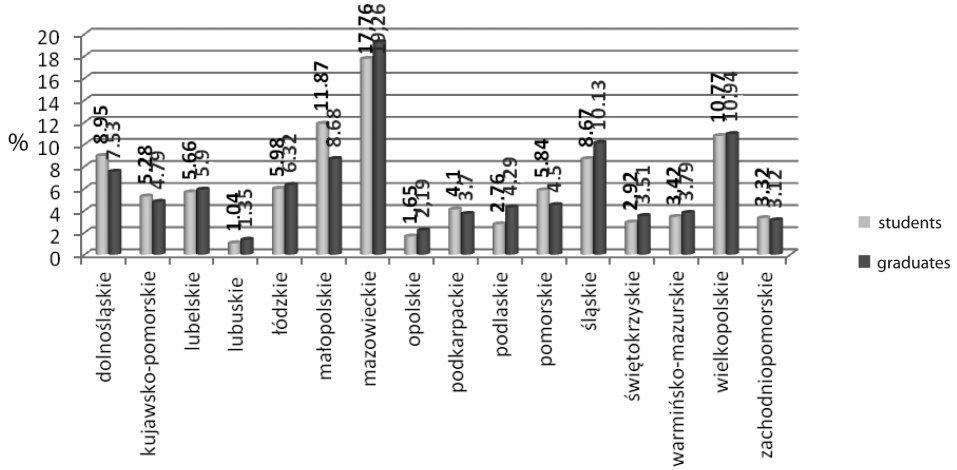


Source: Own calculations based on university annual reports 2009/2010.

Third, the student and graduate populations in various regions differ significantly in the size of the education market (Figure 13). Although this market today is

incomparably larger than in the early 1990s, the vast majority of both public and non-public educational institutions are based in major academic centers such as Warsaw, Cracow, Poznań, Katowice, and Wrocław.

Figure 13
Distribution of students and graduates at the undergraduate level by province



Source: Own calculations based on university annual reports 2009/2010.

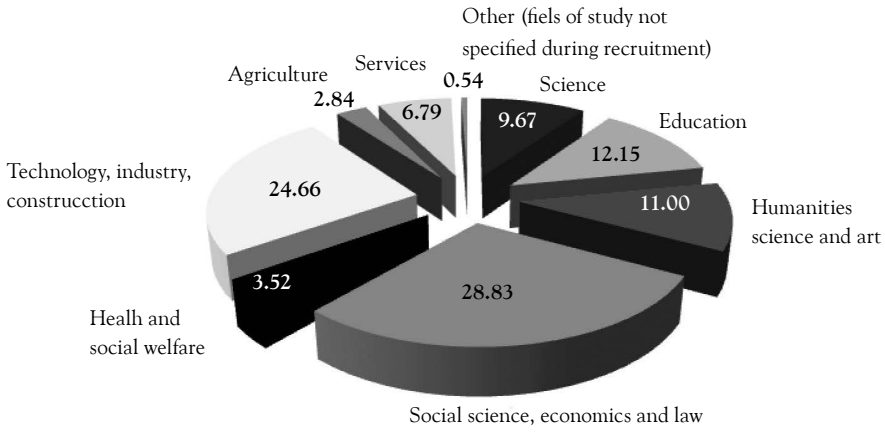
Fourth, applicants and students at public universities have more diverse interests than their counterparts at non-public universities. Public institutions are able to offer a more diversified and "balanced" portfolio in terms of courses and sizes of intake. Although the largest number of public university students (almost 29%) choose social sciences, economics and law, nearly 25% (compared with under 5% at non-public universities) choose technology, industry, and construction, and around 10%-12% select education sciences, the humanities and arts, and science. About 7% choose courses from the "services" group. Courses offered by non-public universities are primarily those in social sciences, economics and law (selected by over 52% of students in these universities), education sciences and services (almost 14% and nearly 12% of students respectively) and health and social welfare (7%) (Figures 14 and 15).

Fifth, a comparison of the breakdown of courses chosen by students and the breakdown of graduates by field of study in both public and non-public universities reveals changing preferences among young people when it comes to the study fields they choose. In public universities, interest in "social sciences, economics and law" and "education sciences" has decreased markedly, while interest in "technology, industry, and construction" has risen. In the case of non-public universities, interest in "social sciences, business and law" has dropped by about 5 percentage points, and interest

in education sciences has decreased by about 3 points; the proportion of students in courses from the group "services" has grown slightly.

Figure 14

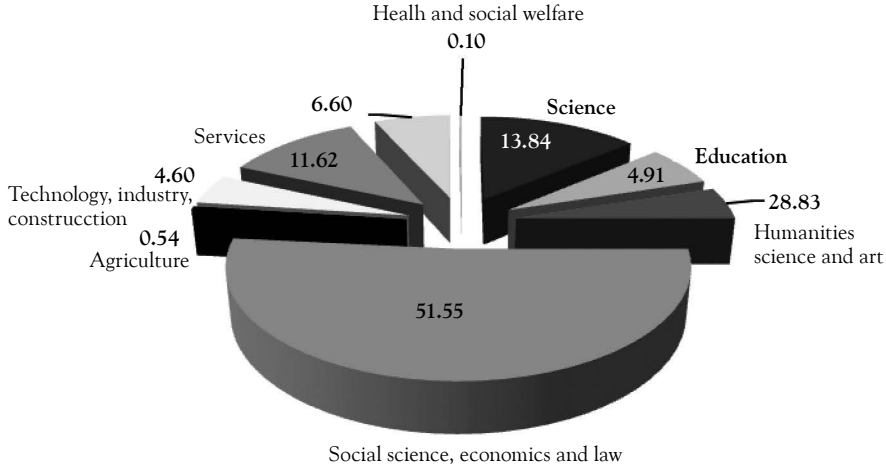
Breakdown of courses chosen by undergraduate students in public universities (by study field groups)



Source: Own calculations based on reports by university rectors.

Figure 15

Breakdown of courses chosen by undergraduate students in non-public universities (by study field groups)



Source: Own calculations based on reports by university rectors.

The main aim of vocational colleges is to quickly (through a short education program) prepare their students for occupations that require both higher education and practical professional skills. But, on account of their status and the way in which they are perceived in society,[20] vocational colleges are also expected to prepare their students for further education, which means studies at graduate level.[21] Can these two goals be reconciled under a two-stage studies system? This question has long been debated: whether undergraduate studies should be academic or vocational in nature. If academic, then the professional qualifications of someone who discontinues their education at this level are unsatisfactory; if vocational, then could all the general and basic subjects be moved to the graduate level (thus reversing the learning pyramid)? (Witkowski, 2001). This ambiguity and inability of vocational colleges to attain their aims in the existing system means that the system should be reformed. It seems that the best solution could be a binary study system in which three-year and five-year vocational studies would exist independently of each other, with different aims as well as different education concepts, plans, curricula and graduate profiles; perhaps such studies could also lead to different degrees. The flexibility of the system could be ensured by an additional compensatory year during which graduates of vocational colleges would be able to catch up with other students in terms of curriculum differences as part of individual programs of study.

1. Three-year (bachelor's) studies: equipping graduates with basic methodological tools to enable them to carry out specific practical tasks;
2. Five-year (master's) studies: enabling graduates to familiarize themselves with the epistemological and methodological basis of a given field, in addition to acquiring professional skills (Witkowski 2001).

Although such a system is more transparent, it has many opponents. Various interest groups linked with higher education as well as educational institutions themselves make it impossible to reach consensus on this matter. Three-year vocational colleges (both public and non-public) want to provide five-year studies, because such are the expectations of the young people who enroll in these colleges and such are the preferences and aspirations of those who establish and run these institutions. One of the reasons is that the bachelor's degree is still not recognized on the Polish labor market and students rarely discontinue their education at this stage. Moreover, "academic" universities are interested in keeping the arrangement in which undergraduate programs are an abridged version of academic programs, because this makes it easier for their graduates to advance to complementary master's studies,

[20] Admittedly, regulations (the law of June 16, 1997 on vocational colleges) imposed no such obligation on them.

[21] A vast majority of graduates of undergraduate programs continue on with their education. Only those who are unable to meet the requirements of complementary master's studies, or those who, because of various life circumstances, cannot remain outside the labor market, decide to get a job instead.

mostly part-time, which means ones that will generate income for the universities from tuition fees.

The range of fields of study offered by public universities is in most cases adapted to their capabilities in terms of lecturers as well as their perceptions about the educational needs of applicants. In the case of non-public universities, the key factor is the needs of the applicants and the possibilities for hiring staff, rather than an evaluation of demand for labor.

Naturally, in both types of university-level schools, the costs of education are important, hence the focus on studies that are less costly than others and whose costs can be reduced still further (by offering part-time programs, not using laboratories, and providing no individualized study programs). At the same time, employers are not interested in hiring graduates of the most popular fields of study such as management or education sciences, though, interestingly enough, management graduates have little problem finding a job (this may be because their key competencies enable them to meet various professional challenges). Statistics on the breakdown of students by field of study (for example, data by Eurostat) show that studies in information technology, law and health have developed too slowly in Poland in the last 20 years, and that there are not enough students in fields involving technology, mathematics and physics, compared with highly developed countries—too few to meet the educational objectives of EU strategies.

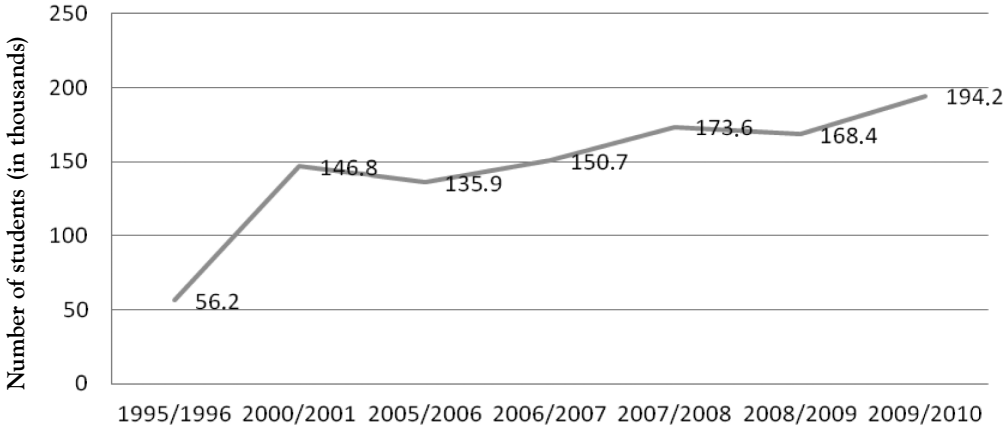
Postgraduate and MBA programs as a form of vocational training for professionals

An extensive range of postgraduate and MBA programs has developed, along with other courses and training programs, in response to rapid changes in the education sector, the labor market and the economy as a whole. These programs enable students to update, deepen and broaden their knowledge and acquire new skills. Postgraduate and MBA programs are also a response to the growing educational aspirations of not only young but also middle-aged people, accompanied by the growing requirements of employers.

Non-technical universities have the largest share in this market (measured by the number of students), with one-quarter of all students, followed by "other institutions" (23%), universities of economics (almost 19% of all students), the Medical Center of Postgraduate Education (around 12%), and universities of technology (just over 11%). About two-thirds of postgraduate students are enrolled in studies run by public institutions.

In the 2009/2010 academic year, universities offered a total of 3,782 postgraduate programs. Most of these were available along commercial lines (except programs financed or co-financed from the European Social Fund, which, due to their attractive prices, have become competitive compared with other programs. Postgraduate studies varied in duration, from one to eight semesters. There were 82 one-semester programs, 2,340 two-semester programs, 1,181 three-semester programs, 161 four-semester programs, and 17 five-, six- or eight-semester ones.

Figure 16
Postgraduate students (in thousands)



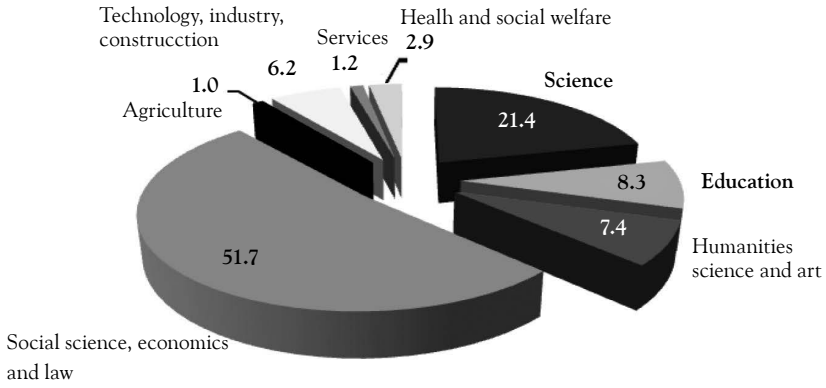
Source: GUS, 2010, p. 33.

In the 2009/2010 academic year, public and non-public universities had a total of 144,387 postgraduate students and conferred 102,414 postgraduate degrees. When it comes to the fields of study, these are closely related to, first, the areas in which the universities and their lecturers specialize, and second, to student expectations and market demand.

Research into the subject matter of postgraduate programs in terms of fields of study[22] shows that almost 52% of all studies were in the area of social science, economics and law, more than 21% in the area of education, and 6%-8% each in humanities science and art and in technology, industry and construction. a breakdown of the fields of study by subgroup reveals that the broadest range of postgraduate programs is available to students in the subgroup headlined economics and administration (almost 34% of all studies), followed by teacher training and education science (21.4%) and social sciences (13.4%). a breakdown of postgraduate programs by field of study shows that education sciences accounted for a fifth of all postgraduate studies, and management and administration for almost 23%. The remaining study fields accounted for 0% to 4% of all postgraduate programs.

[22] According to GUS, 2011.

Figure 17
The subject matter of postgraduate programs by study field groups



Source: Own calculations based on data available on the website www.studiapodyplomowe.info/

Almost one-fifth of all studies were offered by universities in the central Mazowieckie province, around 10% in Śląskie province, around 9% each in Małopolskie and Dolnośląśkie provinces, 7.5% in Wielkopolskie, nearly 7% in Pomorskie, and 5%–6% each in Łódzkie, Kujawsko-Pomorskie, Lubelskie and Zachodniopomorskie provinces.

MBA studies are a specific segment of Poland's education system due to a high level of international standards for these programs, their content, teaching methods, the status of the degree, and the return on investment.[23] According to the European Foundation for Management Development (EFMD), these studies are intended for people with several years of professional experience who seeking to broaden their general knowledge of business management.

In 2010, Polish universities and other educational institutions offered a total of 60 MBA programs, up from 54 in 2008. According to data available on university websites, Poland's first MBA program was launched in 1989, and most of the currently available programs are general executive programs; only six of the 60 programs were specialized. Most programs are offered in association with foreign partners and more than half have a quality certificate (usually issued by a foreign accreditation institution for either the program itself or the institution that runs it). English is the language of

[23] A nationwide study by the Sedlak & Sedlak company in 2009 found that the possession of an MBA degree is an important factor determining remuneration at individual positions in an organization—the higher the position, the higher the salary and the greater the difference in pay. a specialist earns ZL 4,360 per month on average, according to the study, a senior specialist around ZL 8,500, a manager ZL 9,500, a director and a management board member ZL 20,000 (in: A. Czajka, *Zarobki osób o różnym wykształceniu w 2009 roku*, www.wynagrodzenia.pl).

instruction for less than a third of the programs; some are in Polish, and the remaining programs offer some classes in Polish, and some in English or French.

MBA studies last from two to five semesters. Of the 55 programs for which such data is available, 35 lasted four semesters, nine lasted two semesters, another nine lasted three semesters, and two programs were completed in five semesters. The average tuition fee for an MBA program per student was over ZL33,000.[24]

What is the scope of education at MBA programs? No accurate data is available on this subject. In 2006, the managers of 47 programs run by 32 educational institutions covered by a rating system reported that their MBA programs produced around 10,000 graduates. In 2010, the total number of graduates of 37 programs exceeded 12,000. This is a competitive market, very diverse in terms of curricula, procedures, quality and price of educational services (as shown above). a survey[25] shows that the main criterion for respondents in choosing an MBA program is its curriculum (52% of responses), the prestige of the institution that offers it (42%), price (40%) and the location of the university (34%). Less important criteria include the university's rank in league tables (26% of responses), the language of instruction (24%), accreditation (18%), duration, and the way in which classes are organized (17%), recommendation from friends (16%), and lecturers (14%).

Are graduates of specialized (vocational) education programs competitive on the job market?

To answer this question, let us again refer to the aforementioned efforts designed to contribute to building a flexible and competitive area of vocational education in Europe (Wollschläger, Reuter-Kumpmann, 2004, p. 17). These efforts result from the Lisbon Strategy and include:

- building a common framework of qualifications,
- introducing a credit system (ECVET and ECTS),
- identifying and introducing common criteria for the quality of vocational education and training,
- identifying and introducing common guidelines for the validation of informal and non-formal learning
- lifelong guidance.

24 The lowest tuition fee was ZL 7,200, while the highest was ZL 113,620.

25 The survey, called *Report MBA*, was conducted in February 2010 among users selected from the Pracuj.pl database. a total of 677 respondents filled out and returned an online questionnaire (http://www.pracuj.pl/edukacja/kwalifikacje-zawodowe-mba-przepustka-do-kariery.htm).

Building a common framework of qualifications and a credit system

The Polish (National) Qualifications Framework (PRK, KRK) does not yet function in practice as a method of describing education and making skills acquisition more flexible. But work has intensified to introduce it, as is evidenced by numerous seminars and conferences as well as publications focusing on the subject. One objective for introducing the framework is to ensure greater integration of all three sectors of education in Poland—general, higher and vocational—and to create opportunities for quickly responding to the needs of society, including the labor market, and for making education more flexible (MEN, 2010, pp. 17-22). Work published so far by a team of experts shows that the Polish Qualifications Framework model will feature so-called "full" qualifications (assigned to a specific level) and "partial," narrower, qualifications that would not enable the student to seek qualifications at a higher level.

The Polish Qualifications Framework model will be linked with the results of learning to which a specific number of credits can be attributed. At the current stage of work, we are dealing with three systems in this area: ECTS, SATO and ECVET.[26] The oldest, the ECTS system used in higher education, was established in the late 1980s as part of the Erasmus program to permit the transfer of credits between university-level schools for increasingly mobile students (studying and taking internships in different universities). Credits are determined in several ways, usually based on the number of course units and nominal student workload. ECTS credits are allotted depending on learning achievements and matching qualifications at levels 5-7. The two other systems are SATO and ECVET. SATO credits are allotted for learning achievements in general education, corresponding to qualifications at levels 1-4. ECVET credits are allocated for learning achievements in vocational education. Under the draft guidelines of the Polish Qualifications Framework, professional qualifications are those for which the ratio of ECVET credits to SATO or ECTS credits will be expressed as a fraction greater than one-half. Perhaps this arrangement will contribute to greater transparency of what university-level schools have to offer in terms of the academic/professional profile of studies.

As a result of using the KRK (PRK) with regard to learning achievements in higher education, the current principle of standardizing fields of study and the central list of names of study fields will be scrapped. Learning achievements will be standardized at the central level. They will be described according to three factors: knowledge, skills (including communication and learning), and personal and social competence.

[26] SATO is a credit accumulation and transfer system in general education; ECVET is the European Credit System for Vocational Education and Training; ECTS is the European Credit Transfer System in higher education.

Qualifications may also be defined by the profile of education, either theoretical or practical, or by the field of education, for example the humanities, technology or social sciences. It is worth noting that qualifications described in such a way would not only lead to a change of the language terminology used, but first and foremost to a change in the way of thinking about higher education, in which the students' learning process and the results of their work will be the most important factor.

Quality of vocational education and training and the validation of formal, informal and non-formal learning

The quality of vocational training is tested by external examinations that evaluate students' professional qualifications. The existing model of the professional exam taken by vocational school graduates will be modernized in two ways. First, the exam will evaluate qualifications required in a specific trade, and second, in the future, it will evaluate qualifications obtained in an informal and non-formal manner. It seems that higher education institutions could participate in this process by organizing the evaluation of qualifications in some trades or groups of professions, for example economic, technical, or agricultural ones, as well as by opening centers for the validation and recognition of qualifications. Today, they are subject (on a voluntary basis or otherwise) to assessment by accreditation committees (a state committee and community, national and foreign committees) and to assessment by the market (through ranking lists published in the press, surveys of employers and graduates and so on). They also introduce internal quality assurance systems and standardize certain components of training programs as well as requirements.

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5.3. The Impact of Employee Training on the Competitiveness of Polish Enterprises

Joanna Żukowska

Polish companies—their owners, employers and managers—are beginning to invest increasingly in the professional development of staff, hoping that an improvement in staff skills, qualifications and competences will contribute to better performance of the organization. This subchapter focuses on the methods for improving employee qualifications and evaluates the effectiveness of these methods. The evaluation is

based on survey findings and takes into account both the views of employees taking part in training programs and their supervisors who decide to organize and apply such training. The aim of the analysis is to determine whether educating employees leads to an increased competitiveness of the company.

Methods of improving employee qualifications

We begin with a brief discussion of the terminology, which includes notions such as competence and qualifications.

Professional qualifications are a set of knowledge, skills, and psycho-physical characteristics required for the proper performance of responsibilities in a profession. Four types of professional qualifications are commonly categorized:

– supra-professional qualifications
– general professional qualifications
– basic professional qualifications
– specialized qualifications (Bednarczyk, Woźniak, Kwiatkowski, 2007, pp. 41-43)

In another approach, professional qualifications are defined as "the formal outcome of a process of assessment and validation in which the relevant authority declares, in keeping with an established procedure, that an individual has achieved learning results meeting specific standards." (Chmielecka, 2009, p. 18).

Professional skills are the abilities to carry out tasks in a specific profession. They are reinforced by knowledge and psycho-physical characteristics (Bednarczyk, Woźniak, Kwiatkowski, 2007, pp. 41-43).

Alongside qualifications and skills, researchers also speak of competences, or a set of knowledge, understanding, readiness and propensity to carry out tasks in the right way (Chmielecka, 2009).

The European Parliament and the Council of the European Union identified a range of key competences in 2006. These are defined as a combination of knowledge, skills and attitudes appropriate to the context. Eight key competences have been set out:

– communication in the mother tongue,
– communication in foreign languages,
– mathematical competence and basic competences in science and technology,
– digital competence,
– learning to learn,
– social and civic competences,
– sense of initiative and entrepreneurship,
– cultural awareness and expression.

In 2010, the Polish Confederation of Private Employers set out to find out what forms of skill development are the most common on the Polish market. The findings show that, in descending order, these are: 1) training programs, workshops, seminars, 2) participation in various projects and traineeships; 3) coaching and mentoring, 4) postgraduate studies and MBA programs.

Approach to staff development worldwide

Boston Consulting Group, together with the World Federation of People Management Associations, surveyed employees and managers from 36 countries in all continents in the third quarter of 2010. The survey tested the alignment of companies' work-force strategies, including training strategies, with their business strategies. It also looked at how training programs were adapted to the skills of individual employees.

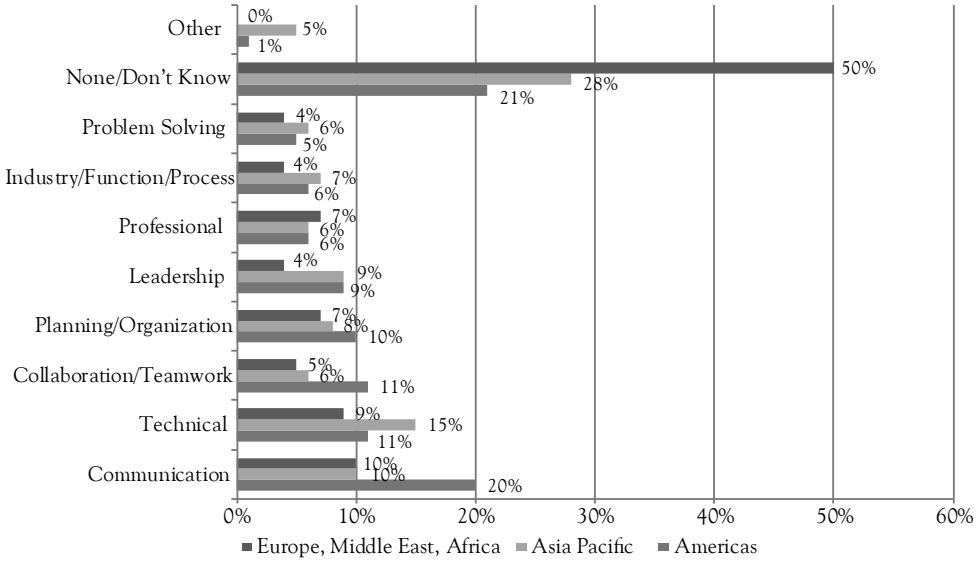
The results of the research are quite encouraging: 77% of the managers surveyed said their companies' work-force strategies were aligned with their business strategies; 64% said their workforce strategy, including training strategy, was adapted to what happened on the market and was agile enough to address the changing needs of the economic environment. Only 4% of respondents said their work-force strategy did not address the changing needs of the economic environment (Manpower, 2010). Interestingly, 79% of employees agreed that their companies' business strategies were aligned with their work-force strategies.

In the next stage of the research, the employees polled were asked to assess to what extent their skills were adapted to the requirements of their job; 90% of those surveyed said they had adequate qualifications to carry out their responsibilities at work. Still, they identified some areas where improvements may be needed. Nearly 20% of respondents mentioned communication and technical skills, just over 10% listed problems with planning and organization, and 8% highlighted difficulties in teamwork. At the same time, they declared a readiness to undergo these types of training.

Notably, those polled gave similar responses regardless of their job and profession. The distribution of the responses by country was more diverse (Figure 18).

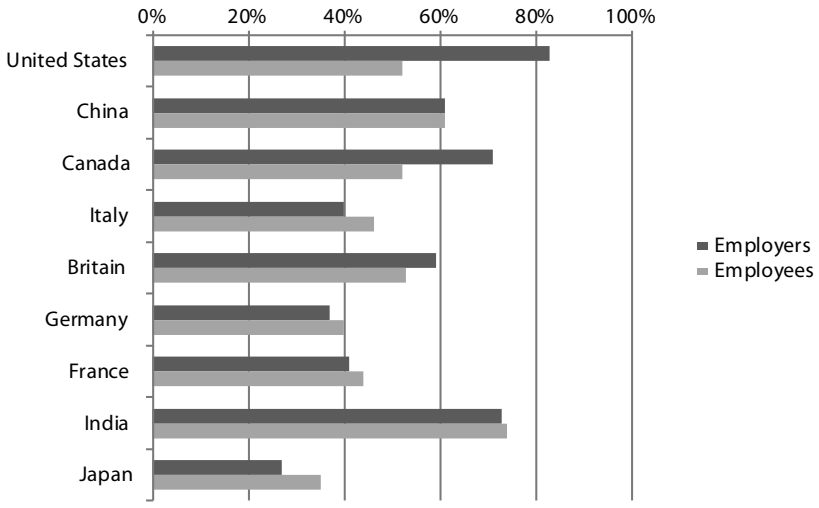
Studies worldwide showed that 73% of enterprises attach great importance to the development of their employees; almost 85% said that staff competences are very important to them. The research also analyzed the actual, not just declared, investment in the professional development of employees. It showed that there are some differences in how employees and employers assess the situation in this area in different countries (Figure 19).

Figure 18
Training needs—survey findings for different regions of the world



Source: Own elaboration based on: Manpower, (2010), *Strategia zatrudnienia: wyniki globalnego badania*.

Figure 19
Investing in staff—survey findings for selected countries



Source: Own elaboration based on: Manpower (2010), *Strategia zatrudnienia: Wyniki globalnego badania*, http://www.hrnews.pl/reports/Badanie_Strategie_zatrudnienia_Globalne_wyniki_2010.pdf.

Investment in work-force education—Poland compared with other European Union countries

The issue of training employees is an increasingly important area of interest for companies in Poland. Surveys of Polish companies in terms of work-force education[27] show that 85% of small businesses sent their staff for training in 2010. For micro-enterprises, the figure was 77% , an increase of 10 percentage points from the previous year. The combined figure for small and medium-sized enterprises in terms of sending staff for training was nearly 90%, an increase of six percentage points from the previous year. In the first quarter of 2011, 81% of small businesses declared that employee training was part of their annual plans. An overwhelming 89.5% of large companies decided to train their employees. Interestingly, training co-financed by the European Union accounted for only 19% of all training programs in companies investing in the development of their staff (http://hrstandard.pl/).

Market data also shows that managers are aware of the role of employee training, viewing it as an important factor that should be part of their companies' strategies. According to 58% of managers surveyed, staff competence has increased significantly as result of training, while 38% said there is a relationship between training and an increase in the company's competitiveness. Only 12% of respondents said training is a superfluous investment when it comes to employees. This last view was voiced in equal measure by all the companies surveyed, regardless of size (*MillwardBrown SMG/KRC 2011)*. Managers also expressed the view that training contributes to increased loyalty among employees and to their greater involvement in their work.

A cross-sectional analysis of market data reveals that the perception of the role of staff development has improved significantly. This is true of both employees and employers/managers. In a study conducted in 2008 by the IPSOS company (2008), 40% of respondents declared that training programs are too big an expense that would pose too much of a strain on their company's finances, without producing an increase in its competitiveness. Respondents also listed other obstacles to participation in training, such as a lack of time (declared by 26% of those polled), or problems in finding replacements for those taking part in training (9%); 25% of respondents mentioned lack of will and laziness. In a 2010 study, these barriers were no longer mentioned. On the contrary, training was described as an adequate investment in employees that results in a competitive advantage for the company.

The government's position and policies confirm the importance of training, education and staff development. The *Polska 2030* report released by the government in 2009 described the country's development strategy for the next two decades. An

[27] The study, commissioned by the Polish Agency for Enterprise Development (PARP), was carried out by MillwardBrown SMG/KRC in the second quarter of 2011.

improvement in the quality of education is a key factor in the report in both micro- and macro-economic terms.

The global financial and economic crisis has been a significant barrier to training workers. This is confirmed by surveys carried out among company executives in the second quarter of 2011 (Delta Training, 2011); 50% of the managers polled voiced the view that the crisis will negatively affect the training market. They primarily list a reduction in open training (42%), and a reduction in closed training (20%). The research shows that both employers and employees already have such a high awareness of the role of training and staff development that the gap will be filled by in-house training. The subject matter of training to which companies send employees may also change. On the one hand, spending on cost-intensive coaching may be reduced, but on the other, the role of training focusing on sales techniques, customer service and sales management is expected to grow. Businesspeople, especially at a time of slowdown, attach special importance to sales figures, so this area of education should enjoy considerable popularity. Leadership workshops—designed to ensure better manager qualifications and thus increase the effectiveness, efficiency and aptitude of staff—are expected to attract special attention in the near future (Skwarek, 2009).

A turbulent, unpredictable and uncertain business environment may make staff development a more effective investment than speculation on the stock exchange. What's more, a growing number of managers are aware that knowledge is a key part of a good team. Also crucial is the need to adapt training to the needs of an organization so as to strengthen knowledge in the right way. This is linked with additional areas of training to which managers send their staff. In addition to those listed above, these include the art of persuasion and exerting influence, as well as online PR. Skills acquired through this type of training come in handy in sales and in building customer relations (http://inwestycje.pl/kadry_i_place/).

While looking at training programs and education, it is worth comparing Poland with the average situation in the European Union in this area. According to education statistics collected by the EU statistics office, the Eurostat, expenses incurred on education from private sources in Poland varied in relation to GDP from 2002 to 2008; in 2008 they approached the EU average (Table 13).

Table 13

Expenditure on education from private sources as % of GDP in 2002-2008

	2002	2003	2004	2005	2006	2007	2008
EU	0.60	0.64	0.65	0.70	0.67	0.72	0.75
Poland	**0.64**	**0.66**	**0.59**	**0.55**	**0.54**	**0.50**	**0.74**

Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database.

Poland fares slightly worse compared with the EU average in terms of the percentage of employees improving their qualifications (Table 14).

Table 14

Proportion of workers improving their skills in the total number of employees in a profession (%)

		2004	2005	2006	2007	2008	2009	2010
Total	EU	12.4	11.9	11.4	11.1	11.1	11.0	10.9
	Poland	**8.8**	**7.8**	**7.2**	**7.7**	**7.0**	**6.9**	**7.8**
Managers, experts, technicians	EU	19.7	18.4	17.6	17.2	17.1	16.6	16.4
	Poland	**15.9**	**14.1**	**13.3**	**14.4**	**12.9**	**12.0**	**13.8**
Clerical workers, sales staff	EU	12.3	11.9	11.3	11.0	10.9	10.7	10.3
	Poland	**9.1**	**7.9**	**6.7**	**7.0**	**6.0**	**6.8**	**6.6**

Source: http://epp.eurostat.ec.europa.eu/portal/page/portal/statistics/search_database.

Poland's indicators are slightly below the EU average, and their level has been relatively stable during the past decade.

Employee training and the competitiveness of Polish companies—qualitative research findings

Description of the study

In order to more precisely assess the impact of staff training on the competitiveness of Polish enterprises, a survey was carried out in August and September 2011 among a group of employees and managers. The main part of the research was preceded by a pilot qualitative survey in which 15 people were interviewed by telephone. This made it possible to ensure the accuracy of the questions included in the questionnaire and make any necessary modifications and adjustments. The main part of the study was conducted out in the field using the Computer Assisted Telephone Interview (CATI) method. To increase the precision of the results, two questionnaires were administered, one targeted at employees, the other intended for managers. The core of the research questionnaire was similar, though some of the questions addressed to the managers were designed to find out about their views with regard to employees.

A five-point Likert scale was used in the study for the respondents to assess individual parameters. The Likert scale is routinely used to measure attitudes on the

basis of the presented views. The scale adopted for the purpose of this study ranged from 1 to 5: 1—„I strongly disagree," 2—„I disagree on the whole," 3—„I don't know," 4—„I agree on the whole," and 5—„I strongly agree."

The study covered 270 employees of micro-, small, medium-sized and large companies. Managers constituted 15.93% of the respondents, while employee represented 84.07% of the sample.

The employees and managers came from 90 companies: 5.93% from microenterprises (with no more than 10 employees), 30% from small companies (with between 10 and 50 employees), 45.19% from medium-sized enterprises (with 50 to 249 employees), and 18.89% from large companies (with more than 249 employees). The studied group was 82.59% made up of private businesses, 3.70% of state-owned enterprises, 11.48% of companies incorporated under commercial law, and 1.11% of foreign-owned companies.

The surveyed companies were divided into sectors: 23.64% were from the manufacturing sector, 23.03% from the service sector, and 21.21% from the retail sector. a further 12.12% were from the construction industry, 6.06% represented the distribution sector, 5.45% transport, and 4.85% the automotive industry. The catering and hotel industry were represented by 1.21% of the companies and education and logistics each accounted for 0.61% of the businesses.

The effectiveness of different forms of skill development as evaluated by employees

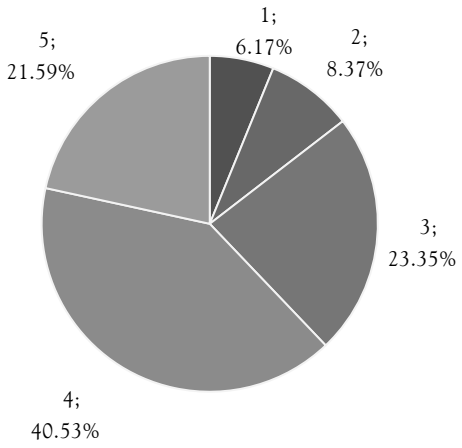
Women constituted 81.5% of respondents, and men represented 18.5%. The vast majority, 86.78%, were white-collar workers. The most interviews were conducted with receptionists (10.13% of the total number of respondents), secretaries (9.69%), and sales staff (9.25%). Accounting and HR/payroll department staff accounted for 8.81% and 7.05% respectively, while blue-collar workers represented 13.22% (including 1.32% drivers, 1.32% fitters, and 0.88% production workers, for example).

In terms of work experience, 66.37% of the employees have been employed in their company for less than five years; of this, 21.36% have been employed for under a year. Another 33.63% have been employed for more than five years. The breakdown of respondents by length of time in their present position looked similar. Those holding their present position for no longer than five years prevailed (67.73%); of this 21.36% have had their present job for no longer than one year. Those holding their position for more than five years accounted for 32.27% of the sample; of this 10% have had their present job for over 15 years.

Of the surveyed employees, 82.67% worked in private businesses, 12% in companies incorporated under commercial law, 4% in state-owned enterprises, and 1.33% in foreign-owned companies.

Figure 20

Impact of training on an increase in staff motivation as evaluated by employees

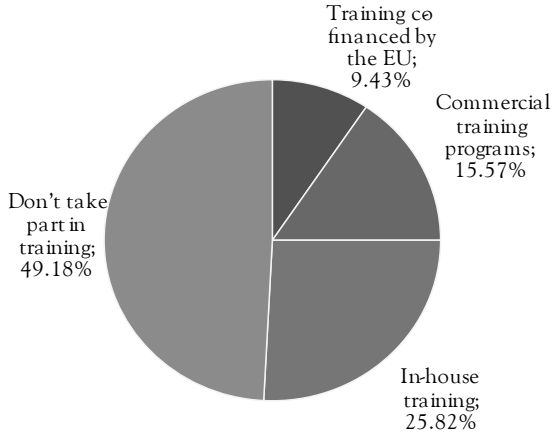


Note:
Likert scale ratings:
5 – strongly agree; 4 – agree on the whole; 3 – undecided; 2 – disagree on the whole; 1 – strongly disagree.

Source: Own elaboration.

Figure 21

Frequency of employees' participation in training during the last year related to their employment in the company by type of training—as evaluated by employees



Source: Own elaboration.

In terms of the size of workplace, 47.14% of the surveyed employees worked in medium-sized enterprises, 27.31% in small businesses, 19.38% in large companies, and 6.17% in microenterprises.

The study began with an analysis of the extent to which the motivation of employees increased thanks to participation in training. More than 60% of the employees declared that they either strongly agreed or agreed on the whole (21.59% and 40.53% respectively) that participation in training programs helps increase staff motivation; 23.35% of respondents were undecided, and 6.17% strongly disagreed (Figure 20).

Respondents' declarations about the frequency of participation in training programs in 2010 are inconsistent with market data. Half the respondents declared they have not taken part in any form of training in the last 12 months; 25.82% said they participated in in-house training; 15.57% took part in commercial training programs, and 9.43% in those co-financed by the EU.

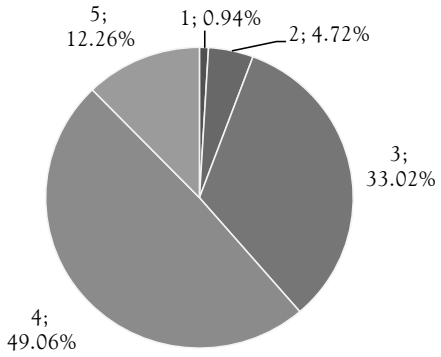
The above data differ from those yielded by a survey on training plans conducted at the start of 2011. This may be because the situation changed in the interviewing period or because the plans made by respondents in the first half of 2011 were too optimistic.

The training programs in which the analyzed group of employees took part covered 135 different areas, but respondents most often mentioned HR and payroll training (13.73% of responses), sales (12.75%), occupational safety (10.78%), languages (7.84%), and value-added tax regulations (2.94%). Respondents mentioned the least often training focusing on security issues (0.98% of responses), environmental protection (0.98%), and public procurement (0.98%). Notably, the subject matter of training was often related to the respondents' professions.

Most respondents, when asked if they have become more efficient in carrying out their responsibilities at work as a result of taking part in training, said training had a positive influence on their performance at work. About 12.26% of the employees surveyed said training contributed significantly to improving their efficiency at work, and almost 50% of respondents said the impact was positive; 3.02% of employees were undecided, and more than 5% said training programs had no impact on an increase in their efficiency at work (Figure 22).

Figure 22

Effect of training on improved staff performance—as evaluated by employees (ratings on a Likert scale of 1 to 5—see note for Figure 20)

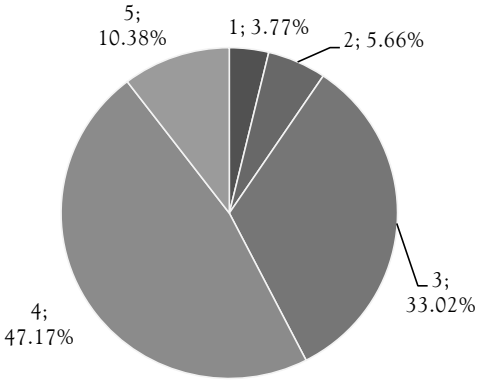


Source: Own elaboration.

Assessing the impact of training on staff motivation, nearly 60% of employees agreed that participation in training has increased their involvement at work (of this, 10.38% strongly agreed, and 47.17% agreed on the whole). a third of respondents were undecided and 5.66% disagreed on the whole, but only 3.77% strongly disagreed (Figure 23).

Figure 23

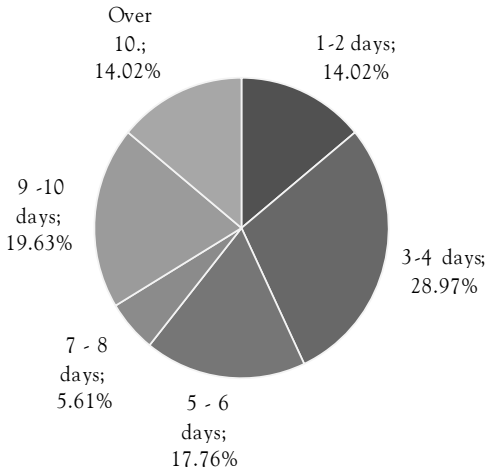
Impact of training on increased staff involvement—as evaluated by employees (ratings on a Likert scale of 1 to 5—see note for Figure 20)



Source: Own elaboration.

Employees were also asked about the number of days they spent in training in the last year. About 14.02% of respondents said they spent more than 10 days training; 19.63% said they were trained 9-10 days; 5.61% were trained from seven to eight days; and 17.76% from five to six days. Around 28.97% of the respondents spent three or four days training; and 14.02% spent one or two days training (Figure 24).

Figure 24
Number of days spent in training over the last year—as evaluated by employees



Source: Own elaboration.

Data on the participation of employees in postgraduate studies in the last three years show that this form of training plays a much smaller role. Only one in 10 surveyed employees said they took advantage of this form of education; 85.85% said they did not participate in postgraduate studies. What's more, the vast majority of those participating in such programs financed this form of education wholly from their own pockets.

Training as part of assessment centers and development centers is even less common.

An important issue addressed in the study was how employees viewed individual forms of skill improvement and their effectiveness in the context of their current position at work.

The assessment covered forms of education such as training programs, postgraduate studies, assessment centers, development centers, a traineeship in a subsidiary in Poland or abroad, as well as coaching and mentoring. Nearly 60% of employees said training

was an adequate method contributing to an improvement in their performance at work; 15% voiced a negative view about training.

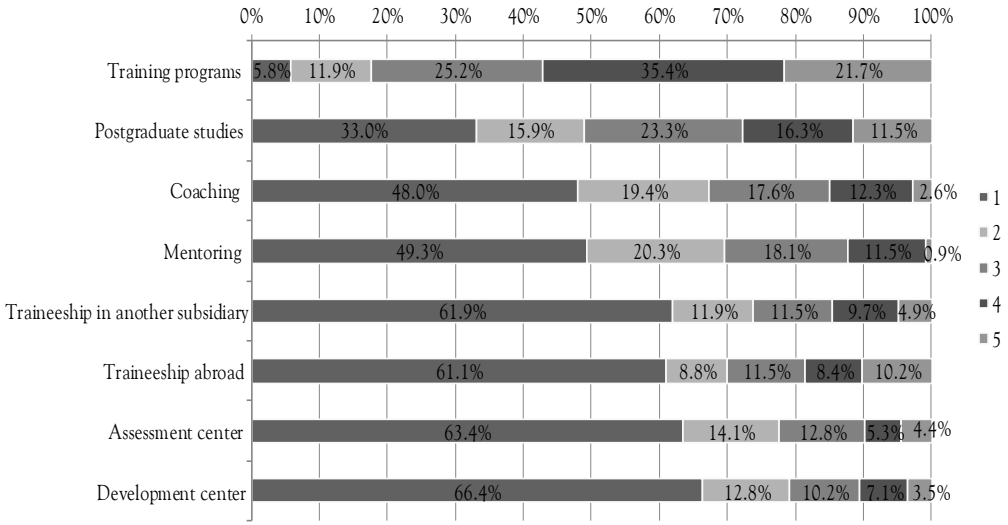
Postgraduate studies were approached somewhat differently. Roughly half the employees said there was no relationship between participation in this form of education and an improvement in their performance at work. Only 25% of respondents said such a relationship exists.

The assessment of coaching by respondents was surprising: 48.02% of respondents strongly disagreed that coaching can positively influence their efficiency at work, while only about 15% of surveyed employees voiced an unreservedly positive view of this form of training.

Similar responses were obtained in evaluating mentoring as a method of improving employees' performance at work. Over 12% of employees surveyed said mentoring has a positive influence on people's performance at work; 18% were undecided; and almost 70% said this form of training had no impact on their work (Figure 25).

Figure 25

Most adequate forms of developing staff competence in their current position at work—as evaluated by employees (ratings on a Likert scale of 1 to 5—see note for Figure 20)



Source: Own elaboration.

Respondents negatively evaluated traineeships in another subsidiary; they do not consider such traineeships to be an effective form of education. Over 70% of respondents disagreed that spending time in another subsidiary contributes to an

improvement in their performance at work. The issue of traineeships abroad looked similar. Just over 10% of employees felt that such traineeships substantially improved their performance.

Only 10% of employees polled positively evaluated the effectiveness of training as part of assessment centers and development centers.

It can be assumed that the negative perception of selected forms of skill improvement by employees may result from the fact that they have never taken part in these, and that innovative nature of these methods is a barrier for them. It should be noted here that the evaluation of different types of training by the other group of respondents, i.e. managers, strongly differed from the views voiced by employees.

Generally, however, employees agreed that taking part in training leads to a significant improvement in their performance at work. They also declared increased involvement and increased personal motivation as a result of training.

The effectiveness of different forms of skill development as evaluated by managers

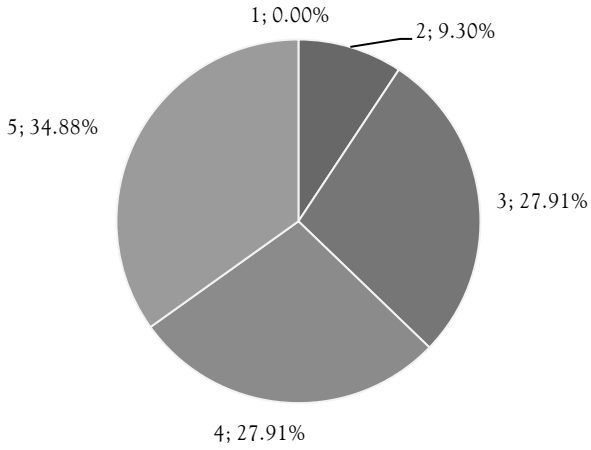
The responses of managers differed from those offered by employees. The studied group was 25.58% made up of women and 74.42% of men; 68.42% of the respondents have worked in their company for over five years, and 31.58% for less than five years; in the latter group, the shortest period of employment was two years. White-collar workers accounted for 97.67% of the managers; of this 25.58% were senior executives. Only 2.33% of the managers were blue-collar workers.

An overwhelming 88.10% of the surveyed managers were from private enterprises, 9.52% from companies incorporated under commercial law, and only 2.38% from state-owned enterprises. Managers from small enterprises represented 44.19% of the studied group, 34.88% were from medium-sized enterprises, 16.28% from large ones, and 4.65% from microenterprises.

Managers evaluated the impact of training on an increase in work motivation among staff in a similar way as employees: 34.88% felt strongly that training increased the motivation of their employees at work, 27.91% agreed on the whole with this view, and 27.91% were undecided—a proportion similar to that recorded among employees. Not a single manager completely dismissed the view that training increases the motivation of employees (Figure 26).

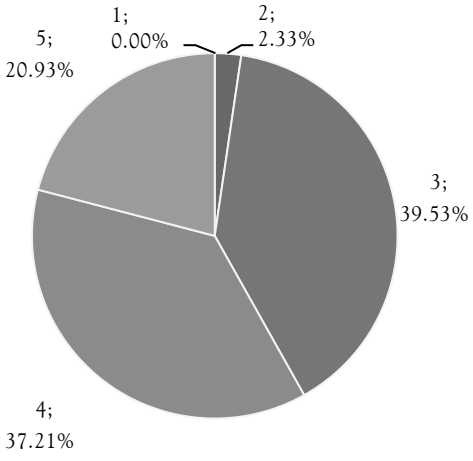
Managers were asked to what extent the performance of employees in their current jobs has improved through participation in training: 20.93% of the respondents strongly agreed that training has a positive effect on employee performance; 37.21% agreed on the whole, 39.53% were undecided, and 2.33% disagreed on the whole (Figure 27).

Figure 26
Impact of training on improved staff motivation—as evaluated by managers (ratings on a Likert scale of 1 to 5—see note for Figure 20)



Source: Own elaboration.

Figure 27
Impact of training on improved staff performance—as evaluated by managers (ratings on a Likert scale of 1 to 5—see note for Figure 20)



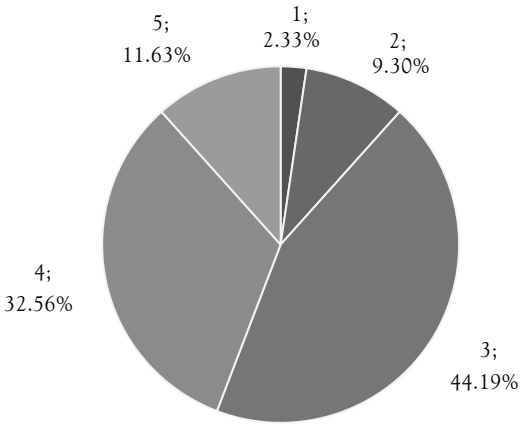
Source: Own elaboration.

The views of managers about the impact of training on an increase in employee involvement are largely similar to the responses offered by employees: 11.63% of the

surveyed managers said training has a strongly positive effect on staff involvement; 32.56% said this effect is positive on the whole. Nearly half the respondents (44.19%) were undecided, and 11.66% disagreed with the view that training leads to an increase in staff involvement (Figure 28).

Figure 28

The impact of training programs on increased staff involvement—as evalated by managers (ratings on a Likert scale of 1 to 5—see note for Figure 20)



Source: Own elaboration.

Managers, similar to employees, said training staff as part of assessment centers is not a very popular form of training. Only 9.30% of the managers said their employees were subject to evaluation as part of an assessment center, while roughly nine in every 10 declared they did not use this method of training with regard to their employees.

The same was true of the role of development centers in employee development. Only 9.30% of the managers said their staff took part in training as part of development centers, while 90.70% answered in the negative.

The views of managers about the impact of individual forms of improving skills on the performance of employees show that training programs are the most effective method. Over 70% of surveyed managers agreed that training has a positive impact on the efficiency of employees (34.88% agreed on the whole and 37.21% strongly agreed with this statement), while less than 7% said that training has no effect on staff performance.

In the case of postgraduate studies, the responses of managers differed from those of employees. Nearly 30% of the managers said this form of training contributes to an improvement in staff performance, while 30.23% voiced the opposite view.

Coaching as a form of employee development was positively rated by 25% of the managers surveyed, while 40% voiced the opposite view. Similar results were recorded

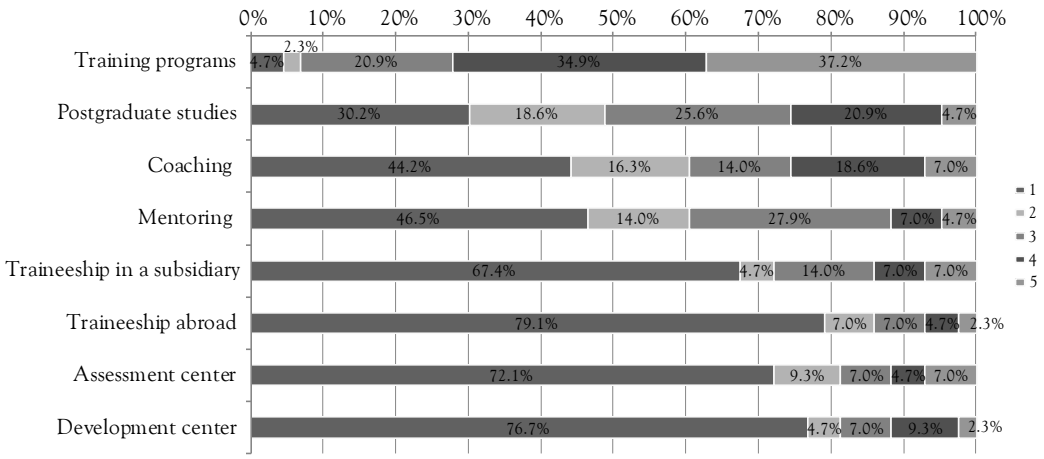
in the case of mentoring. Only 10% of the managers said this method of acquiring knowledge by employees has an impact on their performance at work, and every other manager polled said there is no relationship between mentoring and the employee's performance.

More than 60% of surveyed managers were skeptical about the role of traineeships in subsidiaries in Poland as a form of training. An even larger percentage of respondents in this group (80%) negatively assessed traineeships in subsidiaries abroad. It seems that traineeships are rated so poorly not because managers believe this form of training does not benefit employees in terms of their professional development, but rather because sending staff to traineeships creates problems for the employer, forcing him to find replacements.

Training as part of assessment centers and development centers is not widely supported by managers as a method of professional staff development. Over 80% of managers surveyed did not consider this form of training helpful in developing staff qualifications (Figure 29).

Figure 29

Most adequate form of developing employee qualifications—according to managers surveyed (Likert scale ratings of 1 to 5—see note for Figure 20)



Source: Own elaboration.

The analyzed data show that training programs are by far the most common form of improving employee qualifications. Both employees and managers surveyed felt that this is the most effective training method, with the best effect on staff performance at work.

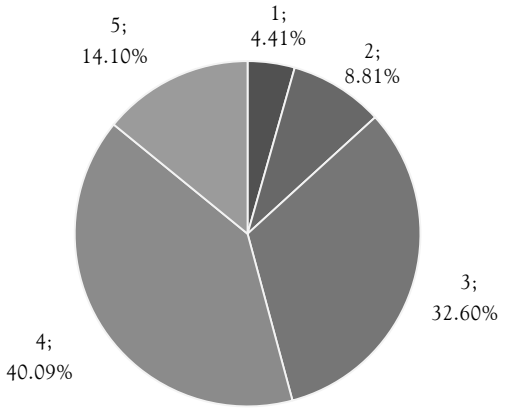
The impact of training on the company's competitive advantage

To find out about the impact of training on the economic performance of a company, a questionnaire was administered to determine whether employee training was part of the company's strategy.

A large group of employees (29.96%) said they did not know, and 55.07% said training was part of their companies' strategies. In the case of managers, 77.53% confirmed that training was part of their companies' strategies, while 9.69% stated the opposite. What's more, 80% of the employers said that staff development as such was part of their company's strategy.

Figure 30

The extent to which the company's competitiveness increased as a result of employee development—according to employees polled (ratings on a Likert scale of 1 to 5—see note for Figure 20)

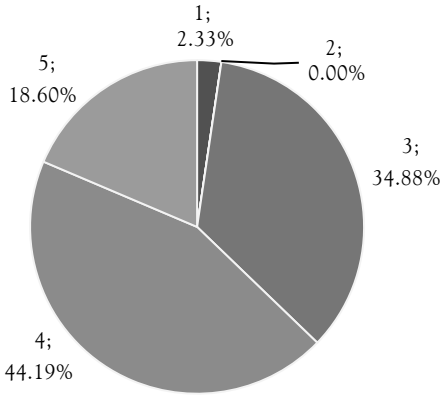


Source: Own elaboration.

Respondents' views about whether or not training leads to an increase in company profits were also analyzed. It should be noted that before the survey was carried out, the companies were reviewed in terms of their economic performance. All the companies covered by the study reported a profit for 2010. In connection with this, the question of the importance of employee development for the economic performance of the company was analyzed. Respondents were asked about the extent to which the competitiveness of their company increased as a result of training staff. More than 50% of the employees and more than 60% of the managers said training staff had a positive impact on the company's competitiveness, while only 4.41% of the employees and 2.33% of the managers voiced a negative view in this respect (Figures 30 and 31).

Figure 31

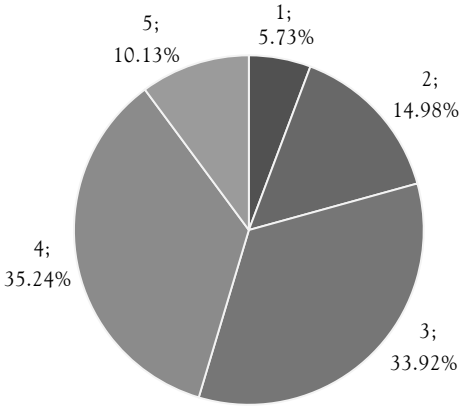
The extent to which the company's competitiveness increased as a result of employee development—according to managers polled (ratings on a Likert scale of 1 to 5—see note for Figure 20)



Source: Own elaboration.

Figure 32

Profit growth attributable to staff development—according to employees polled (ratings on a Likert scale of 1 to 5—see note for Figure 20)

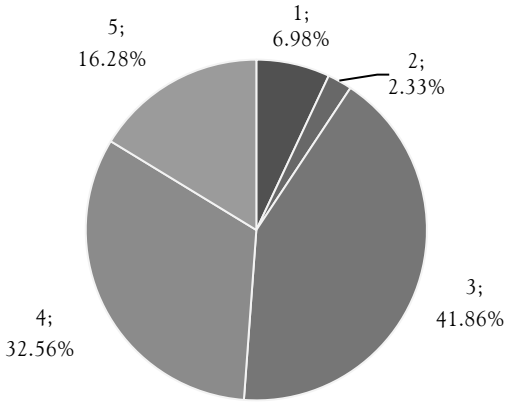


Source: Own elaboration.

When asked about the relationship between training workers and an increase in company profits, nearly 50% of employees replied that there is a positive correlation between the two, while one in three respondents said they were unable to answer that question because they did not have access to such data. Around 50% of the managers said the correlation was positive, while only 10% voiced the opposite view (Figures 32 and 33).

Figure 33

Profit growth attributable to staff development—according to employees polled (ratings on a Likert scale of 1 to 5—see note for Figure 20)

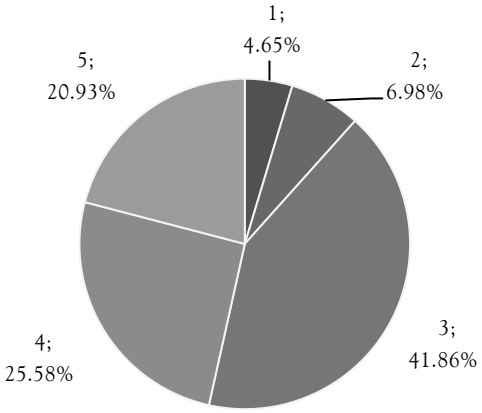


Source: Own elaboration.

Managers were additionally asked if there was a relationship between training staff and revenue growth. Nearly 50% of managers agreed that such a relationship existed. The percentage of those voicing the opposite view was marginal. However, a large group of respondents said they did not analyze this relationship.

Figure 34

Revenue growth attributable to staff development—according to managers polled (ratings on a Likert scale of 1 to 5—see note for Figure 20)

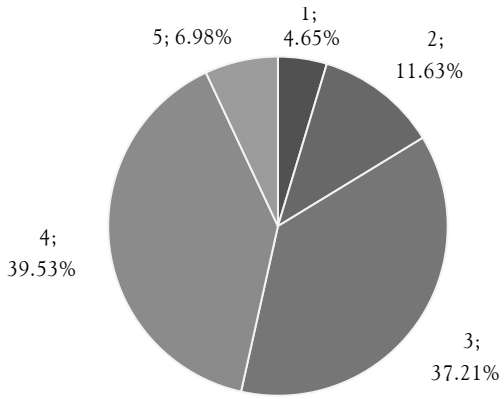


Source: Own elaboration.

In a positive trend, participation in training leads to reduced staff turnover and decreased absenteeism among employees (Figure 35). It can therefore be concluded that investing in people translates into increased staff loyalty and involvement, and thus greater commitment and improved performance of the organization.

Figure 35

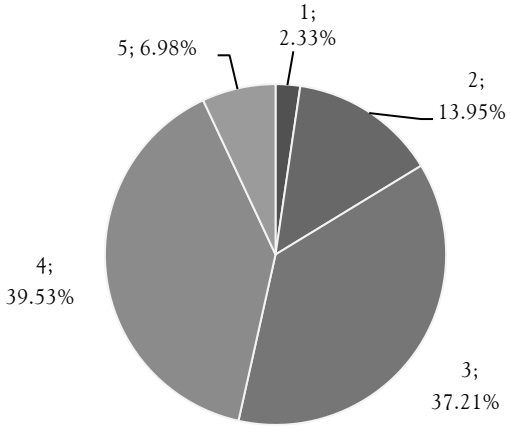
Decrease in staff turnover attributable to employee development—according to managers polled (ratings on a Likert scale of 1 to 5—see note for Figure 20)



Source: Own elaboration.

Figure 36

Decrease in staff absenteeism attributable to employee development—according to managers polled (ratings on a Likert scale of 1 to 5—see note for Figure 20)



Source: Own elaboration.

In summary, the results of the survey, covering the views of both employees and their supervisors, confirm that the professional development of staff leads to improved staff performance; it is also conducive to limiting staff turnover and absenteeism, and leads to higher profits for the company.

Concluding remarks

In 2010, Polish companies heavily invested in the development of their staff, but this trend weakened in the third quarter of 2011, probably due to the fact that the study covered only the first eight months of 2011 and applied to actual participation in training, and not to plans declared in this area. Moreover, the 2011 findings are similar to those obtained in 2008 at the time of the first wave of the crisis. At the end of 2010, managers were concerned that a second wave of crisis might arrive, and consequently they projected a decrease in expenditure on employee development. Interestingly, participation in training financed from EU funds was relatively stable during the studied period; such training programs represented around 20% of all training programs.

Regardless of the analyzed period, managers said they are aware of the importance of staff development for improved competitiveness among enterprises.

The surveys conducted show that training is currently the most popular form of improving employee skills. Employers are relatively eager to send staff to this form of education. Both employees and managers say that participation in training helps increase the involvement of employees in their work. Both groups also said that training has a significant impact on better performance at work.

Other methods of professional development, such as postgraduate studies, coaching, mentoring, traineeships in other subsidiaries, or participation in assessment center and development center programs, are far less common. It seems that the low popularity of these forms of training is due to their high cost-intensiveness and the fact that their results can be seen only after a certain time. Moreover, a time of crisis is not conducive to investing in expensive forms of improving qualifications.

The research also revealed that there is a relationship between training and business revenue and profits. Managers whose staff participated in various forms of training said that employee development has an impact on an increase in the company's revenue and profits. They also declared that improving staff skills has a direct effect on increasing a company's competitive advantage. Moreover, well-trained employees decide to change their employer far less often (a percentage point lower than in the case of natural staff turnover) and are less frequently absent from work. Thus, they are more involved in what they do and in the problems of their organization.

To sum up, both statistical data and surveys make it possible to conclude that the development of employees through training has a positive effect on the competitive advantage of companies.

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Chapter 6

Changing Poland's Higher Education System: Problems and Challenges

Poland's higher education system encountered some new challenges in 2011, related to the entry into force, on Oct. 1, 2011, of a series of new laws, in particular an amended Higher Education Act and the law on academic degrees, accompanied by a set of implementing regulations. The new legislation raises several questions about the direction and possible effects of reforming this segment of Poland's education system and about possible scenarios for the development of higher education in this country. These issues are examined below.

6.1. The Legal and Institutional Framework for the Functioning of Higher Education in Poland—Selected Issues

Jerzy Menkes

Axiology

A critical analysis of the latest changes in the legal and institutional framework governing higher education in Poland should not be limited to legal issues. The discussion should include a comparative study of the new state of play in the legal context of this area of social life in Poland during the socio-politico-economic transition that began in 1989. It is also necessary to examine the objective of the changes in terms of the instruments created for its implementation. a subjective

analysis will also be provided. The subject of the overall analysis is changes in the state of play (directions and tools). I will limit the discussion below to new factors resulting from these changes.

The analysis should be preceded by a look at the causes behind what many consider the unsatisfactory condition of higher education in Poland. It is often argued that the main cause is low government spending. At the same time, the ongoing debate on this subject indicates that the problem cannot be easily solved by introducing tuition fees at state-run universities. Nor are there prospects for a near-term increase in government spending on higher education, or ideas on how to support universities other than with public funds. Under these circumstances, it is unlikely that the necessary reforms will be carried out, that the quality of education will improve or that Polish researchers will become more competitive internationally (Jabłecka, 2010, p. 14).

Let us begin this discussion by disproving the myth that government spending on higher education in Poland is lower than in other countries. In 2006, expenditure on higher education in Poland totaled ZL 15 billion, or about 1.4% of GDP. Public expenditure approached ZL 10 billion (1.0% of GDP), and private spending was under ZL 5 billion (0.4% of GDP). In fact, Poland spends a similar proportion of GDP on higher education as many other member countries of the Organization for Economic Cooperation and Development (OECD). The OECD's 2006 average was 1.5%.

The role of private funds in total spending in Poland is greater than average: it amounts to around 30%, which is one of the highest levels in Europe (*Diagnoza*, 2009, p. 62). This shows that there is no clear causal link between spending on higher education and its standards in Poland. Many argue that it is reasonable to provide studying for free for some students in some types of studies and in selected universities. The cost of university studies is high even without tuition fees, and in some fields such as the arts it is very high compared with average income. According to some experts, the current form of redistributing national income is rational and adequate; others say it should be modified by changing the eligibility criteria. Perhaps public expenditure should be redirected to other areas. However, there is no justification for treating the right to free higher education as a dogma, especially in the context of the myth about insufficient funding of higher education.

This myth is founded on the belief that higher education should remain free of charge regardless of the socioeconomic capabilities of the state. At the core of this myth is the political doctrine of the former communist countries in which the government had exclusive competence in organizing science and education;[1] at the same time access to education was treated as a special good covered by administrative rationing. The level of enrollment at institutions of higher education was low in Poland compared with other OECD countries in the 1970-1990 period. Despite the tenet that

[1] There were a few exceptions in this area. In Poland, they included religious seminaries and the Catholic University of Lublin.

people in Poland had the right to a free education, the participation of young people from rural areas and those with a working-class background in education declined in a trend that continues to this day. After 1989, the government was expected to ensure such a secondary redistribution of national income so as to provide everyone wanting to pursue a higher education with access to such education without even covering a part of the costs involved; this also applied to the direct cost of educational services. An attempt to reconcile the capabilities of the state in the area of social services with the demand for these services produced a compromise under which university students are not required to pay any direct tuition fee for the educational services as long as they study full-time at public universities. This unequal treatment of university students in access to a free education is treated in terms of a fundamental value, even though:

– less than 50% of all those pursuing university studies in Poland (at undergraduate, graduate and uniform master's programs) as well as doctoral studies and postgraduate programs actually take advantage of the possibility of studying for free;
– the possibility of studying for free is not limited to those who are underprivileged economically, so in this case we are not dealing with the principle of compensatory justice under which those in need get more;
– nor is the eligibility for free university studies limited to those who achieved educational success at lower levels of the education system. Students with different educational attainments can enroll for free in full-time programs at various public universities in different fields. Similarly, the right to study for free is not the result of public demand for graduates in specific fields. Polish universities continue to produce an excessive number of graduates in fields such as marketing and pedagogy even though demand for these graduates on the labor market is limited.

Those defending the right to a free education at the university level quote traditional values and attachment to the social model pursued in Poland before 1989. They reject the philosophy of treating the right to education as a market commodity.

The "material" component

The entry into force, on Oct. 1, 2011,[2] of a system of laws, including the amended Higher Education Act of July 27, 2005 (hereinafter referred to as the 2011 law), together with its implementing regulations, put an end to a process of comprehensively reforming Poland's higher education system and science from 2007 to 2011. The legal shape of the reform was determined by a series of regulations designed to change the

[2] Article 38 of the law, in the transitional provisions, provides for exceptions from this date; these exceptions will be analyzed later in this subchapter.

organization, functioning and, above all, financing of the education system and the science sector. In the case of science, a package of six laws, collectively referred to as "Building on Knowledge: Reforming Science for the Development of Poland,"[3] took effect on Oct. 1, 2010, while the higher education reform is referred to in terms of "Partnership for Knowledge."[4]

Diagnosis and purpose

Before going ahead with the reforms, the government made a comprehensive assessment of the state of science and higher education in Poland. The assessment took the form of a presentation in an official document. Of course, the very fact that a strategic reform of the science and higher education sectors was carried out shows that the government gives poor ratings to the functioning of these sectors. Evidently, the government has decided to change this state of affairs, and is consequently working to achieve this goal. The architects of the reform adopted a strategic model for the reform. The transparency with which the reform was prepared and is being implemented shows that the government respects the rules of democracy and the rule of law, as well as the social actors in the science and higher education sectors.

The government's reform measures for science and higher education deserve a clearly positive assessment, especially in comparison with the *modus operandi* of reforms in other areas of public activity, but also in the context of overall European standards. This positive assessment, however, does not apply to the evaluation of the actual methods used and of the purpose of the changes.

The "closing report" presented by the government is inconsistent. For example, the high ratings of accreditation conducted by the State Accreditation Committee seem to contradict assessments pointing to the negative impact of the current situation, in which many university lecturers hold several jobs at a time, on the quality of education. Nor do the authorities explain why a particular factor was found to be negative, as in the case of the age of Polish Academy of Sciences employees. Another example is a major change in the procedure for conferring academic degrees and the title of professor (this issue will be further examined later). The authorities evidently decided that the previous procedure promoted various irregularities on a large scale. However, neither the government nor the public bodies set up for this purpose gave examples of specific irregularities. Of course, it is possible to understand this reserve

[3] The package comprised the following laws: on the National Science Center, on the rules for financing science, on research institutes, on the National Center for Research and Development, and on the Polish Academy of Sciences, in addition to implementing regulations accompanying these laws.

[4] In addition to the law on amending the Higher Education Act, the package included the law on academic degrees and the scientific title and the law on degrees and the title in the area of the arts, accompanied by several dozen regulations.

on the part of the government, because it was evidently wary of making enemies and consolidating its political opponents by naming concrete people responsible for these irregularities.

At the same time, it is difficult to understand why the Central Commission for Academic Degrees and Titles, which is a social actor, has failed to take action in this area. If any serious irregularities indeed took place in the process of obtaining academic degrees and the professorial title, other than the sluggishness of the procedure, these irregularities should be disclosed, because the reform is designed to change not only the deadlines, but also the very essence of the procedure. At the same time, the lack of such fundamental transparency may prove to be an original sin that will prevent the attainment of the reform's goals. The government has not stated clearly enough why it decided to change the procedure for conferring academic degrees and the title of professor. Was it because it wanted to put an end to a situation in an interest group formed by "old" professors created obstacles for young and talented academics? Or rather, was it because the former procedure was imperfect in that it enabled the scientific advancement of individuals with inadequate professional standards, in that universities could appoint degree and title reviewers from among their own staff and enjoyed a majority of votes when granting degrees and the professorial title?[5] Without official knowledge about this subject, achieving the desired state may prove to be very difficult.

The shortcomings of the reform process include a lack of a clearly outlined philosophy of the reform. The laws making up the legal framework of the reform lack preambles highlighting their aims as required by European law. This situation has two negative consequences. First, it is impossible to determine whether or not the objectives of the decision are being or have been carried out. Second, those applying the law must attempt to determine its intentions from a normative text, not from a declaration of the legislator's intention.

Notably, for the first time since 1989, the government officially revealed that it had commissioned outside experts—hailing from the Ernst & Young company and the Institute for Market Economics—to develop the strategic reform concept. Meanwhile, the Foundation of Polish Rectors and the Conference of Rectors of Polish University-Level Schools came up with their own strategy in opposition to the government's concept. The disclosure of the existence of the Ernst & Young strategy is undoubtedly a breakthrough when it comes to the functioning of democracy in Poland. Even though there is no doubt that private people and teams that did not formally exercise any public functions contributed to the socioeconomic transformation of the country,

5 "The number of doctoral degrees granted in 2008 fell to its lowest level since 2001, and the number of professorships has decreased steadily since 2002 (with the exception of 2007), reaching a level comparable to that in the difficult period of the first half of the 1990s. The number of postdoctoral qualifications obtained in recent years has not changed significantly compared with the early 1990s (GUS, 2009a, 2009b)." (*Diagnoza*, 2009, p. 47).

the consecutive governments and parliaments did not highlight this fact, at least officially. This policy could be interpreted as either a case of supporting the fledging institutions of a democratic state or as a sign of a lack of transparency in the state. While this policy helped build strong democratic institutions, is also resulted in a significant level of social distrust and a sense of non-participation in the exercise of real power among citizens. The transparency surrounding the higher education reform shows that democracy in Poland has reached a new, more mature stage in which the government is capable of raising the curtain on its work and tactics in the exercise of power. The disclosure of the involvement of the outside experts and of the lineup of the team disarmed critics from academia who argued that the government had insufficient expertise to reform science and the higher education system and that only the academic community itself could handle such a reform properly. Criticism was further rendered ineffective by the reputation of the consulting firm, Ernst & Young, and the fact that people from academia helped create the reform concept. The disclosure of this last fact led to a division among the critics themselves. It showed that professors differed in their assessment of the state of higher education in Poland, and that they also varied on the causes behind problems and on the recommended shape of the reform. As a result, critics were unable to justify their argument that science and higher education—unlike all other institutions in Poland and elsewhere—should escape scrutiny by outside experts and that the reform concept for science and higher education should be unique rather than based on some general model used in other sectors. Critics were also unable to name the specific abilities and skills of members of the Foundation of Polish Rectors and of the Conference of Rectors of Polish Academic Schools that supposedly made them qualified to decide on the course of the reform.

The legal and comparative analysis of the Higher Education Act of July 27, 2005 in the version in effect since Oct. 1, 2011

The law regulates the operations of both public and non-public universities except those run by churches and religious associations.[6] The lawmakers kept the terminology related to institutions of higher education (public and non-public) and in use since 2005. Instead they decided to scrap a terminological distinction into state and non-state universities that was used in the law on higher education dated Sept. 12, 1990, as well as in the law of May 4, 1982 (which was the result of an agreement between the authorities and the academic community). In terms of symbols, it is possible to see this as a return to the original nature of the university as a community of lecturers

[6] The law also covers the John Paul II Catholic University of Lublin.

and students (the problem is that this role of the European university as a form of institutional cooperation steadily lost its importance from the 14th century onward—when absolute rulers began to finance universities from public coffers, universities became public in the same sense as all other public institutions, even though they were not directly part of the public administration system). Still, the law states that a "public university" is a "university founded by the state" (Article 2. 1. 2 of the law of 2011); it also specifies the scope and instruments of the government's supervision over higher education.

The law maintained the preferential treatment of public universities compared with their non-public counterparts when it comes to the financing of their activities, though the lawmakers removed some particularly blatant signs of discrimination in this area. Permits from the minister for "the establishment of a university, and for obtaining the right to run university studies in a given field and at a specific level of education" (Article 20. 2) are now issued for an indefinite period (Article 20. 8 of the law of 2011). Previously, the first such permit was issued for five years, and the next for either a definite or indefinite period (Article 20. 8 and 9 of the law from 2005). At the same time, the lawmakers set the criteria for using the word "university," "technical university," "polytechnic" or "academy" in the name of university-level schools. This is important from the point of view of the right to conferring doctoral degrees. Besides, the name of a university indicates that it belongs to a group of institutions with high research and development achievements. This arrangement may be regarded as a sign of the government's intention to protect buyers of educational services from being misled by unreliable university-level schools.

Supervision over universities in terms of whether their activities comply with the law is exercised by the science and higher education minister. This applies to both public and non-public institutions of higher education (Article 33). In the case of universities run by churches and religious associations, supplementary supervision is exercised by the authorities of these churches and associations, under the Concordat agreement between Poland and the Vatican or laws regulating relations with individual churches and religious associations.

Factual supervision over the quality of education is exercised by the Polish Accreditation Commission, an "independent" institution guided in its work by the principles of "credibility, impartiality and transparency" (Articles 48 and 48a). The law of 2011 changed the name of the institution from "State Accreditation Commission" to "Polish Accreditation Commission (PAK)," but the change of the name does not alter the fact that the commission is not really an independent institution. It was set up by the minister and its members may include non-public university founders and those holding managerial positions at universities. At the same time, these people are free to seek reappointment without any restrictions (membership eligibility criteria for the General Council for Science and Higher Education are regulated along different lines under Article 46a. 2). That the commission lacks independence is further demonstrated

by the fact that the minister has the right to dismiss a member of the commission and appoint and dismiss its chairman and secretary (no term of office is envisaged for these positions) without giving any reasons for his decision. An additional factor contributing to the lack of PAK's independence is the right of the rector to exempt a PAK member from the obligation of working as a teacher. This creates a situation in which he or she may become dependent on the rector (Article 48. 12). At the same time, the lawmakers exempted the minister from the obligation to cover the costs of a dismissal (a change from the 2005 law), requiring universities to pick up the tab. This lack of independence is important because of its extensive powers in relation to the university. The lack of institutional guarantees of independence, in combination with a wide range of the commission's executive and quasi-judicial powers, is contrary to the standards of a state governed by the rule of law. Moreover, the law does not guarantee that PAK will be transparent in its dealings. The lawmakers stopped short of requiring the commission to post reports by outside evaluators on its website. The commission is allowed to do so but has no obligation under Article 53a. 2.

The law of 2011 deprived the minister of the right to exercise preliminary inspection of university articles of association.

The law (Article 2. 1. 7-10 and Article 9) replaces the term "knowledge and skills" acquired by students with the word "qualifications." We are dealing with constant changes in terminology in this area. Under Article 3. 2. 1 of the law from 1990, a university was responsible for "training students in a specific discipline of knowledge" and for "preparing them to work in specific jobs," while Article 3. 2. 1 of the law of 1982 defined this task as "educating highly qualified specialists for all spheres of social life, and developing in them the skill of thinking independently and of acting efficiently and creatively." The latest change is based on a move away from describing the course of the teaching process; instead it refers to the end result of the education process.

Surprisingly, the authorities decided against using state exams at the university level. What's more, they have decided to abolish the state medical exam. While an in-depth discussion of the reasons for this decision would extend beyond the scope of this subchapter, it is necessary to note that generally state exams make it possible to verify the quality of education in a fair and objective way. Exams testing the qualifications of students according to standards set by the state are used in Poland in primary, lower secondary and upper secondary schools as well as in the case of access to regulated professions. It seems that similar exams should be taken by university graduates.

EU law provides for the existence of "regulated professions" and "regulated activities" as part of which qualifications are checked by the government by means of an aptitude test,[7] for example. Article 9b of the law gives a brief list of fields of study/professions subject to regulation in Poland.

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[7] *Dyrektywa 2005/36/WE Parlamentu Europejskiego i Rady z dnia 7 września 2005 r. w sprawie uznawania kwalifikacji zawodowych (Tekst mający znaczenie dla EOG). Dziennik Urzędowy Unii Europejskiej 30.9.2005 L*

Notably, under Article 13a of the law of 2011, Polish universities are not obligated to monitor the professional careers of their graduates in terms of whether they obtain specific professional qualifications—for example those needed to work as lawyers or medical specializations.

The lawmakers show a far-reaching lack of consistency in this area. On the one hand, state degrees conferred upon graduation, uniform in substantive terms, are replaced by university degrees (as different as the universities themselves). On the other hand, Article 191a 7 and 8 provides for the recognition of degrees obtained abroad, and grants the candidate the right to choose the university to carry out the recognition procedure and the issuance of the "Polish" degree of graduation.

One important change involves the possibility of departing from the traditional "parliamentary-Cabinet" system at the university, formed by the university Senate and an elected rector, in favor of a "managerial" model in which the Senate is replaced or supplemented by "another collective body" (Article 60) while the rector may be either appointed through a competitive recruitment process or elected (Article 72). The law creates conditions for limiting "parliamentary" democracy based on the functions and powers of the university Senate. The lawmakers acknowledged the relatively widespread view among public university rectors that the powers of the university Senate are excessive and hamper effective management of the university. However, the lawmakers failed to specify the functions and powers of what is referred to as "another collective body" that is expected to substitute for the Senate (for example, with regard to obligations imposed on the Senate under Article 99. 3); nor is it clear how this new collective body should be established. There is also a lack of precise regulations governing the functioning of the university council (*konwent*).

The law of 2011 is in many cases inconsistent. This is illustrated by the fact that it provides for the possibility of dismissing a rector chosen by way of a competitive recruitment process only if such a dismissal is effected by the university Senate (Article 78. 1 and 2). The lawmakers decided against regulating a case in which the university rector was appointed by way of competitive recruitment process and instead of the university Senate "another collective body" is in operation.

It also needs to be noted that Article 72 of the law reduces the requirement with regard to the academic degree of the rector from postdoctoral qualification to Ph.D. The promotion of the managerial model is the main argument in favor of this solution. As far as the appointment of the rector through a competitive recruitment process is concerned, in this case too there are no arguments in favor of the requirement that the candidate must have the highest academic degree. The differentiation of the eligibility criteria depending on the mode of appointment is irrational. Both the

255/22 (Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications (Text with EEA relevance). *Official Journal of the European Union* 30.9.2005 L 255/22).

tradition related to the position of rector and his status/authority as *primus inter pares* (first among equals) speak against this logic. It is difficult to assume that the new solution will pass the test in the case of an elected rector who "only" has a Ph.D. degree.[8] Experience shows that academics working as university rectors are usually so busy managing their institutions that they cannot dedicate themselves to pursuing intensive research. In this situation, if someone with a Ph.D. degree becomes rector, they may have to be prepared for immediate departure from the university after they end their term as rector due to a lack of scientific development; or they will be given another job at the university in recognition of their merits. In either case, highly undesirable practices are at work.

The law preserves the classic structure of the university with an internal division into departments as the basic organizational units and faculties in other locations. Article 84a and 84b of the law provides for the possibility of granting Leading National Research Center status to university organizational units. Granting the status, following a competitive procedure, will involve a number of privileges, including financial privileges. This is one of the elements of stratification of the university based on the criterion of quality. Significant changes apply to concessions in the founding of universities and subsidiaries by foreign universities, which are exempt from the provisions of the law.

Article 95 of the law creates the possibility of equalizing non-public and public universities in access to government subsidies intended for tasks related to education in the broad sense (Article 94). The law provides for the possibility of introducing tuition fees for students enrolled in a second and further fields of study at public universities.

Even though many public universities in Poland are heavily in debt, many members of the academic community display a carefree attitude resulting from the fallacious belief that a public university cannot collapse. Article 100a introduces a financial anchor[9] requiring the university community to institute a recovery program and, if this program fails to produce results, the law provides for the possibility of suspending the university's authorities and appointment of an acting rector by the minister for three years. At the same time, in what is hardly surprising for political reasons, the lawmakers stopped short of saying what should be done if a public university fails to balance its finances. Experience with the public health service justifies the concern that the financial imbalance of public universities is structural in nature, and that potential liquidation or privatization is likely to run into political barriers.

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8 In the decade of 1970-1980, some communist party and student organization activists went on to become university rectors even though they did not have the necessary qualifications. Obviously, this infamous model should be relegated to the dustbin of history.

9 A recovery program must be instituted by a public university whose total net loss from a period no longer than the last five years is higher than 25% of the government subsidy allocated to this university in the preceding year.

The law significantly changes the rules related to university employees. The direction and scope of the changes shows that the lawmakers give poor ratings to the current university practice. This is reflected by the removal from Article 110 of clause 4 permitting the employment of teaching staff—by virtue of statutory regulations—in the capacity of assistant professors (*docent*), though with the preservation of vested rights (Article 22 of the transitional provisions). Clearly, the move was made because the lawmakers negatively assessed that arrangement.

In fact, the position of assistant professor was abolished under the law of 1990. It seems that the intention at the time was to rid universities of so-called March assistant professors, or individuals who did not have postdoctoral qualifications but were nonetheless appointed assistant professors because they took part in an anti-Semitic and anti-intelligentsia political campaign in 1968. This was, therefore, a tool with which the authorities sought what they called "positive" changes. The desired effects were not achieved, and the regulations became absurd. On the one hand, there is no "natural" level of promotion from the position of senior lecturer (*adiunkt*) for someone who has obtained a postdoctoral qualification; the position of assistant professor was such a level, while the position of associate professor (*professor nadzwyczajny*) is not quite that (Article 114 clauses 2 and 5 maintains the state of affairs in which a Ph.D. with a postdoctoral qualification can be hired/promoted or hired/allowed to keep the position of senior lecturer). On the other hand, in many universities the position of "teaching" assistant professor (*docent dydaktyczny*) was maintained/created for people who do not show the necessary academic advancement (which de facto means they have not been carrying out their research responsibilities) even though they have worked as researchers and teachers for many years.

A move has been made away from the widespread practice of officially appointing (*mianowanie*) academic teachers. Only academics with a professorial title will be employed on the basis of official appointment (Article 118), but with the preservation of vested rights (Article 23 of the transitional provisions). This is clearly designed to make it easier to get rid of those failing to carry out their responsibilities as employees, who are mentioned in Article 111. The lawmakers, in Article 120, once again introduced rotating terms of office for junior and senior lecturers (*asystent* and *adiunkt*) making their continued employment conditional on obtaining a degree (Ph.D. or postdoc) over a period of eight years. While the logic behind this requirement is fully acceptable, an employee's responsibilities cover research to the same extent as teaching (Article 130. 1) and the fact of conducting research work is reflected in the employee's paycheck. It should be noted that the lawmakers made a political concession by postponing, by two years, i.e. until Oct. 1, 2013, the entry into force of these regulations. At the same time, it is unclear what method will be used to set the starting date for the period—whether this will be the actual situation or the entry into force of the law. In the latter case, long-term senior lecturers are entitled to a further 10 years of employment, and it is difficult to assume that this will result in postdoctoral qualifications. It is impossible to

analyze the regulation in question in detachment from the past situation in which the academic community effectively blocked the functioning of the rotating mechanism with regard to lecturers, especially senior lecturers.

At the same time, the lawmakers deprived those without the title of professor of the right to be granted—once every seven years—a paid research leave and a six-month leave to prepare for getting a postdoctoral qualification. This clearly betrays a quest for cost savings, though it does not seem that these savings are reasonable (the lawmakers did not clearly state that this practice was dysfunctional, but even if that was the case they should have focused on eliminating dysfunctional behaviors only). The change is certainly not conducive to scientific development. The lawmakers also deprived those preparing for obtaining a postdoctoral qualification of the right to a special postdoctoral fellowship.

The lawmakers seem to be determined to shape employment, especially at public universities. On the one hand, the lawmakers limit the possibility of moonlighting by academics by forcing them to secure permission from the rector to have an extra job; such permission will be granted only if this extra job is not against the interests of the university (Article 129. 1 and 2.). On the other hand, the lawmakers abolish the need for securing such permission by those wanting to moonlight by starting a business (Article 129. 3). This may jeopardize the existence of weaker institutions of higher education, especially private universities, suffering from a shortage of staff. Moreover, Article 127. 2 provides for the expiration of the contract of employment for those with a professorial title after they reach the age of 70, and all others at age 65. This specific case of discrimination on account of age may be surprising in Poland, a country in which low economic activity among the elderly is seen as a social and economic problem. This is contrary to the European Union's Lisbon Strategy, which calls for keeping the elderly professionally active for as long as possible. At the same time, this arrangement can be looked at in terms of a belief that it is necessary to rid universities of those who "remember the past" and that it is necessary to sideline the old generation in order to enable the promotion of the young generation. This case of discrimination also makes it possible to provide private universities with staff laid off from public universities with minimum financial outlay.

In a new arrangement, Article 168a of the law permits universities to provide practical studies together with companies. Practice will show how valuable this regulation will prove to be.

The law maintains two academic degrees, the Ph.D. degree and a postdoctoral degree (*doktor habilitowany*), as well as the title of professor.[10] This is despite strong pressure to scrap the postdoctoral degree, and even the professorial title, in a move that was justified by referring to the "American" model and was further motivated by the

[10] The amended law of March 14, 2003 on academic degrees and the scientific title and on degrees and the title in the area of the arts (Dz. U. of April 16, 2003).

need to facilitate scientific advancement. Those using this argument failed to mention the existence of tenure in the United States, which is de facto the equivalent of the Polish postdoctoral degree, as a condition for being employed on a full-time basis as a professor. Critics also overlook the fact that in countries such as Germany academics cannot continue to be employed at their university after they obtain a higher degree. Another point worth making is that academics in countries which are usually cited as models in this area are closely monitored in terms of their scientific achievement. It could therefore be assumed that the pressure primarily reflected the ambitions of a group of senior lecturers without postdoctoral qualifications who wanted to have easier access to promotion.

The state of play created by the amended law on academic degrees and the scientific title should be assessed as clearly positive. It makes the process of obtaining academic degrees and the professorial title more transparent and faster, especially in the case of the postdoctoral qualification. Wherever possible, it also eliminates nepotism and puts an end to the practice of blocking promotions. a few years from now it will be clear if the sluggish pace of scientific advancement in the past stemmed from those feudal academic structures, or from the fact that academics simply did not work hard enough and lacked talent. The first clues will come after a two-year transition period during which the candidate is allowed to choose the legal regime. This will determine if the candidates develop a preference for the procedure outside their alma mater—in a bid to avoid pressure from those seeking to block their advancement—or whether they decide to stick with their own university, hoping to receive support within its walls from their peers. Of course, the amendment is not free from minor slipups that betray the characteristic features of the academic community.

When it comes to the procedure for conferring the Ph.D. degree, Article 13. 7 and 8 of the law ushers in a requirement to go public with a summary of the doctoral dissertation and a review of the dissertation (in fact, it is to be regretted that this requirement did not cover the entire dissertation). This transparency should help disprove arguments that, in some cases, the Ph.D. degree is awarded for work that does not really meet the required scientific criteria (Article 13.1), and that the dissertation reviews were negative except for the conclusion. In addition, reviewers can no longer come from the same institution as the doctoral student or from the same institution in which the doctoral proceedings are carried out. This means that both reviewers are now from an outside institution (Article 20. 5).

If the case of the postdoctoral degree, the law obligates the minister to specify, in the form of an official regulation, the criteria for evaluating the performance and achievements of a candidate (Article 16.4). This protects the procedure/candidate from arbitrary ratings from reviewers. The postdoctoral qualification procedure is conducted in an organizational unit selected by the candidate, yet this institution has the right to refuse to carry out the postdoctoral procedure (it is difficult to think of a rational and socially desirable justification for this practice). The procedure involves tight and

strict deadlines, but there is no mention of the consequences of noncompliance by the authorities handling the procedure. The Central Commission has the final say in the procedure (even though this arrangement was sharply criticized in the past). Under Article 18. 13, the Commission can "punish" the institution's council (with the sanction specified in Article 9) for passing a resolution divergent from that of the Commission. The postdoctoral lecture is no longer part of the postdoctoral procedure (former Article 18.4), which is understandable because the postdoctoral lecture has lost much of its former appeal and effectiveness. However, the tradition of the *venia legendi* (Latin for "permission for lecturing") speaks against this move.

Equally significant changes have been introduced to the procedure for conferring the title of professor. While some of these changes are in line with the overall logic of changes in the area of conferring academic degrees, others appear to be the result of a loss of difference between the scientific title and the position of professor. The logic of the changes covers the new procedure for appointing reviewers (Article 27. 3-5): there will be five of these (an increase from four previously), all of them appointed by the Central Commission. The Commission can use a list of 10 candidates submitted by the board of the institution, but it may also decide to make appointments from outside this group. The reviewers, in addition to scientific qualifications (having professorial titles themselves), must have headed a research team for at least five years and have supervised at least two Ph.D. theses. The requirements set out in Article 26. 1. 2 for those seeking to qualify for the position of professor are far-fetched. They involve managing research teams as part of projects financed on a competitive basis, taking secondments and conducting scientific research. In particular, doubts are raised by a requirement under which a person seeking the professorial title must have taken part in doctoral or postdoctoral proceedings as a reviewer (Article 26. 1. 3). This is controversial because meeting this condition does not directly depend on the candidate. The procedure for conferring the professorial title no longer has the kind of tight and restrictive deadlines as those in the postdoctoral procedure. The procedure for conferring the title is bound to be time-consuming because the Central Commission may take up to six months (Article 28. 2) adopting a resolution on the application for granting the title of professor following the entire procedure, including the reviews stage; the Commission also has a month to submit the application to the President (Article 28. 3). These deadlines, especially the second one, are not only drastically different from the seven days stipulated in the case of the formal evaluation of an application to award the postdoctoral degree (Article 18a. 4) or the three months in the case of an official opinion on employing an academic without a postdoctoral degree in the position of professor (Article 33. 2). These liberal deadlines are also against the fundamental principles of "the right to good administration." Similarly, the law differentiates the deadlines for the preparation of a review of the postdoctoral application, on the one hand, and a review of a doctorate and the procedure for

granting a professorial title, on the other: The deadlines are six weeks (Art. 18a. 7) and no less than six weeks (Article 30. 20) respectively.

Serious doubts are raised by whether it will be possible to enforce an obligation under which academics must accept the role of reviewers in proceedings involving academic degrees. Tight deadlines and an increased number of reviewers may prove to be an unrealistic scenario and pose an undue burden on staff.

An undoubted advantage of the law is that it introduces provisions under which a procedure for granting an academic degree or the title of professor is declared invalid in the event of academic plagiarism (Article 29a). On the minus side, the law inadequately regulates the issue of who should cover the costs of doctoral proceedings and other procedures. Under Article 30. 3. 2, these costs are borne by the institution handling these proceedings, with the option of shifting them on to the candidate's employer. The law does not permit a situation in which the costs of the doctoral proceedings and other procedures would be imposed on the candidate. The lawmakers thus impose financial obligations on universities that have no coverage in government subsidies. This practice is *contra legem*—contrary to the law.

In summary, the amended law on academic degrees and the scientific title creates a generally sound legal framework for improving the quality of research in Poland. The new regulations should help encourage more academics to obtain postdoctoral qualifications and professorships to match the increased number of new doctorates and the growing student population, thus putting an end to a situation in which many academics limit their professional activity to teaching while neglecting research.

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6.2. Education in Poland's Largest Centers of Higher Learning as a Response to the Needs of the Labor Market

Beata Michorowska

Poland is gradually exhausting its capabilities to compete internationally with the simple growth of capital or labor productivity. There are increasingly frequent calls for changes to allow the economy to enter a growth path based on advanced technology and innovation. This scenario requires the availability of well-prepared labor—employees with high qualifications.

High education enrollment ratios are treated as the basic indicator of a country's development in terms of human capital potential—an input factor for innovation and competitiveness of the economy. Nevertheless, in the case of Poland, these indicators do not translate into a growth of innovativeness or competitiveness of the economy. One can wonder if such a quantitative approach is accurate in the case of Poland since these indicators say little of the quality of higher education in Poland and the degree of its adaptation to the present and future needs of the country's developing economy. It will not be until education processes are adapted to the needs of the market that this factor (reflected by the education enrollment rate) will be capable of exerting a significant influence on the economy.

The aim of this subchapter is to examine the level of adjustment of higher education in Poland's largest academic centers (covering both bachelor's and master's studies) to the needs of the local community and labor market. Because it is not the number of students or graduates that matters, but their active participation in the economy after graduation (i.e. whether or not they are able to find a job or establish their own company or whether they are forced to join the army of the unemployed).

In this study, the qualitative assessment of education in academic centers in Poland is based on two points of view. First, the views of students are analyzed in terms of how they assess the knowledge and experience they have gained during their studies and what opportunities they believe their university degree opens for them on the labor market. Second, the views of employers are analyzed—those who were looking for new workers at the time of the study, chiefly those ready to hire university graduates. The employers were asked about their requirements with regard to job candidates and whether the applicants met these requirements.

The study is based on the research conducted by the Polish Agency for Enterprise Development as part of the Human Capital Balance (BKL) project. The analysis relies

on the results of the first round of the research, which was conducted at the end of 2010 among students [11] and employers.[12]

Education in Poland's largest centers of higher education

In order to analyze the quality of higher education in Poland, the emphasis in this study was placed on the largest centers of higher education in the country. The largest centers of higher education were selected based on the findings of the BKL study. The study covered universities in 61 cities across the country, yet the majority of the interviews were conducted in universities in Warsaw and Cracow, which accounted for a combined 24% of those interviewed; 36% of the interviews were conducted in the following academic centers: Poznań, Wrocław, Lublin, Łódź, Katowice and Gdańsk.

These eight centers—Warsaw, Cracow, Poznań, Wrocław, Lublin, Łódź, Katowice and Gdańsk—accounted for 50% of the students. All eight cities are province capitals. For the sake of clarity, the remaining 53 cities were excluded from the analysis because of their lesser importance to the Polish labor market.

Map 1 shows the number of students covered by the BKL study in selected centers and their share in the analyzed sample. Concurrently, the main directions of migration are shown on the map below. Each of the analyzed centers trains students from many

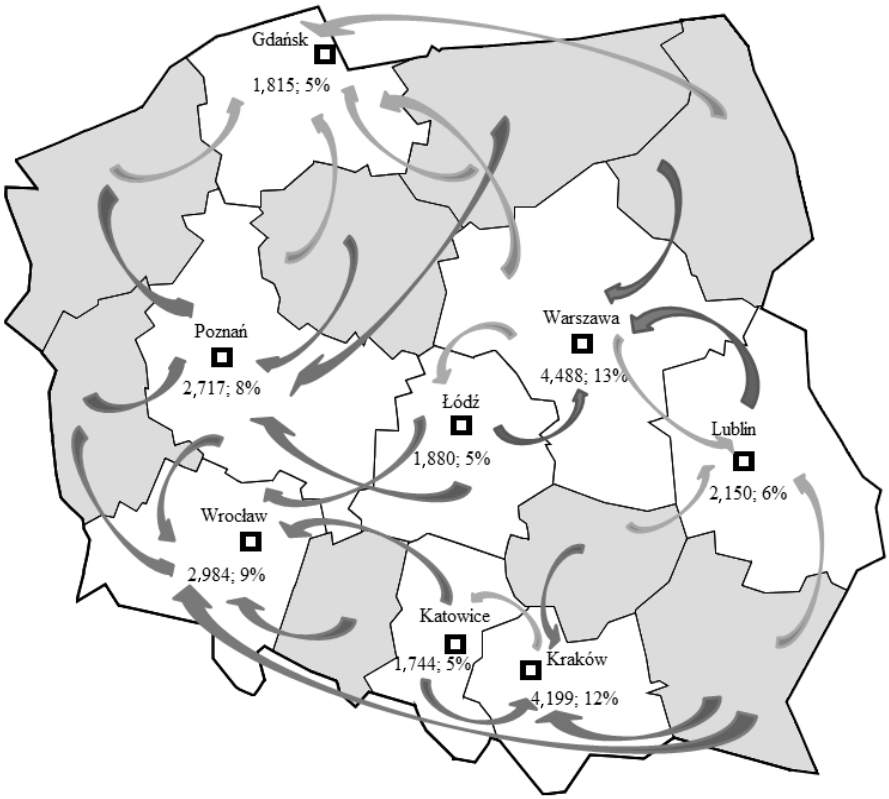
11 The survey among the students was conducted using the lecture method between Sept. 30, 2010 and Jan. 19, 2011 as part of the first round of fieldwork research under the Human Capital Balance project. The survey covered students in their last year of 1st degree studies and those in the last two years of 2nd degree studies. The sample was selected on the basis of a systemic layered selection of majors (or sets of majors), where a major is an organizational unit of studies at individual universities. Students of 1,600 majors took part in the study. Both public and nonpublic universities were included in the study. Universities managed by churches and religious associations were excluded, except for the Catholic University in Lublin. Schools managed by the Ministries of Defense and Internal Affairs as well as marine universities were also excluded. The obtained data were weighted. For more information on the methodological aspects of the study see K. Keler, *Raport metodologiczny z badań realizowanych w 2010 r. w ramach projektu Bilans Kapitału Ludzkiego,* PARP, Warsaw 2011.

12 The survey among the employers was conducted between Aug. 17 and Dec. 10, 2010. a multi-mode approach was used in the study, which means simultaneous use of different contact methods with respondents. Consequently, the research was conducted using the computer-assisted telephone interview (CATI), computer-assisted personal interview (CAPI) and computer-assisted web interviewing (CAWI) methods. The BKL study covered companies that employ at least one worker. The study covered selected PKD (Polish Classification of Activities) categories (sections: B, C, D, E, F, H, G, I, N, J, K, L, M, R, S (except for division 94), P, Q. Local entities as well as those operating in the form of foundations, associations, social organizations (unless listed elsewhere), political parties, trade unions, employers' organizations, business and professional self-regulation organizations, housing cooperatives, and associations of farmer groups, were excluded from the population. The same was true of the Catholic Church and other churches and religious associations. The data obtained were weighted. The weights were calculated in such a way that the share of the combination of the drawing layers (province and employment size class) with six PKD classes in the sample matched their share in the drawing population—a register of active enterprises made available by Poland's Central Statistical Office (GUS). A total of 16,009 entities participated in the study. For more on the methodological aspects of the study see K. Keler, *op. cit.*

regions of Poland, though invariably the dominant group are students from the province in which the center in located. Only those directions of student migration that involve at least 2% of the student population in the analyzed academic centers are marked on the map.

Map 1

Sample of students surveyed in the largest academic centers in Poland and major student migration directions[a]



[a] arrows show an inflow of out-of-province students accounting for no less than 2% of the total number of students in an academic center in a province

Source: Own analysis based on PARP, (2011).

As a result, it is possible to observe that Gdańsk, for example, primarily attracts students from northern Poland, Poznań from the central and western parts of the country, and Wrocław chiefly from the southern and southwestern regions, whereas Warsaw from central and eastern Poland. The largest percentage of out-of-province students was noted in Cracow (34.2%) and Wrocław (36.4%). The lowest percentage

of students from outside the local market was recorded at universities in Katowice (14.4%) and Łódź (14.8%), whereas students from Podkarpackie and Śląskie provinces displayed the greatest tendency to come to study in the analyzed academic centers. Students from Podkarpackie province accounted for 13% of out-of-province students in the analyzed centers, and students from Śląskie province represented 12% of out-of-province students in all analyzed centers except Katowice.

As mentioned earlier, the first part of the analysis concerns students' assessment of the quality of education at their university. Table 1 shows views about the effectiveness of studies in terms of using obtained knowledge in practice. As it turns out, the majority of students in all the analyzed academic centers are satisfied with the practical abilities they have acquired during their studies; however, this differs significantly depending on the location and the major chosen.

Generally, students completing their studies in Warsaw (72.2%) are the most satisfied with the practical knowledge they have gained at university. Such a view was chiefly declared by students pursuing mathematical and statistical majors (100%) as well as medical majors (98.4%). a much lower level of satisfaction is observed among students of law (only 56.1% of positive responses) and transport services (55.6%).

Cracow is the second-highest rated academic center in terms of providing students with practical knowledge; 67.4% of students positively assessed the practical knowledge they have obtained during their education in Cracow, which is the capital city of Małopolskie province. In this case, students of the arts were the most satisfied (95.1%), followed by students of journalism and information communication (91.5%). As in the case of students in Warsaw, the worst ratings were given by students of law (46.1%) and transport services (43.9% of positive responses).

Łódź and Katowice fared the worst in the league table. In these academic centers, only 58.2% and 54.7% of the students respectively were satisfied with the practical knowledge they have acquired at university. In both these centers, the lowest ratings were noted in the case of social majors (48.2% and 45.1% respectively) as well as in the case of pedagogical majors in Łódź (43%) and law in Katowice (only 27.1% of satisfied students).

The remaining centers were positively assessed in this context by between 62% and 65% of students. In Lublin and Wrocław, the lowest grades were given by students of law (47.3% and 31.5% respectively) and veterinary science (55.3% and 6.5% respectively). In Gdańsk and Poznań, the lowest ratings were in the case of social majors (53.7% and 49.1% respectively) as well as business and administration (57.9% and 56.9% respectively). On the other hand, students positively rated law and medicine in Poznań (100% and 91.6% of satisfied), environmental protection in Gdańsk (97%), art and biology in Łódź (91.2% and 93%), and pedagogy (teacher training) in Wrocław (90%).

Table 1

Efficiency assessment of studies in terms of how students are prepared to use knowledge obtained in selected academic centers in practice, distinguishing groups of majors with the most positive and negative responses

Warsaw		students pursuing the following majors[a]:				Cracow	students pursuing the following majors:			
		law	transport services	medicine	mathematics and statistics		transport services	law	arts	journalism and information communication
no	19.1%	43.9%	44.4%	1.6%	0.0%	22.0%	56.1%	53.9%	4.9%	8.5%
yes	72.2%	56.1%	55.6%	98.4%	100.0%	67.4%	43.9%	46.1%	95.1%	91.5%
n	4,096	132	36	386	41	3,753	57	115	103	59
Lublin		students pursuing the following majors:				**Łódź**	students pursuing the following majors:			
		law	veterinary science	humanities	agriculture, forestry, fishery		pedagogy	social	arts	biology
no	24.4%	52.7%	44.7%	16.1%	16.0%	31.2%	57.0%	51.8%	8.8%	7.0%
yes	63.0%	47.3%	55.3%	83.9%	84.0%	58.2%	43.0%	48.2%	91.2%	93.0%
n	1,878	55	47	329	50	1,681	114	197	68	43
Wrocław		students pursuing the following majors:				**Poznań**	students pursuing the following majors:			
		veterinary science	law	physics	pedagogy		social sciences	economics and administration	medicine	law
no	25.8%	93.5%	68.5%	14.8%	10.0%	25.1%	50.9%	43.1%	8.4%	0.0%
yes	63.8%	6.5%	31.5%	85.2%	90.0%	62.7%	49.1%	56.9%	91.6%	100.0%
n	2,652	46	54	149	120	2,387	330	353	202	56
Gdańsk		students pursuing the following majors:				**Katowice**	students pursuing the following majors:			
		social	economics and administration	social services	Environmental protection		law	social	arts	engineering-technology
no	24.4%	46.3%	42.1%	10.2%	3.0%	32.5%	72.9%	54.9%	12.5%	9.2%
yes	64.6%	53.7%	57.9%	89.8%	97.0%	54.7%	27.1%	45.1%	87.5%	90.8%
n	1,615	205	266	98	33	1,521	48	175	32	65

[a] There were 22 groups of majors: pedagogy, humanities, arts, social sciences, economics and administration, law, journalism and information communication, biology, physics, mathematics and statistics, computer science, medicine, social care, engineering/technology, production and manufacturing, architecture and construction, agriculture, forestry, fishery, veterinary science, social services, environmental protection, transport services, protection and security.

Source: Own analysis based on PARP, (2011).

The viability and effectiveness of education processes must be confirmed on the labor market. The possibility of finding a job by graduates in a specific profession is a test for the quality of education.

The subjective assessment of students completing their education is positive for universities. The vast majority of students believe that the knowledge and abilities they have gained during their studies will allow them to find a job in their profession (Table 2).

Table 2

Assessment of opportunities to find a job in a specific profession thanks to knowledge and abilities gained during studies in major academic centers in Poland

Academic center	Assessment of opportunities to find a job in one's profession			
	yes	no	Students will not look for this kind of job	n
Cracow	86.5%	10.8%	2.6%	3,617
Warsaw	85.7%	12.3%	2.0%	4,030
Wrocław	80.8%	17.4%	1.8%	2,524
Poznań	79.9%	17.7%	2.5%	2,146
Gdańsk	77.8%	18.7%	3.5%	1,553
Lublin	77.4%	21.1%	1.5%	1,755
Łódź	76.1%	21.8%	2.1%	1,520
Katowice	74.2%	22.5%	3.3%	1,353

Source: Own analysis based on PARP, (2011).

Again, students in Cracow and Warsaw gave the best grades to their universities (86.5% and 85.7% of positive responses respectively). The lowest ratings were in Łódź (76.1%) and Katowice (74.2%). Generally, the ratings in this category are higher than in the previous comparison focusing on views about practical skills obtained during studies. This shows that students give positive ratings to theoretical knowledge taught at university courses.

It should be emphasized that some students do not plan to take up work in the profession they have studied. Admittedly, the percentage is not large, yet it is significant for some individual majors. Students in Gdańsk (3.5%) and Katowice (3.3%) are the most reluctant to look for a job in their profession, while students in Lublin (1.5%) and Wrocław (1.8%) are at the opposite end of the spectrum. In Gdańsk, this problem particularly applies to students of the humanities (7.9%) and

economics and administration (6.5%). In Katowice, chiefly students of the humanities (7.7%) and social sciences (4.5%) say they will not look for a job in their profession.

The fact that students are reluctant to look for a job in their profession shows that they are aware of the situation on the labor market and know that they may have problems finding a job due to an oversupply of graduates in some disciplines. This problem concerns students of selected majors in all analyzed academic centers. In Warsaw, 6.7% of students of journalism and information communication do not plan to look for a job in their profession. In Cracow, 7.5% of students of agriculture, forestry and fishery and 6.9% of students of the arts have made such a decision; in Wrocław and Łódź, 5.7% and 8.1% of arts students respectively do not plan to look for a job in their line of work. These students do not believe they can be successful on the labor market even though they are at the beginning of their professional carrier.

Students of the arts are an interesting group in this context because they most often give high ratings to the practical knowledge they have gained during their courses. At the same time, many of them do not plan to look for a job in their profession after graduating. The opposite is true of medicine and law students, almost all of whom are planning to look for a job in their profession.

Students are aware of the need to upgrade their qualifications and broaden the knowledge they have gained during their studies to increase their chances of finding a good job. Students polish their skills by attending extracurricular activities (being active in student self-regulation organizations, science circles, working as volunteers, and joining various associations and organizations), by attending traineeships and internships, and by securing various certificates needed to work in a specific profession.

Table 3 shows the level of student participation in traineeships and internships during studies. As shown below, this form of gaining additional skills is popular, though many students still do not try to gain professional experience in this way. In this context, it is also important to gain professional experience in one's field of expertise and planned job—this aspect was not analyzed in the BKL study. [13]

The largest percentage of students attending traineeships and internships was recorded in Wrocław (76.1%) and Lublin (73.1%), where the highest percentages were noted for veterinary and medical students (100% and 95.7% respectively in Wrocław and 94.3% and 87.3% respectively in Lublin).

[13] This aspect was not included in the BKL study, which means that declarations in this context concern all kinds of traineeships and internships attended—not always related to the major studied.

Table 3

Participation of students in traineeships and internships during their studies, in selected academic centers; groups of majors with the largest numbers of positive and negative responses

Warsaw		majors:				Cracow	majors:			
		environmental protection	biology	arts	mathematics and statistics		medicine	biology	mathematics and statistics	journalism and information communication
yes	60.1%	93.3%	88.2%	42.1%	33.3%	62.2%	96.2%	90.9%	38.3%	37.5%
no	39.9%	6.7%	11.8%	57.9%	66.7%	37.8%	3.8%	9.1%	61.7%	62.5%
n	4,487	30	102	126	42	4,200	208	164	107	64
Lublin		majors:				**Łódź**	majors:			
		veterinary science	medicine	agriculture, forestry fishery	physics		social services	medicine	production and manufacturing	arts
yes	73.1%	95.7%	87.3%	39.7%	20.4%	68.3%	88.6%	88.1%	36.1%	19.4%
no	26.9%	4.3%	12.7%	60.3%	79.6%	31.7%	11.4%	11.9%	63.9%	80.6%
n	2,150	47	189	58	54	1,882	44	243	36	72
Wrocław		majors:				**Poznań**	majors:			
		veterinary science	medicine	humanities	mathematics and statistics		pedagogy	environmental protection	arts	law
yes	76.1%	100.0%	94.3%	50.9%	41.1%	67.4%	89.1%	85.7%	47.0%	5.3%
no	23.9%	0.0%	5.7%	49.1%	58.9%	32.6%	10.9%	14.3%	53.0%	94.7%
n	2,980	50	192	334	56	2,717	192	35	66	57
Gdańsk		majors:				**Katowice**	majors:			
		medicine	pedagogy	environmental protection	engineering/ technology		pedagogy	social services	computer science	arts
yes	56.9%	89.8%	87.4%	5.9%	16.3%	68.3%	95.8%	82.9%	42.9%	34.3%
no	43.1%	10.2%	12.6%	94.1%	83.7%	31.7%	4.2%	17.1%	57.1%	65.7%
n	1,813	127	182	34	258	1,746	214	35	77	35

Source: Own analysis based on PARP, (2011).

On the other hand, students in Gdańsk (56.9%) and Warsaw (60.1%) participated less often in these kinds of activities, though there were majors where traineeships and internships were common in these cities as well (93.3% of environmental protection students in Warsaw and 89.8% of medicine students in Gdańsk took part in traineeships and internships). High rates of student activity were also noted in other academic centers. This especially applies to majors such as medicine in Cracow (96.2%) and Gdańsk (89.8%) and pedagogy in Katowice (95.8%). Students at law courses in Poznań (5.3%) and environmental protection courses in Gdańsk (5.9%) participated less frequently in traineeships and internships. Students of engineering/technology in Gdańsk (16.3%), arts in Łódź (19.4%) and physics in Lublin (20.4%) displayed little interest in this kind of activity.

Apart from looking for a job on the market, students can also decide to start their own business. As illustrated in Table 4, students in the analyzed academic centers show moderate interest in self-employment and doing business on their own. It is important to note that the data shown below reflect only declarations of interest in such an activity, not the actual decisions or steps already taken to carry out such plans.

Generally, students in Wrocław, Gdańsk and Warsaw are potentially the most entrepreneurial at the end of their education at the university level. In Wrocław, 50% of the students declared a desire to run their own business; for both Gdańsk and Warsaw, the figure was 46%. In Wrocław, students of veterinary science (91%) and architecture and construction (64%) were the most determined to do so; in Gdańsk the same was true of students of environmental protection (82%) and social services (70%), and in Warsaw of students of mathematics and statistics (98%) as well as architecture and construction (69%). On the other hand, students in Lublin and Katowice were the least eager to start their own business (in both these academic centers, only 33% of the students declared a desire to start their own business). In Lublin, students of biology and computer science turned out to be the least business-minded (at just 22% and 24% respectively), while students of veterinary science were again at the opposite end of the spectrum (80%). In Katowice, the smallest percentage of those planning to start their own business was found among students of mathematics and statistics (9%)—in a trend totally opposite to that recorded in Warsaw—followed by biology students (24%). In Katowice, students of social services displayed the highest propensity to self-employment, at 64%.

Table 4

Students' declarations of a desire to run their own business (in the form of a company, farm, foundation or association) in selected academic centers; majors with the largest percentages of positive and negative responses[a]

Warsaw		majors:				**Cracow**	majors:			
		mathematics and statistics	architecture and construction	agriculture, forestry fishery	biology		journalism and information communication	medicine	production and manufacturing	pedagogy
no	27%	2%	13%	52%	25%	33%	24%	27%	34%	63%
yes	46%	98%	69%	35%	26%	41%	60%	56%	30%	26%
n	4,488	42	125	86	102	4,199	64	208	186	307
Lublin		majors:				**Łódź**	majors:			
		veterinary science	agriculture, forestry, fishery	computer science	biology		environmental protection	architecture and construction	biology	computer science
no	33%	4%	26%	37%	55%	24%	7%	14%	30%	24%
yes	33%	80%	57%	24%	22%	39%	65%	54%	32%	32%
n	2,150	47	58	77	110	1,880	44	57	47	161
Wrocław		majors:				**Poznań**	majors:			
		veterinary science	architecture and construction	physics	mathematics and statistics		architecture and construction	social services	agriculture, forestry fishery	arts
no	26%	6%	18%	43%	50%	24%	13%	16%	22%	33%
yes	50%	91%	64%	34%	27%	39%	63%	54%	30%	24%
n	2,984	50	143	160	56	2,717	64	211	95	67
Gdańsk		majors:				**Katowice**	majors:			
		environmental protection	social services	pedagogy	biology		social services	arts	biology	mathematics and statistics
no	25%	6%	12%	32%	36%	32%	9%	17%	34%	60%
yes	46%	82%	70%	29%	26%	33%	64%	59%	24%	9%
n	1,815	34	101	182	39	1,744	35	35	38	35

[a] the answer "hard to say" is not included in the table – therefore the percentages do not always add up to 100.

Source: Own analysis based on PARP, (2011).

Among the remaining centers, students of architecture and construction in Łódź and Poznań (54% and 63% respectively) stand out. The same goes for students of environmental protection in Łódź (65%) and social services in Poznań (54%). Cracow differs from other centers in that students of journalism and information communication (60%) and medicine (56%) are the most business-minded there, while students pursuing pedagogical majors are the least eager to run their own business (26%).

Another confirmation of qualifications gained by students, beside extracurricular activities, are various entitlements (guaranteed benefits) and certificates needed to work in selected professions.

There is little diversity in this area in the analyzed academic centers. Apart from Cracow, where this percentage was the lowest (24%), in other academic centers around one-third of the students said they have obtained useful entitlements.

Students pursuing pedagogical majors were the most likely to seek various professional certificates. In Gdańsk, 42% of the students in this group possessed or were in the process of obtaining such certificates. In Poznań, the figure was 44%, in Wrocław 45%, in Katowice 48%, in Lublin 53%, and in Łódź 57%. Entitlements and certificates are also important to students of social services. In Gdańsk, 40% of the students had or were in the process of obtaining such certificates, and the figures for Wrocław, Cracow and Katowice were 51%, 49% and 65% respectively.

Students of mathematics and statistics, environmental protection, and agriculture, forestry, and fishery in Warsaw were the least interested in obtaining professional certificates (100%, 96% and 94% respectively). The same is true of environmental protection students in Gdańsk (91%) and Wrocław (92%), and of students of mathematics and statistics (94%) and biology (91%) in Cracow.

The opposite holds true for majors such as pedagogy and social services, where a relatively large group of students have secured or are in the process of obtaining professional certificates. In the case of pedagogical majors, the figures are 42% for Gdańsk, 48% for Katowice, 53% for Lublin, 44% for Poznań, and 45% for Wrocław, while in the case of social services Katowice reports 65%, Cracow 51%, Lublin 48%, Łódź 57%, and Wrocław 49%. Moreover, a relatively large percentage of those interested in obtaining certificates was noted for majors such as transport services (43%) and law (50%) in Wrocław, physics (43%) and arts (42%) in Warsaw, and social care (42%) in Cracow.

To sum up, the majority of students positively rate the knowledge and skills they have gained during their studies and broadened at various traineeships and internships and in the course of extracurricular activities or thanks to various professional certificates they have received. Many of the students believe they will manage to find a job in their line of expertise, but they also are considering the possibility of doing business on their own.

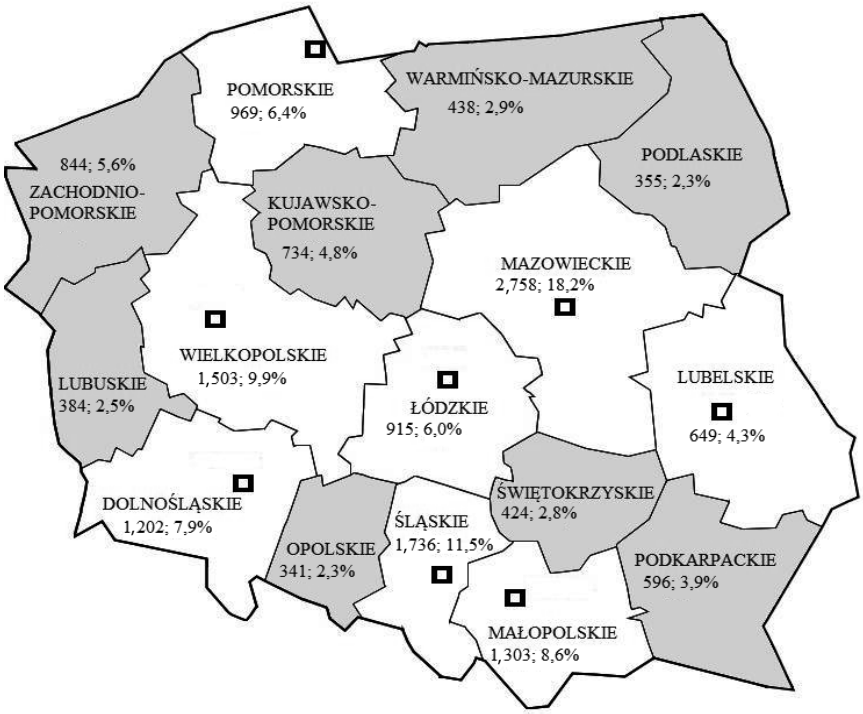
Job applicants as evaluated by employers

The labor market is where the self-assessments and decisions made by students in the course of their education are tested. In case of an applicant looking for a job in companies active on the market, such verification is made by employers.

In the following assessment, the views of over 15,000 employers across Poland were analyzed. As shown on Map 2, employers from Mazowieckie (18.2%), Śląskie (11.5%) and Wielkopolskie (9.9%) provinces were the most strongly represented in the study.

In line with the assumptions made in the BKL study, the analysis included entities from selected PKD categories (Table 5); local entities, the central administration, and nonprofit organizations were excluded from the population (see footnote 2). As shown below, the breakdown of the analyzed sample of enterprises by sector is similar to the structure of the entire population in the data of the Central Statistical Office.

Map 2
Breakdown of the sample of employers by province



Source: Own analysis based on PARP, (2011).

Table 5

Breakdown of the sample of studied entities by business sector, in relation to the general population

Sector	sections of PKD	BKL		GUS	
		Number	Percentage	Number	Percentage
Industry and mining	B, C, D, E	2,236	15%	379,650	10%
Construction and transport	F, H	2,709	18%	732,348	20%
Trade, accommodation and food service activities	G, I, N	5,335	35%	1,318,969	36%
Specialist services	J, K, L, M, R, S (without division 94)	3,674	24%	949,594	26%
Education	P	790	5%	116,132	3%
Human health and social work	Q	407	3%	186,008	5%
Total		15,152	100%	3,682,701	100%

B – mining; C – manufacturing; D – electricity, gas, steam and air conditioning supply; E – water supply; sewerage, waste management and remediation activities; F – construction; G – trade; repair of motor vehicles; H – transportation and storage; I – accommodation and catering; J – information and communication; L – real estate activities; M – professional, scientific and technical activities; N – administrative and support service activities; P – education; Q – human health and social work activities; R – arts, entertainment and recreation; S (without division 94) – other service activities;

Source: Own analysis based on PARP, (2011) and GUS, (2011).

Only 17% of the employers surveyed at the end of 2010 said they were looking for new workers (Table 6). The largest percentage of employers looking for new employees was noted in Podlaskie and Lubelskie provinces, at 23% and 20% respectively. On the other hand, the lowest percentage of employers looking for staff was in Świętokrzyskie province (13%), followed by Wielkopolskie and Zachodniopomorskie (each 14%). However, while analyzing this data, it is important to take into account the absolute values, which show the size of a local market.

Not all job offers will satisfy university graduates because most of the openings (45%) are for people with a secondary education; 39% of the offers were intended for people with a higher education, but 30% of the employers said they could also hire a person with a secondary education for that kind of job. This reduces the possibilities for university graduates to find a job commensurate with their level of education.

The highest percentage of job offers for higher education graduates was noted in Dolnośląskie (51%) and Mazowieckie (49%) provinces, with the lowest in Lubuskie (12%) and Warmińsko-Mazurskie (5%). At the same time, 17% of the employers said they were ready to hire people with a lower level of education for these kinds of jobs.

Table 6
Employers looking for staff and the level of education required from applicants, by province

Province	Employers looking for new workers		Required level of applicant education				
	total	percentage	primary	vocational secondary	secondary	higher	
							secondary also an option
Dolnośląskie	202	17%	0%	16%	33%	51%	33%
Kujawsko-pomorskie	140	19%	0%	23%	38%	38%	26%
Lubelskie	129	20%	0%	13%	47%	40%	32%
Lubuskie	66	17%	0%	39%	48%	12%	3%
Łódzkie	162	18%	0%	17%	38%	44%	12%
Małopolskie	235	18%	0%	30%	31%	39%	49%
Mazowieckie	507	18%	0%	1%	50%	49%	30%
Opolskie	63	18%	0%	18%	53%	29%	3%
Podkarpackie	88	15%	0%	20%	44%	36%	41%
Podlaskie	83	23%	0%	7%	60%	33%	34%
Pomorskie	150	15%	0%	14%	55%	32%	56%
Śląskie	274	16%	0%	8%	49%	44%	1%
Świętokrzyskie	54	13%	0%	32%	32%	35%	68%
Warmińsko-Mazurskie	68	16%	7%	26%	63%	5%	17%
Wielkopolskie	211	14%	0%	14%	58%	28%	25%
Zachodnio-pomorskie	119	14%	0%	23%	30%	47%	48%
Total	2,551	17%	0%	15%	45%	39%	30%

Source: Own analysis based on PARP, (2011).

Employers in Świętokrzyskie, Pomorskie and Małopolskie provinces were the least interested in hiring workers with a university education. In Świętokrzyskie province, employers were ready to hire a person with a secondary education for 68% of the job openings nominally intended for workers with a higher education. For Pomorskie province, the figure was 56%, and for Małopolskie 49%. This shows that people with

a higher education are in a difficult position on local labor markets. In fact, only in Śląskie province are university graduates in a relatively good situation: 44% of all job offers are intended for workers with a higher education, and only 1% of these vacancies could be filled by workers without a university degree. Graduates of universities in Łódzkie, Dolnośląskie and Mazowieckie provinces are also in a relatively better position on the labor market. On the other hand, graduates in Warmińsko-Mazurskie, Świętokrzyskie, Lubuskie and Pomorskie provinces are the worst off. Warmińsko-Mazurskie, Świętokrzyskie, Lubuskie provinces do not have strong academic centers, as a result of which students deciding to return home after studies in other regions have poor prospects for employment in these three provinces.

Graduates of universities of technology are the most popular with employers looking for staff members with a higher education (Table 7). A total of 341 employers were looking for workers with degrees from universities of technology, especially the AGH University of Science and Technology in Cracow, the Warsaw University of Technology, and the Wrocław University of Technology. Those were mainly enterprises from industry and the mining sector but also those active in specialist services sector. The AGH University of Science and Technology was the most popular in Śląskie province, the Warsaw University of Technology in Mazowieckie, and the Wrocław University of Technology in Dolnośląskie.

Employers were also interested in hiring graduates of non-technical universities, mostly the University of Warsaw and the Jagiellonian University in Cracow. Graduates of these universities were mainly sought by firms in sectors such as specialist services and education. Among economic universities, the Warsaw School of Economics was the most often spontaneously mentioned by employers polled, while employers had no distinct preferences for medical universities.

Table 7

Universities preferred by employers looking for workers with a higher education

Type of university	Number of employers listing a given university			
	Total			
universities of technology and technical colleges	341	broken down by:		
any university of technology – not specified	82	sector [a]	Industry and mining	36
			Construction and transport	13
			Trade, accommodation and food service activities	11
			Specialist services	15
		province [b]	Dolnośląskie	13
			Mazowieckie	10
			Wielkopolskie	9

Type of university	Number of employers listing a given university			
	Total			
AGH	48	sector	Industry and mining	20
			Specialist services	14
		province	Małopolskie	19
			Śląskie	10
Warsaw University of Technology	44	sector	Industry and mining	16
			Specialist services	15
		province	Mazowieckie	15
Wrocław University of Technology	30	sector	Industry and mining	14
		province	Dolnośląskie	9
non-technical universities	146	broken down by:		
University of Warsaw	32	sector	Specialist services	10
			Education	10
		province	Mazowieckie	19
any non-technical university – not specified	25	sector	Education	11
Jagiellonian University	24			
economic universities	86	broken down by:		
any economic university or business school – not specified	34	sector	Industry and mining	11
Warsaw School of Economics	17	province	Mazowieckie	9
medical universities	55	broken down by:		
any medical university – not specified	38	sector	Human health and social work	30
		province	Dolnośląskie	9
			Mazowieckie	9

The figures given in the table are based on "raw," i.e. unweighted, data

[a] at least 10 recommendations

[b] at least 9 recommendations

Source: Own analysis based on PARP, 2011.

Education is just one of many factors taken into account by employers when they evaluate job applicants. Employers looking to recruit staff want them to have experience working in a similar position, and other requirements include professional certificates and fluency in foreign languages. However, employers generally believe that a good worker is hard to find on the labor market, especially in sectors such as human health and social work (where the problem appeared in 90% of the cases). In construction and transport, 81% of the employers said they had problems finding appropriate workers (Table 8).

In the human health and social work sector, employers primarily expect newly hired staff to have appropriate certificates and at least a secondary education. Experience and knowledge of foreign languages are slightly less important: they are important to 55% and 48% of employers respectively. In construction and transport, 91% of employers said that a job candidate should be experienced in work in a similar position; for 69% of employers, professional certificates are also essential, while the level of education is slightly less important. Only 17% of employers in this sector expect job seekers to be university graduates.

Employers in the education and specialist services sectors exhibit the greatest demand for university graduates: 82% and 69% of job offers in these two sectors respectively are targeted at workers with a higher education. At the same time, employers in these two sectors have the least difficulty finding the right kind of employees (67% and 69% respectively), though this does not apply to workers with a higher education (in this case, difficulties were encountered by 84% and 72% of employers respectively). The biggest problems with employing people for positions requiring higher education are reported by employers in the human health and social work sector. In this case, all employers had problems hiring the right people. Generally, in sectors where companies were looking for more workers with a university education, a larger number of employers reported problems with finding the right candidates. Conversely, in sectors where most job offers were for people with a lower level of education, finding workers for positions requiring higher education was easier, though in no case did the percentage of unsatisfied employers drop below 64%. This shows that there are significant shortages of qualified job seekers. In sectors where demand for labor is small and competition among job seekers is significant, employers find it easier to recruit workers meeting their expectations, but in sectors where many new workers are needed and where the employers' choice is limited, the shortcomings in the candidates' qualifications are more distinct.

The requirements of employers seeking to hire staff with a university education are more stringent than those for workers in general. In sectors such as specialist services and education, most job offers are targeted at individuals with a higher education. When it comes to knowledge of foreign languages, the general tendency is that employers in all sectors have higher requirements with regard to candidates with a higher education. In industry and mining, 62% of employers additionally require university graduates to hold professional certificates (with the average for all sectors at 42%), while 46% expect job seekers to have work experience in a similar position (the average for all sectors is 58%). The reverse is true of employers in sectors such as trade, accommodation and food service activities, where 68% of employers require university graduates to have professional experience (with the average for all sectors at 60%) while only 20% require them to have certificates (with the average for all sectors at 35%). In the case of the human health and social work sector, a certificate is required for each job offer aimed at a person with a higher education, while work experience is less often a must (43%, against an average of 55% for all job offers).

Table 8

Employers' requirements with regard to job candidates and the percentage of enterprises reporting difficulties in finding the right kind of workers

Main branch	Employers' requirements with regard to job seekers											problems finding appropriate workers to fill vacancies
	work experience in a similar position	professional certificates	speaking foreign language	education								
				primary	vocational secondary	secondary	higher					
								requirements including:			problems finding appropriate workers	
								experience	certificates	foreign language		
I	58%	42%	36%	1%	20%	53%	25%	46%	59%	65%	64%	75%
II	91%	69%	32%	0%	40%	42%	17%	91%	68%	74%	69%	81%
III	60%	35%	44%	0%	11%	67%	22%	68%	30%	57%	66%	72%
IV	59%	48%	64%	0%	8%	23%	69%	56%	54%	75%	72%	69%
V	60%	53%	57%	0%	0%	18%	82%	51%	55%	61%	84%	67%
VI	55%	84%	48%	0%	0%	54%	46%	43%	100%	49%	100%	90%

I Industry and mining
II Construction and transport
III Trade, accommodation and food service activities
IV Specialist services
V Education
VI Human health and social work

Source: Own analysis based on PARP (2011).

The results point to a discrepancy between student qualifications and employer requirements. In the human health and social work sector, each candidate for a position where a university education is required should also hold appropriate certificates. In reality, no more than a third of students in their senior years of medical studies hold or are in the process of obtaining such certificates. On the other hand, medical students quite often participated in traineeships and internships, even though these are not often required by employers. Furthermore, students of social services stand out when it comes to obtaining certificates and entitlements, even though employers in the "trade, accommodation and food service activities" sector give the highest ratings to work experience. As a result, graduates find it difficult to fully meet the requirements of employers.

Overall, depending on the sector, anywhere from 43% to 91% of firms expect university graduates to have work experience. Even though, depending on the academic center, from 57% to 76% of students say they have taken part in traineeships and internships, it turns out that these are not necessarily students from those courses where work experience is indispensable for graduates to get a job. Even though almost all companies in the construction and transport sector say they do not want to hire inexperienced employees, students of architecture and construction, or transport services, are not among the most active in gaining work experience while at university—despite the fact that this should be a priority for them.

Table 9 gives a deeper insight into the requirements of employers with regard to job seekers concerning professional certificates and knowledge of foreign languages—especially in positions where university graduates are needed.

The importance of various types of certificates depends on the sector where employers are active. a driver's license and other certificates for drivers or mechanics, as well as those related to transport and vehicles, are required mainly in the construction and transport sector, but this usually does not apply to positions for which people with a university education are sought. Generally, certified professional qualifications, though welcome in every position, are most badly needed in the human health and social work sector, especially in the case of job candidates with a higher education. In particular, job seekers with a higher education need specialist certificates related to construction and industry (for employers in these sectors), and medical and pharmaceutical certificates if they are looking for work in the human health and social work sector as well as in the "trade, accommodation and food service activities" sector. University graduates also need accounting and financial certificates, especially if they want to work in construction and transport (although, in general, such certificates are mostly required in the specialist services sector for most posts). Other certificates related to medicine and social work as well as psychology are mostly required in the human health and social work sector as well as in the education sector.

Table 9

Most important certificates and foreign languages required by employers seeking employees in general and for positions in which higher education is a must

branch	Required																		
	certificates													foreign languages					
	driver's license (different types)	general professional	specialist in construction and industry	electrical	other for drivers, mechanics, related to transport and vehicles	other certificates related to medicine and social work, psychology	other related to services	computer science	welding	medical and pharmaceutical	linguistic	educational	accounting and finance	English	German	Russian	French	Other	Spanish
I	8%	15%	14%	22%	3%	0%	8%	0%	14%	0%	3%	0%	0%	95%	31%	15%	0%	3%	0%
II	43%	15%	15%	17%	21%	9%	0%	0%	9%	0%	3%	0%	3%	84%	48%	18%	7%	4%	0%
III	23%	8%	11%	1%	5%	1%	11%	9%	6%	7%	10%	6%	4%	95%	43%	10%	2%	1%	2%
IV	21%	13%	10%	8%	0%	4%	15%	15%	0%	0%	4%	8%	16%	92%	21%	5%	2%	3%	1%
V	1%	6%	0%	1%	0%	18%	2%	6%	0%	0%	27%	50%	1%	100%	34%	19%	0%	5%	0%
VI	0%	26%	0%	0%	0%	38%	0%	16%	0%	56%	6%	7%	0%	100%	3%	1%	0%	1%	0%
positions where higher education is a must																			
I	11%	9%	37%	33%	0%	0%	15%	1%	0%	0%	13%	1%	0%	92%	46%	39%	1%	1%	0%
II	1%	1%	79%	12%	0%	0%	0%	0%	0%	0%	1%	0%	37%	89%	45%	24%	0%	0%	0%
III	1%	1%	26%	0%	0%	0%	0%	1%	0%	70%	1%	0%	0%	100%	39%	7%	5%	0%	0%
IV	5%	11%	17%	8%	0%	0%	0%	12%	0%	0%	7%	11%	21%	89%	31%	9%	4%	2%	2%
V	0%	7%	0%	0%	0%	22%	2%	7%	0%	0%	34%	61%	1%	100%	41%	22%	1%	6%	0%
VI	0%	35%	0%	0%	0%	21%	0%	11%	0%	51%	11%	2%	0%	99%	5%	1%	0%	1%	0%

I Industry and mining
II Construction and transport
III Trade, accommodation and food service activities
IV Specialist services
V Education
VI Human health and social work

Source: Own analysis based on PARP, (2011).

Foreign language certificates are chiefly required in the case of specialist services and particularly in the case of positions intended for university graduates. Even though the percentage of employers who require language certificates is relatively low, this does not mean that employers do not expect job candidates to be fluent in foreign languages. Just the reverse: foreign language fluency is an important criterion enabling an applicant to get a job.

English is the most useful foreign language for those searching for a job in Poland. Depending on the sector, between 92% and 100% of employers require English if they expect a candidate to speak a foreign language, regardless of whether the job offer applies to a person with a university or lower education. Employers from the specialist services and human health and social work sectors are the most single-minded in this case: all employers searching for workers in this sector require job seekers to speak English. In the case of the human health and social work sector, English is largely the only foreign language required by employers; other languages were required only occasionally.

German is the second most useful foreign language for those looking for a job (especially in construction and transport, as well as in industry and mining in the case of people with a higher education). Russian-speaking candidates are less often searched for (most often in the education sector, but also in industry and mining and in construction and transport in the case of openings for those with a higher education). Finally, a small group of employers expect job applicants to speak French, Spanish or another foreign language.

The high requirements of employers concerning professional certificates held by job seekers mean there is a significant discrepancy between the actual qualifications of job candidates and employer expectations. This discrepancy is even more distinct in the case of professional experience. As mentioned earlier, only about one-third of students possessed or were in the process of obtaining professional certificates, although such certificates are required by 56% of employers.

At the same time, the expectations of employers with regard to job candidates largely depend on their own readiness to run training programs and improve employee skills. Depending on the sector, there are noticeable differences in how employers approach this. In the education sector, 76% of employers expect job candidates to have all the necessary skills required for a specific position. Only 15% of employers provide some minor additional training, and 4% offer major extra training. Companies in the human health and social work sector are also hesitant to provide extra training to newly hired staff: 59% of employers in this sector expect job candidates to be fully qualified for work; 27% of employers are ready to offer some minor extra training, and a paltry 4% are willing to provide large-scale training. On the other hand, enterprises active in industry and mining are the most eager to provide full training (22%). Employers in this sector are also the least likely to expect that newly hired staff will be fully qualified for work (25%). Similarly, only 31% of employers in the "trade, accommodation and

food service activities" sector expect newly hired staff to be fully prepared for work; 50% are ready to provide partial training and 19% full training.

Table 10

Expected level of job candidate preparation by business sector

Employer expectations with regard to newly hired staff	Main branch of activity						Total
	I	II	III	IV	V	VI	
fully prepared	25%	38%	31%	33%	76%	59%	5,312
needs minor training	40%	40%	38%	37%	15%	27%	5,638
needs major training	13%	9%	12%	13%	4%	4%	1,701
needs full training	22%	13%	19%	16%	5%	10%	2,499
total	2,236	2,708	5,334	3,674	790	408	15,150

I Industry and mining
II Construction and transport
III Trade, accommodation and food service activities
IV Specialist services
V Education
VI Human health and social work

Source: Own analysis based on PARP, (2011).

Overall, employers negatively assess job candidates in terms of their ability to carry out responsibilities in their new job. This applies to both job seekers in general and specifically to candidates with a higher education—as shown by the high percentage of employers experiencing difficulties finding workers. Employers have high expectations with regard to applicants, to a large extent expecting them to be fully prepared for work or needing only minor additional training. Young university graduates often find it difficult to meet these expectations.

Conclusions

As shown in this subchapter, there is a wide gap between how students assess their own qualifications for work and how employers evaluate them. The optimistic expectations of students that they will be able to find a job in their line of expertise are to a large extent unrealistic. The participation of students in various traineeships and internships deserves special attention in the context of the extent of work experience required by employers. The same is true of professional certificates held by students and those required by employers.

The substantial discrepancy between employers' requirements and what students can offer them in practice means that job offers aimed at people with a higher education are rarely intended for newcomers on the labor market. Experienced individuals who have been active on the labor market for years are usually searched for rather than young university graduates. This—together with the fact that a considerable portion of the job offers essentially targeted at people with a higher education are also open to individuals with a secondary education—significantly reduces the possibilities of finding a job by new generations of graduates and exposes them to tough competition. This competition varies from one province to another. In some provinces, few new jobs are created for university graduates where they could find employment commensurate with their education.

Consequently, graduates experiencing difficulties finding a job adapted to their education can avoid unemployment by either accepting work below their qualifications or by starting their own business. Roughly 40% of students say they are ready to start their own business, which, however, does not mean that all of them will actually do so. On the other hand, young employees waste their potential if they work at a job for which they are overqualified.

As a result, it can be seen that, given the large-scale participation of society in higher education, the labor market has significant problems putting all this human capital to a good use. The reasons for this are twofold: first, the economy does not create an adequate number of jobs for qualified workers; second, the qualifications of university graduates are insufficient compared with the requirements of today's employers. This creates a serious risk that the development potential of the country may be wasted, and that the process of transforming Poland's economy toward one based on advanced technology and innovation will slow down.

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6.3. Development of Higher Education in Poland – Toward Scenario Analysis

Tomasz Szapiro

This subchapter[14] discusses selected development scenarios for Poland's education system in the context of changes in education in Europe and worldwide.

In order to improve the decision-making process, this *scenario analysis* ponders the future by considering several alternative outcomes. Instead of offering an exact picture of the future, it presents future developments without either extrapolating the past or expecting the future validity of the observations. It considers possibilities connected to the past to show possible future outcomes. Usually several scenarios are presented to make the analysis clear.

This approach is designed to offer a background for future educational decisions and create a benchmark for policy makers. The education market requires sophisticated decision-making processes.[15] The market itself is divided into public, private and hybrid (merging both forms) education sectors. This results in a different perception of prices and costs in each sector, especially as institutions responsible for developing educational programs are often not fully aware of students' preferences. The complex, intricate structure of educational services is difficult to explain to industry outsiders. In many cases, the quality of education cannot be directly perceived and is not easily measurable. This explains why educational decisions often depend on information presented in the form of league tables reported in the media. They require deep reflection if a prospective student wants to meet specific requirements rather than consider only top-ranking places. As the education system is extremely complex, some economic analysis—descriptive and normative—is presented below to increase the credibility and understanding of the presented arguments.

The subchapter is organized as follows. In the next section, the contemporary education landscape is portrayed in global, regional and national terms. This section is followed by a brief discussion of the most important topics related to the international debate on ways of financing education. Then comments are made on the use of simulations in educational analyses, along with an attempt to highlight the specific features of Poland's education system in this context. The subchapter concludes with three scenarios for the development of Poland's education system.

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14 Some of the results presented in this text were worked out together with my Ph.D. students G. Koloch and P. Szufel.

15 See e.g. "Ryzyko i szansa konkurencji edukacyjnej," in: J.Dietl (ed.) (2006), *Konkurencja na rynku usług edukacji wyższej*, FEP, Łódź.

Contemporary education in global, regional and national terms

Education aims at human development and at shaping people's personality and creative skills. The general goal of education is to prepare individuals to live in society and to form personal judgments. The education process consists of collecting knowledge and mastering skills and attitudes. The effectiveness of the education system is understood as the achievement of these goals. The efficiency of the education process varies: the lower the cost of the defined educational effect or the higher the educational effect produced from a specific level of funding, the more efficient the education system is. Education policymakers are concerned about the effect of the education process, but at the same time they try to make it effective and efficient. However, sometimes educational efforts may prove to be counterproductive. Education („negative" education in this case) may produce social maladjustment and obedience to imposed group judgments. Socially shaped attitudes may crowd out inborn ones and lead to undesirable behavior (lack of respect for the rules of democracy, ignoring elections, etc.) and lack of responsibility for the individual, community and environment. This is why education is so important.

Let us note that the effectiveness of education is hard to measure at the global level as educational goals (e.g. desired attitudes) are value-dependent, and value systems depend on culture. The efficiency of education is based on measurable variables that can be compared more easily in the global perspective, at least theoretically.

One of the most important outcomes is the preparation of individuals for life in society under conditions of wealth. The first expectations here are employment[16] and wealth. Although both are generally positively correlated to education, the distribution of wealth questions the effectiveness of education. The percentage of poor people in the world population is decreasing (Sala-i-Martin, 2002), but remains enormous. The population of "under $1 daily" consumers decreased from 20% to 5% over the past 25 years. The population of "$2" consumers decreased from 44% to 18%. Milanovic (2000) shows that transfers to the poor increase as the income variance grows. But Milanovic (2000; 2002) discovers significant inequalities among rural and urban areas. More than 50 million with the highest wages earn more than the 2.7 billion with the lowest wages. Eurostat data show that the earnings of the top 1% exceed those of the bottom 57%. Similarly, the 20/20 inequality index (the ratio of the average income of the richest 20% to the poorest 20%) for 25 European countries from 1999 to 2005

16 The issue of unemployment is not considered in this text. Interested readers can find this perspective in my earlier text "Business Education vs. Unemployment and Economic Growth," in: *Poland International Economic Report*, M. Lubiński (ed.), World Economy Research Institute, Warsaw School of Economics, 2004.

reveals a largely monotonic trend (during those seven years, the ratio of "nine poor to two rich" was replaced by the ratio of "10 poor to two rich"). The Gini coefficient for income rose from 25% to 45% in Europe and to 65% in the world (Poland is close to the European average, with a Gini coefficient of 34%).[17]

Inequality and employment can be treated as outcome measures of the efficiency of the education system. We will focus on internal measures related to the process at the macro and micro levels. Let us, therefore, consider some examples of efficiency measures. To this end, we will review data on education systems in selected countries with a different size of the economy, growth rate, area and population.

Typical variables used in such effectiveness evaluations include the size of the population, age structure, average time of education, organization of the system (educational levels and existence of an obligation to learn), as well as the structure of funding. More specific variables include the number of students per teacher, spending on education per student in relation to the education level and GDP, total national financing of education, share of education in government spending, and student age.

In developed countries, education lasts under 15-16 years on average, while in other countries it is two to three years shorter. In Europe, one primary school teacher works with 14-17 pupils. In Japan and China, there are 20 schoolchildren per class on average; in South Korea there are 31, and in India 40. This number decreases when the percentage of GDP spent on education grows. In Poland, the average number of children per class is relatively small, but the cost of financing education measured by the percentage of GDP spent on education is high. This illustrates two important issues. First, if a smaller class means that children have easier access to the teacher and the educational effect is consequently higher, then the question is if the cost of employing teachers is optimal. The second question is related to the appropriate tradeoff between quality and cost.

Government spending on education varies in different countries. Poland and Spain divide funding equally among individual education levels, while Germany, Britain and China tend to invest far more in higher levels of education, unlike South Korea and Japan, for example. We thus deal with radically different education policies.

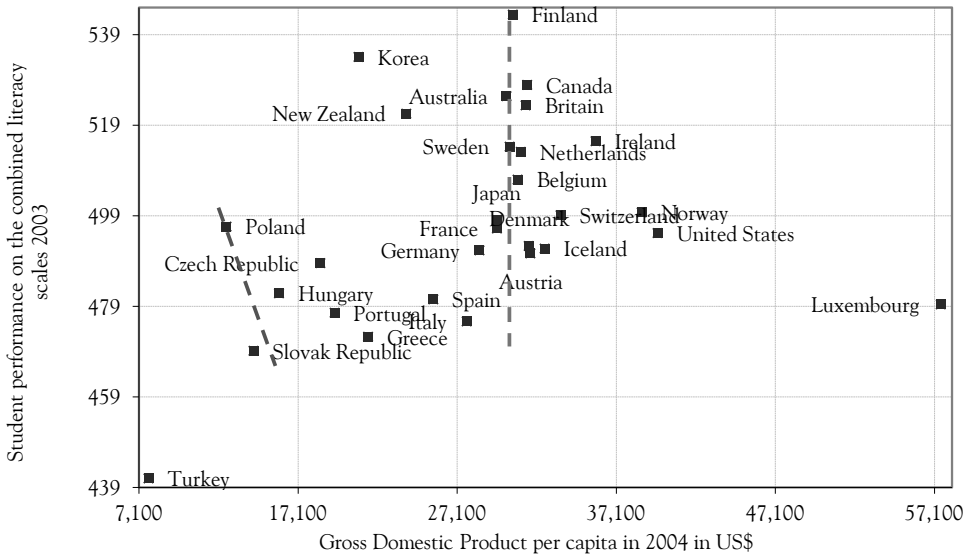
The relative cost of education is reflected in the percentage of GDP per capita spent on education. While at the primary and secondary level this cost is similar, in higher education the difference is 20-fold when comparing South Korea with China and India. Education spending in Poland is similar at all levels.

Total spending on education ranges from 4% to 5% of GDP (with the exception of China and India). Medium-sized countries spend tens of billions of U.S. dollars; big countries spend more than US$ 100 billion, while the United States spends over US$ 600 billion (Poland spent 5.6% of its GDP, i.e. US$ 13.5 billion, on education

[17] See subchapter 1.3.

in 2002). The data describes the education system from the point of view of funding education. Let us now consider the macroeconomic aspect of education outcomes.

Figure 1
National wealth and student performance



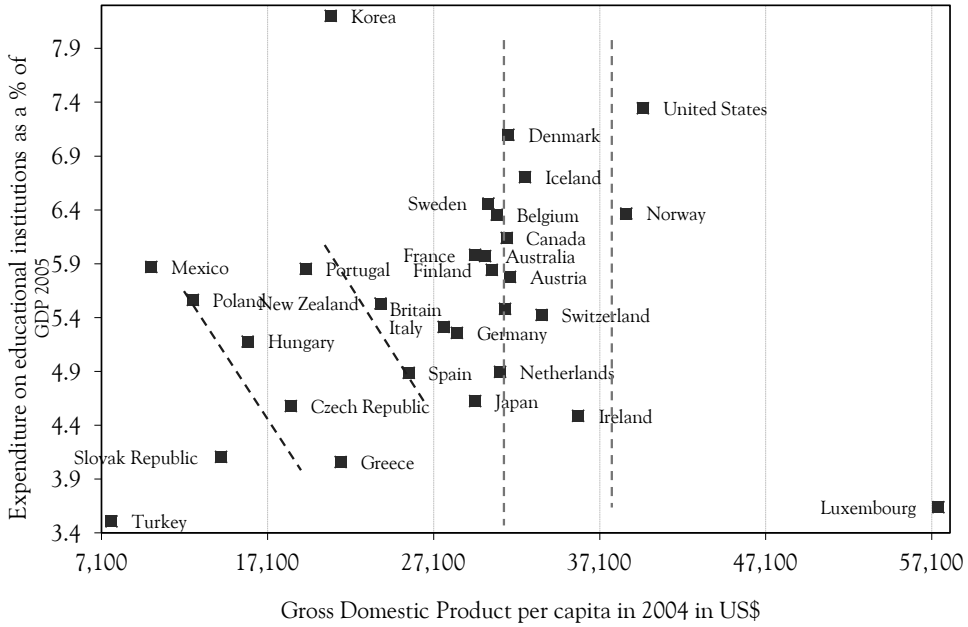
Source: Eurostat.

The data in Figure 1 point to a similar performance of Polish, French and American students despite different national wealth. On the other hand, the performance of students in Finland and Belgium is extremely different despite similar wealth. Postcommunist countries are characterized by a negative correlation of student performance and wealth. As educational expenditures are positively correlated with wealth, this suggests that other factors need to be considered or that major private funds are involved in education in these countries.

The online edition of *McKinsey Quarterly* reports the results of a simple calculation relating the results of performance tests to education expenditure in the United States. In 2006, the United States scored 474 points in the Program for International Student Assessment (PISA) test in mathematics and science, a far cry from the top performers Finland (548) and South Korea (552) (and also below the average scores of 498 and 494 respectively). For the United States, the price of each point is the highest among the studied countries, at US$ 165 per student, compared with US$ 100 for Finland and US$ 77 for South Korea. Poland's scores are 494 for mathematics and 502 for science, with the price per point at US$ 48. If points could be traded, the United States would have to spend US$ 2.3 trillion to fill the gap, according to *McKinsey Quarterly*.

Data on education expenditure in the UNESCO-OECD-Eurostat database (distribution of education expenditure by country, year, level of education, source of funding, and type of transaction) is supplemented by data from national administrative sources, reported by education ministries and national statistical offices. Financing institutions can be divided into governmental (public) and nongovernmental (private) sources, in addition to the separate category of "international agencies and other foreign sources." The size of region and type of transaction are also taken into account in statistics.

Figure 2
National wealth and education expenditure



Source: Eurostat.

The data in Figure 2 show there is a positive correlation between wealth and education expenditure in the analyzed group of countries. However, if subgroups are considered, there are two subgroups with a negative correlation of these variables and in two other subgroups wealth is not attributable to education expenditures. This suggests that education expenditures are not optimal.

For example, the similar performance of Polish and French students can be attributed to a similar level of education expenditures in these two countries, while the higher expenditure in the United States for the same performance suggests that the U.S. education system is less effective. This is confirmed by the fact that it is

constantly criticized in the media. On the other hand, the different performance of students from Finland and Belgium cannot be attributed to education expenditures. The level of education expenditure does not depend on a high level of wealth (e.g. Belgium and Norway or Poland and Britain); similarly, wealth does not determine the education expenditure policy (Denmark and Austria or France and Germany).

These observations show that high education expenditures are not necessarily effective, and other factors should be considered.

The data show that there is no simple mechanism on the basis of which educational policy can be built at the macroeconomic level. At the microeconomic level, private return needs to be considered (Dietl, 2007). Private return $\varepsilon = \frac{W_t - W_{t-1} - K}{W_{t-1}} 100,$

where $K=K_f+K_W$ denotes the cost of education (fee and alternative cost equal to K_W – lost compensation for work) and W_t-W_{t-1} is the increase in wages.

Polish education data show that private return is different for different educational services. It is the highest for education in medicine, law and economics (Czapiński, Panek, 2005). The perception of the price of education is biased, however, since, in a large part of the market, students do not cover the costs on their own (public education is covered from public funds).

These remarks present a picture that is difficult to interpret. Some questions remain unanswered: why do some countries with the same GDP per capita have different systems for financing education? Why do some wealthier countries spend less on education than poor ones? Why cannot student performance be easily related to GDP per capita? There are no clear rules explaining the relationship between economic performance, growth and funding. Consequently, the important issue of the potential impact of changes in financing education remains unclear for education policy makers. To a large extent, no viable theory is available in this area because the education system is highly complex; it involves a wide array of agents with complicated interactions, accompanied by diverse national architectures.

The debate on financing education

The international debate on education focuses on the problem of educational failures and wastage. According to academic institutions—a view reflected in the Glasgow Declaration of the European University Association (2005)—the inefficiency of education systems is related to the fact that Europe's universities are not sufficiently funded and thus cannot be expected to compete on the global market and provide students with high quality education. On the other hand, the academic community is aware that a proper allocation of resources is of key importance today given the need

to guarantee better access to education and improve its quality at a time when funds are being cut back and costs are being streamlined.

Consequently, the costs of higher education are increasingly being shared with students and their families via tuition and cost recovery fees, with public funding mechanisms used as a supplement. In some countries, students have access to means-tested grants and student loans. Nevertheless, student loans have not, in most cases, shifted the cost burden from the taxpayer to the student, mainly due to subsidized interest rates, poor collections and targeting.

An open debate continues in most countries on the advantages and disadvantages of centralized and decentralized systems, and about the role of public and private education as well as the role of the government, and the autonomy of universities. The government's policy must combine efficiency and flexibility—factors related to diversification and privatization—with continued responsibility for guidance, regulation and subsidizing. The main aim is to ensure minimum standards of quality and consumer protection, a range of educational services adapted to the needs of the economy and society, and access to academic education for talented and highly motivated individuals from poor families that would otherwise be unable to pay for their education.

The models for financing education vary significantly across the countries. Despite the large variability of expenditures, governments try to make the system as effective as possible in the long term. Moreover, day-to-day budgetary pressures, fund wastage, and the unsatisfactory performance of the system make an optimal allocation of public resources even more important. One option is to change the financing regime—in an extreme case, by switching from publicly financed education to a system financed from private sources, or by introducing co-financing arrangements.

The European University Association's (EUA) Glasgow Declaration of 2005 reads that education in Europe is underfinanced compared with the United States. The EUA names those European universities that are not sufficiently funded and cannot be expected to compete with their counterparts in the United States without comparable levels of funding. The EUA concludes that governments must ensure appropriate levels of funding to maintain and improve the quality of institutions.

In its Prague Declaration of 2010, the EUA expanded its message, saying that enhanced quality and improved transparency can be achieved by fully embracing the responsibilities stemming from the commitment of universities to quality and by providing students, employers and other entities with accurate information about their institutional mission, activities, performance and results. In 2010, the debate became global. The American Council on Education (ACE), the Association of Universities and Colleges of Canada (AUCC), and the European University Association (EUA) held their 12th Transatlantic Dialogue meeting that attracted around 30 college and university heads from Canada, Europe, and the United States. The meeting aimed to review internal decision-making processes and examine relations between higher

education and local and regional institutions. The review showed that the availability of data and information on the quality of teaching and learning is unsatisfactory and that the existing ratings and ranking lists do not provide reliable information on learning outcomes and on the acquisition of knowledge and skills by students. The meeting's participants concluded that "in most countries, hardly any comparable information is available on the educational quality of different programs and institutions. Approaches to assess higher education learning outcomes have been developed, but little cross-country information is available on the characteristics of the instruments used."

Overall, education requires huge budgets despite doubts over the effectiveness of education system performance and financing. Major international bodies are recommending measures to increase the accountability of national education systems in order to monitor their efficiency and assess the impact of educational policies.

Theoretical models (Koloch, Szapiro, Szufel, 2010) make it possible to consider simplified situations, for example a switch in the financing regime from private to state funds or the other way around. Typically, such models involve assumptions about the representative household, rationality based on utility functions and so-called stylized facts, which reflect the dynamics of the system and make it possible to use mathematical optimization methods and derive solutions describing these dynamics quantitatively. Results obtained from such models lead to qualitative interpretations. For example, they may suggest that welfare decreases in the short term because the structure of education expenditure is not optimal, while in the long term welfare increases since average income increases. Although such models describe education expenditure endogenously, they are of limited operational value because dynamics equations are solvable if they describe dynamics in a simplified way. An alternative method to tackle the problem of determining the impact of funding restructuring is Multi-Agent Simulation (MAS).

The multi-agent simulation of education system dynamics

We will briefly describe an information system model used for simulating the dynamics of education markets and for approximating the consequences of regulatory interventions on this market. This conceptual model involves a definition of the environment, of agents who populate it, of the decisions they make, of possible actions they can take, and of the interactions they are involved in.

In the MAS model, the economy is populated by four types of agents (students, schools, firms and the regulator). It is assumed that each agent lives an infinite number of periods (iterations). Moreover, agents and educational institutions are heterogeneous (the distribution of individual characteristics is available). The agents are interrelated

and influence one another's decisions (e.g. the location of the school influences the costs of education and the decisions of students).

Students differ in their level of intelligence, which is defined as an ability to learn, the level of human capital defined as an ability to produce value added, the geographic location, which determines the cost of studying in different locations, age, and education. Schools differ in terms of geographic location and quality, defined as an ability to increase the level of human capital in the case of students.

Different agents have different rationality: individuals maximize their utility calculated as an expected discounted sum of future income. They procreate[18] in order to keep population size constant. Firms maximize profits (Becker, 1993).

In the above model, agents make different decisions. Individuals decide on choosing a partner for mating,[19] choosing between education and work, and choosing an educational institution. The decision regarding studies depends on budget constraints (the student has to afford the cost of studies) and on the expected return. Other modeling assumptions involve limited student knowledge about the quality of a particular university. If the number of candidates exceeds a given university's capacity, the university selects candidates according to intelligence.

The MAS scenario makes it possible to consider not only a switch of financing regimes but also arbitrary mixes of private and public education (e.g. public full-time, public part-time, private full-time and private part-time studies).

This conceptual model is easy to implement numerically and calibrate due to the MASON Java-based library application (Luke, Cioffi-Revilla, Panait, Sullivan, 2004). Simulation scenarios are prepared using the so-called Spring Framework and the data presentations employ jHepWork software. a typical experiment simulates decisions made by the population of agents with characteristics described by normal distributions, a random geographical location and extramural students working part-time. The firms are homogeneous and represent one agent—the economy if the regulator is assumed to play the role of decision maker. The schools are represented by the aforementioned four types of agents. The simulation takes into account the situation in Poland where there is a limited number of places in public university-level schools and an unlimited number of places in nonpublic universities. a typical scenario in the experiment assumes a change in the existing financing regime. For example, this means that the arrangement in which the government covers the fee for full-time students in state-run universities, while in private universities students pay for themselves, is replaced with a situation in which all the students have to pay half the fee. Each simulation covers 1,000 periods for 10,000 agents and shows the

[18] Conclusions from the article of Becker G. S. (1993), *A Treatise on the Family – Enlarged Edition*, Harvard University Press, Harvard, are applied here to develop the matching mechanism.

[19] The choice of spouse results from evaluating random candidates of the opposite sex with the most similar level of human capital (consistent with evidence, e.g. Becker, 1991).

impact of restructuring in education financing on agents' decisions. The simulations also show the microeconomic outcomes of the change after aggregation.

In the experiment based on the switch from the existing system with hybrid financing (whereby state-run universities financed from public funds and private universities by students) to a fairer system in which the government subsidizes half the cost of education in the form of an educational voucher, for example, simulations point to a crucial role of the quality of education for economic rationality. The experiments show that the result of such a change does not meet the expectations of the public. Although the overall product grows, even in the case of a relatively mediocre quality of educational institutions, the costs of educational investment by the government may not be covered by this growth. It appears that the introduction of education co-financing is reasonable only when the quality of non-public education is good. When the quality of public universities is very high relative to non-public ones, changing the regime may have a negative effect on the economy. An optimization of the structural change is also possible within this framework. The simulation also makes it possible to identify the determinants of an effective educational policy that lead to a decrease in income inequality measured by the Gini coefficient.

MAS provides educational policy makers with interesting hints and conclusions, but at the same time it requires major efforts to improve the effectiveness of private and public spending on education through reengineering the education financing regimes. Providing policy makers with the MAS toolbox to support scenario analyses requires a project-oriented approach involving: a) forming interdisciplinary teams of analysts and policy makers, b) creating standards for database creation, and c) designing and implementing an institution building agenda. The cost of such a project can be estimated and seems to be justified in the context of the existing expenditure on education systems and complaints about their inefficiency.

Toward scenario analysis: The case of Poland

Poland's education system has undergone an unprecedented change over the last two decades.[20] A legal framework for private educational institutions has been designed and implemented since the early 1990s. The number of students has tripled and the curricula have been reengineered. Changes to the Higher Education Act and the implementation of the Bologna Process[21] have accelerated the openness of Poland's education system.

The benchmark description of Poland's education system is summarized in Table 11.

[20] See other chapters in this report.

[21] Some difficulties related to this are analyzed in "Proces Boloński – nowa szansa czy nieznane zagrożenie?" in: *Ekonomiczne Studia Licencjackie. Perspektywa Procesu Bolońskiego i Dotychczasowe Przemiany*, E. Drogosz-Zabłocka and B. Minkiewicz (ed.), CBPNiSW, Wyd. UW. Warszawa, pp. 17-34, 2008.

Table 11
Polish education system—a brief description

Category	Poland	Reference pool
Education expenditure (% of GDP)	5.6%	4-6%
Average time spent in education system	15 yrs	15-16 yrs in developed countries and 8-11 yrs in developing countries
Government funding of primary education per pupil as a percentage of GDP per capita	23.5%	16-22%
Government funding of higher education per student as a percentage of GDP per capita	22.1%	Depends on the organization of the education system: 5% in South Korea, 20-30% in the U.S. and Europe, but 43% in Germany, 86% in India, and 99% in China

Source: Szufel, (2011).

The breakthrough was driven by the awareness that for years in the past—due to political pressure on universities—Poland produced an insufficient number of students. Moreover, they were provided with a "negative"—in other words counterproductive—education and this had to be changed. However, the change strategy was not obvious. The natural idea of transferring Western models to Poland appeared tempting but impractical—the necessary institutional and cultural adjustments would have taken too much time. The final shape of the strategy was determined by skepticism about the effectiveness of changes in law, combined with cultural considerations and the need to increase the number of educated people in the country. Poland entered a path of spontaneous change in a bid to turn its traditional education system into a market for educational services.[22]

These dynamic processes were not free from serious failures that were partly rooted in the global situation and partly stemmed from a lack of harmony in the system's development. Four important issues are particularly worthy of note.

First, even though the number of students tripled, employment in the higher education system increased by only half. This fact is related to the quality of education. It seems that the system is looking for a balance between traditional analytical teaching (especially in reorganized educational institutions) and new skill-oriented teaching (especially in managerial education). Traditional analytical teaching creates an opportunity for the best students to compete in the international environment and strengthens Poland's position in the world, but it is not compatible with the abilities

[22] See also T. Szapiro, (ed.) (2004), *Biogramy Edukacyjne*, and T. Szapiro (ed.) (2006), *Mechanizmy kształtujące decyzje edukacyjne*, Oficyna Wydawnicza SGH, Warszawa.

and expectations of other students. Skill-oriented teaching—unlike traditional analytical teaching, which is strongly embedded in Polish culture—is supported by EU policy, which has highlighted the positive influence of education on employment over the last two decades and just recently put more emphasis on the scientific and analytical backgrounds of innovative policies.

Second, there is no experience when it comes to the acceptable limits of regulatory intervention in the education system. This is exemplified by teacher training. The number of graduates from teacher training programs[23] is growing (it increased by 130% from 1994 to 2007), while the number of children is declining (it went down by 35% during the same period). These data show that the allocation of funds on the education market is not optimal, which is due to an asymmetry of information on job opportunities and poor communication at the social level. This may result in negative education.

Third, at the micro level, negative education is the result of an oversimplified skill-forming orientation of teaching. Reasonable education policies can be distorted in this way. Teaching based on Polish textbooks, which are frequently overloaded with theoretical information, and requiring students to memorize large amounts of data have been replaced by skill-oriented techniques. However, an excessive move away from analytical and theoretical content in favor of skill-based teaching results in a loss of creative potential.

To handle the threefold increase in the number of students, the system allows academic teachers to be employed at several universities at a time. In a situation in which those working in the education sector are underpaid, this improves the income status of many teachers. However, this situation has its drawbacks. It makes it difficult to manage a university when teachers are often busy working somewhere else and increases the costs of research. It also makes it difficult for universities to reconcile teaching with research due to the unavailability of staff.

These four factors were considered together with global and regional education trends to prepare three scenarios for Poland's higher education. The scenarios are referred to as the Educational Banana Republic Scenario, the Educational Bipolarity Scenario, and the Slow Educational Recovery Scenario—in a rhetoric designed to encourage educational policy makers to focus on the risks involved.

The Educational Banana Republic Scenario provides for a local, internationally isolated education system with a high degree of instability and corruption in management. The need for innovation is satisfied by external education systems. Education helps people adopt foreign technology rather than create their own solutions. The demand for primary education can be satisfied ("banana education") because the leaders' education heavily depends on external systems. Education is a factor that may

[23] Between 1996 and 2008, the number of graduates from teacher training programs increased by over 250%, GUS (1996, 2008).

push the country into the periphery and digitally splits the population into those with access to international culture and science and those without such access. The system is relatively stable with no dramatic upheavals other than frequent local changes.

The Educational Bipolarity Scenario for Poland's[24] education system provides for two five-year intervals. The first one is dominated by a transformation process while the second petrifies the existing situation. In this scenario, due to the openness of the system, Poland's education system is open to international students (leading to an inflow of funds). The system promotes the emergence of a relatively small elite of students. Academic staff is split into internationally recognized researchers teaching part-time in Poland and abroad and involved in international projects (also as their leaders) and a contingent of professional teachers relying on adopted external strategies and capable of assisting during projects. This is reflected by an unequal level of wealth among academic teachers. The bipolarity results in system adjustments such as reducing the criteria for graduation and relaxed supervision. This results in an antagonism between first- and second-educational league players, along with the removal of the elite from the management of the country's education sector and individual universities. The system tends to strike a balance between the negative consequences of bipolarity and the positive impacts of openness.

The Slow Educational Recovery Scenario assumes success of the educational strategy resulting from the government's *Polska 2030. Wyzwania rozwojowe* report unveiled in 2009 and subsequently revised as a result of social consultations. This strategy appreciates the role of intellectual and social capital[25] in building society's wealth. It looks for a reasonable balance between innovation and the social orientation of education; it also promotes the openness of education and the mobility of students. The strategy is heavily supported by European funds. Moreover, the new law on higher education delegates decision-making responsibility to universities,[26] simplifies the rules for promoting staff, and revitalizes committees operating at the national level. This means that new regulatory solutions are worked out and implemented to solve problems in Polish education. But this scenario will take decades to implement given the transition period needed for preparing the regulations and the cycles for the first, second and third levels of education, which last three, two and at least three years (doctoral programs) respectively.

Overall, educational reengineering in Poland faces a host of challenges (discussed in the first part of this text) and largely depends on whether solutions are found to global problems. It seems that if international cooperation results in the emergence of institutions ensuring the accountability of educational policy makers for their

24 A more detailed version was presented in "Projekcja skutków utrzymania reaktywnego charakteru działania uczelni," in: *Warszawa Akademicka*, XLI Zeszyt Naukowy Instytutu Problemów Współczesnej Cywilizacji, Warszawa, 2008.

25 See also Dietl, Sapijaszka (eds.), 2009.

26 See also Kieniewicz, 2007, pp. 37-48.

decisions and capable of using sophisticated simulations, Polish education will take a course compatible with the country's aspirations.

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Summary and Conclusions: Poland's Competitive Position in 2011

Marzenna Anna Weresa

In 2011, the global economy was still experiencing the negative effects of the international financial and economic crisis. The United States lost its top-flight credit rating[1] for the first time in history, and the ratings of many European Union economies declined significantly. At a time of increased indebtedness of many countries and a continuing global economic downturn, Poland stood out positively.

Poland's robust GDP growth shows that the country's competitiveness is based on relatively strong pillars. In 2011, the Polish economy expanded by 4.3%, according to preliminary data by the government's Central Statistical Office, well above the EU15 average of 1.5%.

GDP growth is one of five indicators taken into account in an overall assessment of countries' competitive positions, which are collectively referred to as the "magic pentagon." The four other indicators are the unemployment rate, the inflation rate, the balance of public finances in relation to GDP, and the current-account balance as a percentage of GDP. Based on these indicators, the competitiveness of the Polish economy, seen from a macroeconomic perspective, did not change significantly in 2011 compared with the previous year. Despite a slowdown on major export markets, the country's economic growth was maintained and even accelerated slightly. Unemployment declined, though it continued to run high, at 9.6%. Inflation rose to 3.9%. The budget deficit was reduced to 5.5% of GDP, though it is still almost twice as high as the European Union's convergence criterion. The Finance Ministry's plan to bring the budget deficit down to a safe level of 3.0% of GDP in 2012 is a promising sign for the future.

The current-account deficit relative to GDP, the fifth element in the macroeconomic evaluation of the competitiveness of the economy, deteriorated in 2011. It stood at 4.8%, at a higher level than in the preceding year.

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[1] Standard & Poor's downgraded the United States from AAA to AA +.

Nevertheless, Poland was among the fastest-growing economies in the EU. Poland's GDP growth was faster than that of other new EU countries except the three Baltic states, and other indicators of competitiveness described by the "magic pentagon" were relatively good compared with the overall economic situation in Europe and worldwide. However, there are still many problems and risks for the further development of the Polish economy.

When it comes to the standard of living, another indicator of economic competitiveness, Poland's position in the EU was still weak in 2011. Poland is one of the least-developed countries in the EU27. With a GDP per capita of €16,100 at purchasing power parity standard, it was ahead of only four fellow EU member states: Latvia, Lithuania, Romania and Bulgaria.

On the other hand, the development gap between Poland and most other EU countries, measured by GDP per capita, has narrowed. This positive trend continued in 2011 when Poland's GDP per capita in PPP terms represented 58% of the EU15 average, and was 1 percentage point higher than in 2010. Poland's competitive position improved as a result of significant differences in GDP growth rates in EU countries from 2009 to 2011. Poland not only reduced its development gap in relation to the EU15, but also surpassed Latvia and Lithuania in terms of GDP per capita, and almost caught up with Hungary.

Income inequality narrowed, contributing to an improvement in Poland's competitive position, but it remained slightly above the EU27 average.

Some improvement was noted in the quality of life in Poland in 2011, measured by indicators such as infant mortality, life expectancy, and the schooling rate. On a list based on the Human Development Index (HDI), which is a composite measure of the level of social development and quality of life, Poland was ranked 39th worldwide, ahead of fellow EU countries Lithuania, Portugal, Latvia, Romania, and Bulgaria.

It seems that the competitiveness of the Polish economy in comparison with other EU countries will improve in 2012, due to the fact that Poland has proved itself to be resilient to the negative implications of the global crisis. The country is likely to maintain moderate GDP growth and stay on the path of economic convergence.

Poland's competitive position internationally also depends on the country's ability to compete on foreign markets. In 2011, Poland's exports grew 2.5 times faster than imports. The majority of Poland's trade (69% of imports and 78% of exports) was with other EU member states, where Poland has recorded a surplus since 2009. The share of intra-industry trade in Poland's overall foreign trade with the rest of the EU has increased steadily, but inter-industry trade still accounts for over 70% of the country's foreign trade turnover. Contrary to expectations, the intensity of Poland's intra-industry trade did not decrease during the economic crisis. Such a decrease would have been only natural at a time when world trade declined more dramatically than global GDP. Furthermore, the improvement in the competitiveness of Polish products

on international markets was to an extent caused by a weakening of the Polish zloty in the wake of the global crisis.

Another aspect of the international competitiveness of the Polish economy is its ability to attract foreign factors of production, in particular foreign direct investment (FDI). According to preliminary data by the National Bank of Poland, after a slowdown in FDI in 2009 and 2010, the inflow of foreign investment to Poland increased in 2011. Poland maintained its leading position among EU10 countries in terms of the FDI inflow, and the value of foreign capital accounted for more than a third of the total FDI inflows to the region.

A combination of several factors contributed to the improvement in Poland's competitive position in 2011. As far as resources are concerned, two factors were particularly important: investment and human capital.

A negative trend in the value of investment outlays reversed, and investment increased by 8.5% in 2011. This was primarily due to increased absorption of structural funds from the EU, combined with an increased FDI inflow.

Human capital development and the growth of total factor productivity (TFP) were other factors that boosted Poland's competitiveness in 2011. Despite the global crisis, Poland had one of the highest human capital accumulation rates among the EU10 countries in 2009-2011, and was only surpassed by Slovakia.

Some positive changes occurred in economic policy in 2011. The conditions for doing business have improved steadily since 2009. According to the U.S. think tank Heritage Foundation, the level of property rights protection in Poland has stabilized gradually, and the country also enjoys a relatively low, and decreasing, level of fiscal stringency. Moreover, the government's efforts to reduce the budget deficit have helped protect the Polish economy from the negative effects of external shocks.

While assessing the competitiveness of Polish education, which was examined in the third part of this report, it should be noted that even though Poland's education sector has changed considerably over the past decade, major changes in the higher education system were only introduced in October 2011. Consequently, it is too early to evaluate their full effect. A shortage of funds is one of the barriers to developing education. Expenditure on primary and secondary education in Poland represents 3.4% of the country's GDP, while the OECD average is 3.6%, with Denmark and Britain, for example, reporting figures over 4%.

Poland's higher education system is also underfunded. In recent years, the ratio of expenditure on higher education to GDP in Poland was 1.3%, below the OECD average of 1.5%. There are, however, some positive trends in this area. Spending on higher education in Poland has grown at a relatively fast rate. From 2000 to 2007, the growth reached 172%, well above the OECD average of 136%. Moreover, expenditure per student in secondary schools has grown steadily in relation to GDP and the gap between Poland and the EU27 average has been reduced since 2000. In 2000, this gap was more than 10 percentage points; by at the end of the decade it shrank to less than

2 points. Poland's performance in terms of average learning time is similar to that of some other EU countries, such as Italy, Spain, Finland, and France. It is 10 years in Poland, less than in Germany, Sweden, the Czech Republic, and Estonia.

The discussion in this report shows that Polish schools are not yet internationally competitive in terms of the curricula, teaching methods and learning outcomes. Poland's educational programs are still not flexible enough, with a large number of mandatory classes and exams. There is an insufficient number of classes that shape creativity and teach students practical skills. Therefore, the functioning of schools and universities in the new legal and financial framework should be supported by a more active educational policy aimed at building a flexible education system, strengthening the best educational institutions, and promoting their internationalization.

Overall, the analyses presented in this year's report indicate that Poland managed to improve its competitive position with regard to other EU member states in 2011, mainly through better utilization of internal resources and relative resilience to external shocks compared with other EU economies. As far as the importance of education as a factor influencing competitiveness is concerned, it should be pointed out that the reform of Poland's education system began not long ago and is still in progress. Therefore the potential of education as a competitiveness driver has yet to be fully exploited.

The direct influence of education on the competitiveness of Polish economy can already be seen in the area of training and in the positive impact of training programs on the profits of Polish enterprises. Education is also an important factor shaping the country's attractiveness for foreign direct investment. The reforms in higher education that have been recently implemented will in the long term have an impact on innovation performance, economic growth and thus, Poland's competitive position in the global economy. Therefore, this issue requires continuous monitoring and further in-depth research.