EDITED BY
Marzenna Anna Weresa

POLAND

COMPETITIVENESS REPORT 2014

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**A Decade
in the European Union**

WORLD ECONOMY RESEARCH INSTITUTE
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SUMMARY AND CONCLUSIONS

Preface

This new monograph presents the results of the latest comparative studies conducted by the World Economy Research Institute at the Warsaw School of Economics. The book aims to determine Poland's competitive position in the European Union 10 years after the country's entry into the bloc. The Polish economy is shown in a broader comparative perspective against the background of other EU members, in particular the 11 new member states from Central and Eastern Europe (EU11). Competitiveness is defined for the purposes of these analyses as a country's ability to achieve a sustainable improvement in the quality of life, accompanied by a strengthening of the country's economic position on foreign markets and by an increase in its investment attractiveness. This definition provides a general framework for assessing various economic and social issues that make up the competitive position of the Polish economy.

Analyses carried out in this book go beyond a simple scoreboard approach that could fail to capture all structural factors. Developing effective policies requires an in-depth understanding of the complex factors that drive the competitiveness of economies. Therefore, a systematic approach has been adopted enabling comparisons of various determinants of Poland's competitive position. The cross-country comparison is conducted in both quantitative and qualitative terms, which allows the authors to forecast future trends and indicate some policy priorities.

The book consists of three parts, further divided into chapters, each with a number of subsections. The first part (Chapters 1–2) aims to show the development of Poland's competitive position during the first decade of its EU membership. The assessment consists of two complementary components: the nation's prosperity and its position versus external partners compared with other new EU member states. The starting point is an analysis of the nation's prosperity measured by its overall economic performance, the real income of the Polish population and the capacity to increase this income. This is followed by an assessment of Poland's competitive position in external relations. A comparison of Poland's economic performance in the 2004–2013 period with results achieved by other EU countries includes an analysis of real GDP growth, convergence of income levels in Poland in relation to the EU15, and an assessment of

the scale of income inequality and poverty (Chapter 1). The international competitiveness of the Polish economy is reflected in changes in the country's role in world trade and in international investment flows (Chapter 2).

The aim of Part II (Chapters 3–4) is to identify the main factors determining changes in the competitive position of the Polish economy in the past decade. Competitive position determinants were divided into two groups: (1) assets such as capital, labor, and technology, including changes in their productivity; and (2) institutions and their quality, including economic policy. Detailed characteristics of each of these factors are complemented with an attempt to establish their role in shaping the competitiveness of the Polish economy in the first 10 years of Poland's EU membership.

The third part of the book (Chapters 5–6) focuses on the impact of Poland joining the EU on the country's competitiveness. This analysis is not limited to identifying changes in competitiveness, but also shows Poland's role in shaping common market rules, including EU policies. When it comes to the EU's influence on Poland's competitiveness, we discuss the position of its enterprises in European value chains and the evolution of its innovation policy in the context of EU policies. We also focus on the importance of EU funds to the competitiveness of the Polish economy and on the transformation of Poland's energy market as a result of EU policies (Chapter 5).

Looking at Poland's contribution to European integration, we focus on two key factors, namely on the achievements of the Polish presidency of the EU Council and on Poland's role in developing the European Union's Eastern Partnership initiative (Chapter 6).

Conclusions from the analysis of specific issues are included at the end of each subsection. They are the basis for an overall assessment of Poland's competitive position in the European Union at the beginning of 2014. The assessment is made at the end of this book, along with some tentative conclusions for economic policy in the context of the EU's flagship Europe 2020 strategy.

Marzenna Anna Weresa

PART I

POLAND'S COMPETITIVE ECONOMIC PERFORMANCE AND COMPETITIVE POSITION IN 2013

Chapter 1
Economic Development and Convergence

This chapter aims to assess changes in the competitiveness of the Polish economy from 2004 to 2013, after Poland's EU accession. The comparative analysis covers key indicators of economic development, such as GDP growth, inflation, unemployment, public finances and the current-account balance, which collectively form the so-called "magic pentagon of competitiveness." In addition, income convergence among the 11 Central and Eastern European (CEE) countries that joined the EU in 2004, 2007 and 2013 – Poland, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Slovakia, and Slovenia (EU11) is analyzed in comparison with the old EU members (EU15). This comparative analysis is followed by a discussion of changes in income inequality in Poland compared with other EU countries.

1.1. Comparative Economic Performance in 2004–2013: Poland and the EU

Zbigniew Matkowski, 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 2004–2013, we will first outline its global context by sketching a picture of the prevailing medium-term patterns of economic growth that occurred in the world economy during the studied period.

Table 1

World economic growth in 2004–2013 (rates of growth in %)

Year	2004-2007 (annual averages)	2007-2010 (annual averages)	2011	2012	2013[a]
World	3.9	1.8	2.8	2.4	2.1
Developed countries	2.7	0.3	1.5	1.3	1.0
Eurozone	2.4	0.2	1.6	–0.7	–0.5
USA	2.8	0.3	1.8	2.8	1.6
Japan	2.3	0.0	–0.6	1.9	1.9
Transition countries [b]	7.8	2.9	4.6	3.2	2.0
Russia	7.6	2.4	4.3	3.4	1.5
Developing countries, of which:	7.2	5.9	5.9	4.7	4.6
Least developed countries	7.7	6.9	3.6	4.9	5.4
Africa	5.9	4.8	0.8	5.7	4.0
Southeastern Asia	8.4	7.6	7.0	5.5	5.6
China	11.3	10.8	9.3	7.7	7.7
India	9.1	8.1	7.3	5.1	4.8
Latin America	5.4	3.4	4.4	3.0	2.6

[a] Preliminary data. [b] 17 post-socialist countries not including new EU member states of Central and Eastern Europe.
Economic growth rates of country groups are calculated as a weighted average of individual country GDP growth rates, where weights are based on GDP in 2005 prices and exchange rates.

Source: UN, (2009; 2011; 2014).

As can be seen from preliminary data shown in Table 1, the global Gross Domestic Product grew 2.1% in 2013, which implies some slowdown compared with 2011–2012. In the medium-term perspective, this growth dynamics is, on the one hand, above the trend line for 2007–2010, which includes the effects of the deepest global recession since World War II (–2.4% in 2009). On the other hand, it amounts to slightly more than half of the global economic growth in the pre-crisis years (2004–2007).

As in 2010 and 2011, and similar to the prevailing trends from 2004 to 2010, the continuing recovery of the global economy was mostly due to fast economic growth in developing economies; their GDP growth rate was 4.6%. The most remarkable growth indices were recorded in Southeastern Asia (5.6%), especially China (7.7%). The macroeconomic performance of the world economy was also supported by the relatively good growth performance of African and Latin American economies.

On the other hand, global economic growth was adversely affected by a continued deceleration in developed economies (compared with both 2011–2012 and 2004–2007), including in particular the eurozone, which sustained a GDP contrac-

tion. This trend was compounded by the mounting fiscal crisis in the eurozone and protracted recession in some of its member countries.

Also worth highlighting is an unprecedented change in the composition of world economic growth factors. In 2013, total factor productivity (TFP) in the global economy declined for the first time since World War II (by 0.1%), mainly due to a fall in the productivity of capital (Jankowiak, 2014).

Size of the economy

We begin our analysis of the results achieved by the Polish economy in 2013 and of its international competitive position with a brief assessment of Poland's economic potential and its place in the world economy as well as in the enlarged European Union.

Table 2, based on the latest IMF data, shows the ranking of the world's largest economies in 2013 according to the value of GDP measured in dollars at current exchange rates (CER) and at purchasing power parities (PPP). GDP data for 2013 given in the table are preliminary estimates that may be subject to revisions.

The list is based on the values of GDP calculated at CER. The rankings of the countries concerned in an alternative league table based on GDP values at PPP are shown in parentheses. The full list of the 30 biggest economies in terms of the value of GDP at PPP would additionally include Egypt, Pakistan, Malaysia, Nigeria, and the Philippines, while excluding Belgium, Sweden, Austria, Switzerland, and Norway.

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 the difference in price levels: GDP calculated at PPP reflects the value of output produced in a given country expressed in dollars at prices that exist in the United States.

According to these data, Poland ranked 21st or 23rd, depending on the conversion rate, among the world's largest economies in 2013. With GDP calculated at CER ($514 billion), Poland's economy was ranked 23rd, between Norway and Belgium, but in terms of GDP at PPP ($814 billion), it ranked 21st, between Taiwan and Argentina. Compared with the previous year, Poland dropped by one position in terms of the GDP value measured at PPP, but it improved significantly (by three notches) in terms of GDP at CER, partly due to an appreciation of the Polish currency against the U.S. dollar.[1] The share of Poland in the global GDP was 0.7% in CER and 0.9% in PPP terms.

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[1] According to Poland's central bank (NBP), in December 2013, the exchange rate of the Polish zloty against the U.S. dollar was 2.4% higher than a year earlier.

Table 2

The world's largest economies in 2013 (GDP in billions of dollars)

Rank	Country	GDP at CER		GDP at PPP	
		billions of $	% of world's total	billions of $	% of world's total
1 (1)	United States	16,724	22.8	16,724	19.3
2 (2)	China	8,939	12.2	13,374	15.4
3 (4)	Japan	5,007	6.8	4,729	5.5
4 (5)	Germany	3,593	4.9	3,227	3.7
5 (9)	France	2,739	3.7	2,273	2.6
6 (8)	United Kingdom	2,490	3.4	2,378	2.7
7 (7)	Brazil	2,190	3.0	2,422	2.8
8 (6)	Russia	2,118	2.9	2,558	3.0
9 (11)	Italy	2,068	2.8	1,805	2.1
10 (13)	Canada	1,825	2.5	1,518	1.8
11 (3)	India	1,758	2.4	4,962	5.7
12 (17)	Australia	1,488	2.0	998	1.2
13 (14)	Spain	1,356	1.8	1,389	1.6
14 (10)	Mexico	1,327	1.8	1,845	2.1
15 (12)	South Korea	1,198	1.6	1,666	2.1
16 (15)	Indonesia	867	1.2	1,285	1.5
17 (16)	Turkey	822	1.1	1,167	1.3
18 (23)	Netherlands	801	1.1	696	0.8
19 (19)	Saudi Arabia	718	1.0	928	1.1
20 (33)	Switzerland	646	0.9	370	0.4
21 (32)	Sweden	552	0.8	394	0.5
22 (35)	Norway	516	0.7	282	0.3
23 (21)	**Poland**	**514**	**0.7**	**814**	**0.9**
24 (31)	Belgium	507	0.7	422	0.5
25 (22)	Argentina	485	0.7	771	0.9
26 (20)	Taiwan	485	0.7	926	1.1
27 (34)	Austria	418	0.6	361	0.4
28 (24)	Thailand	401	0.5	674	0.8
29 (18)	Iran	389	0.5	987	1.1
30 (25)	South Africa	354	0.5	596	0.7
	World	73,454	100.0	86,698	100.0

Note: All GDP data for 2013 are IMF preliminary estimates. The ranks given in the first column refer to GDP calculated at CER and GDP calculated at PPP (the latter in parenthesis).

Source: IMF, World Economic Outlook Database, www.imf.org, accessed on Jan. 30, 2014.

Year-to-year changes in GDP values expressed in an international currency reflect not only changes in output volumes, but also changes in price levels and exchange rates. A better basis for the assessment of a given country's position in the global economy or in another international grouping is data for a longer period, which reveal the long-run

trend in the country's relative economic potential. In the case of Poland, this trend was until recently positive, meaning a gradual improvement in the international position of the Polish economy. However, the last few years have seen some deterioration in this position despite Poland's relatively strong growth. This is simply because some other countries in the world have grown more rapidly or benefited to a greater extent from favorable trends in exchange rates and relative price levels.

Of special note are some major changes that have occurred in the structure of the world economy during the past several years as a result of rapid economic growth in developing countries in Asia and Latin America. Developing or emerging economies today account for more than half of the world's 30 biggest economies in terms of the value of GDP at PPP. The five largest Asian economies now produce more than 30% of total world output, and the three largest economies of Latin America contribute a further 6%. The growing role of the emerging countries of Asia and Latin America in the world economy is reflected not only by their share in world 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, which have become the most dynamic part of the global economy.

Before we go on to evaluate the position of the Polish economy in the European Union (EU28), let us first indicate the share of the EU28 in the world economy. According to preliminary IMF estimates, the combined GDP of all EU28 countries in 2013 was $17,267 billion at CER, or $16,214 billion at PPP, which represented 23.5% and 18.7% of global output respectively. For benchmarking purposes, the GDP of the United States, the largest single economy in the world, was $16,724 billion that same year, representing either 22.8% or 19.3% of global output, depending on the conversion rate used to calculate global output. China, the second—largest single economy, remained far behind the European Union in terms of GDP at CER ($8,959 billion), but is rapidly bridging the gap in terms of GDP at PPP ($13,374 billion), representing 12.2% or 15.4% of global output.

Table 3 provides data on the size of EU economies. It includes preliminary data on the value of GDP in individual member countries in 2013, calculated in euros at current exchange rates (CER) and at the purchasing power standard (PPS).[2] GDP data for 2013 are preliminary estimates that will be subject to revisions.[3]

As in the case of GDP estimates at PPP expressed in U.S. dollars, the GDP values at PPS expressed in euros depend on the purchasing power of international currency

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[2] Purchasing power standard (PPS) for the member countries of the European Union, calculated by Eurostat, the EU's statistical office, is based on the average price level in the EU28. 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.

[3] The preliminary (forecasting) estimates of the GDP values for EU countries in 2013, accessed on Jan. 17, 2014, have been withdrawn from the Eurostat database until the expected release of the revised GDP data, but the figures used here are still available in the *Statistical Annex of European Economy*, published by the European Commission in November 2013 (European Commission, 2013). The same remark applies to the per capita GDP data used in Figure 1.

(in this case, the euro) in a particular 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 the GDP value calculated at CER and in countries with relatively low prices, the GDP value at PPS is higher than the GDP value at CER. For all the CEE countries, the GDP values at PPS are much higher than those calculated at CER. For Poland, the difference in 2013 was 73%, for the Czech Republic it was 46%, and for Bulgaria 117%. The difference between the two alternative valuations of the GDP—at CER and at PPP or PPS—is usually larger 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 PPP or PPS values of GDP for the CEE countries given by the World Bank, IMF and Eurostat may be overestimated. Anyway, the conversion rates (parities) used in estimating GDP at PPP or PPS are very favorable for most CEE countries. This reservation should be kept in mind when interpreting the comparative position of CEE economies in the EU and in assessing the gap between Central Eastern Europe and Western Europe in terms of per capita GDP. This is why we include both CER and PPP or PPS estimates of GDP in our comparisons.

The European Union is composed of 28 member states of very different sizes and economic potential.[4] The five biggest countries in terms of population and production volume—Germany, France, the United Kingdom, Italy, and Spain—represent 63% of the total population of the EU28 and 71% of the combined GDP if calculated at CER or 68% at PPS. The 15 Western European countries that formed the EU before its major enlargement (EU15) represent 79% of the total population and produce 92% of the combined GDP calculated at CER, or 86% of the combined GDP at PPS. The 13 new member states that joined the EU in 2004, 2007 or later, i.e. 11 CEE countries along with Cyprus and Malta, represent 19% of the total population, but they produce only 8% or 14% of the total GDP respectively. This asymmetry between the "old core" of the EU and the new entrants (or, more broadly, between Western Europe and Central Eastern Europe) should be borne in mind when evaluating the position of Poland in the European Union.

Poland is the largest country among the new EU member states in terms of area, population and GDP. Poland ranks sixth in terms of area and population in the enlarged European Union (EU28), with 7.1% and 7.6% respectively. In terms of GDP value at PPS, it also ranks sixth (5.1%), but it is eighth (3.0%) if GDP is converted using CER. As we can see, Poland's share in the economic potential of the EU28 is much lower than what might be suggested by the size of its territory or population, but in the light of historical experience, this fact should come as no surprise; a similar disproportion exists in all other CEE countries. Poland has significantly improved its position in the European economy since its accession to the EU. Its share in the combined output of

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[4] Croatia was admitted as the 28th member state of the European Union on July 1, 2013; it has been included in the analysis in this chapter to the extent allowed by the available data.

all current EU member countries (EU28), calculated at CER, rose from 1.9% in 2004 to 2.5% in 2007, 2.9% in 2010, and 3.0% in 2013. Similarly, Poland's share in the total output of the EU28 calculated at PPS rose from 3.9% in 2004 to 4.2% in 2007, 4.8% in 2010, and 5.1% in 2013.

Table 3
GDP of EU member countries in 2013 (€ billion)

Rank	Country	GDP at CER		GDP at PPS	
		billions of €	%	billions of €	%
1 (1)	Germany	2,735.8	20.9	2,609.6	20.0
2 (2)	France	2,066.5	15.8	1,833.0	14.0
3 (3)	United Kingdom	1,893.0	14.5	1,742.9	13.3
4 (4)	Italy	1,558.8	11.9	1,545.0	11.8
5 (5)	Spain	1,019.9	7.8	1,122.4	8.6
6 (7)	Netherlands	602.9	4.6	544.2	4.2
7 (9)	Sweden	420.7	3.2	312.3	2.4
8 (6)	**Poland**	**388.7**	**3.0**	**672.9**	**5.1**
9 (8)	Belgium	384.1	2.9	342.1	2.6
10 (10)	Austria	314.6	2.4	282.6	2.2
11 (15)	Denmark	248.9	1.9	181.5	1.4
12 (17)	Finland	195.7	1.5	159.6	1.2
13 (13)	Greece	182.8	1.4	209.9	1.6
14 (18)	Ireland	165.7	1.3	152.6	1.2
15 (14)	Portugal	165.3	1.3	202.9	1.6
16 (12)	Czech Republic	148.3	1.1	216.7	1.7
17 (11)	Romania	141.6	1.1	280.4	2.1
18 (16)	Hungary	97.9	0.7	171.2	1.3
19 (19)	Slovakia	72.8	0.6	106.7	0.8
20 (24)	Luxembourg	45.3	0.3	36.6	0.3
21 (21)	Croatia	44.1	0.3	66.6	0.5
22 (20)	Bulgaria	41.0	0.3	89.1	0.7
23 (23)	Slovenia	35.0	0.3	43.2	0.3
24 (22)	Lithuania	34.7	0.3	57.0	0.4
25 (25)	Latvia	23.4	0.2	34.9	0.3
26 (26)	Estonia	18.5	0.1	24.9	0.2
27 (27)	Cyprus	16.4	0.1	18.7	0.1
28 (28)	Malta	7.1	0.1	9.4	0.1
	EU28	13,069.5[a]	100.0	13,068.9[a]	100.0

Note: All GDP data for 2013 are preliminary Eurostat estimates. The ranks given in the first column refer to GDP calculated at CER and PPS (the latter in parenthesis). The percentage shares in the EU28 total were calculated by the author.
[a] The total for the GDP values shown in the table for individual countries differs slightly from the total GDP value for the EU28 given by Eurostat (€13,068 billion).

Source: Eurostat Database (ec.europa.eu/eurostat), accessed on Jan. 17, 2014.

Economic growth and real convergence

In the last 24 years, the Polish economy has experienced a fast real convergence vis-à-vis both EU countries and all transition economies. The improvement in Poland's relative development level is mostly due to its relatively fast economic growth, the fastest in the new CEE members of the European Union (EU11) and nearly twice as fast as the average for the "old" EU members (EU15). Similar economic growth trajectories in Poland and these two groups of countries were recorded between 2004 and 2013, i.e. after Poland's EU accession. Table 4 provides a statistical picture of the trends involved.

Table 4
Growth of Gross Domestic Product, 1990–2013

Country	Real GDP growth rate					Real GDP index in 2013		
	Average annual % growth	Annual % growth				1989 = 100	2000 = 100	200 = 100
	1990-2013	2004	2011	2012	2013			
Poland	**2.9**	**5.3**	**4.5**	**1.9**	**1.3**	**204**	**158**	**141**
Bulgaria	0.4	6.7	1.8	0.8	0.5	112	154	125
Croatia	0.0	4.1	0.0	–2.0	–0.6	100	124	104
Czech Rep.	1.3	4.7	1.8	–1.0	–0.4	138	140	122
Estonia	1.5	6.3	9.6	3.9	1.5	146	163	126
Hungary	1.0	4.8	1.6	–1.7	0.2	129	121	103
Latvia	0.4	8.8	5.3	5.2	4.0	109	165	122
Lithuania	0.6	7.4	6.0	3.7	3.4	117	174	129
Romania	0.8	8.5	2.2	0.7	2.0	121	157	124
Slovakia	2.2	5.1	3.0	1.8	0.8	173	169	142
Slovenia	1.3	4.4	0.7	–2.5	–2.6	139	125	109
EU15	1.5	2.4	1.5	–0.5	–0.1[a]	144	114	106

[a] Weighted average calculated by the authors, with PPP GDP estimates for 2013 treated as weights. The unweighted average is –0.4.
GDP growth rates for 2004, 2011 and 2012 according to Eurostat; GDP growth rates for 2013 according to IMF; growth indices 2000 = 100 and 2004 = 100 calculated based on Eurostat data supplemented by IMF data for 2013 (for EU15 – unweighted average); growth indices 1989 = 100 based on EBRD estimates going back to 1989.

Source: Eurostat, ec.europa.eu/eurostat; EBRD, www.ebrd.com; IMF, *World Economic Outlook Database*, October 2013; own calculations.

Poland's GDP rose by 41% in the studied period, or around 4% per annum on average. Poland's economic growth was the second-fastest among the new EU members from Central and Eastern Europe (EU11), just behind that of Slovakia (42%). At the same time, Poland's GDP grew seven times as fast as that of the EU15. As a result (see data in Tables 5 and 6), Poland managed to considerably narrow its gap in economic development to all the "old" EU members. In the "new" CEE group, Poland's income gap narrowed relative to six of the 11 economies. Changes in the relative development level of the Polish economy resulted not only from its fast growth but also from diverging demographic trends and different appreciation paths for real exchange rates in individual CEE countries.

Table 5

**Relative development levels in Poland and selected EU countries, 1989–2013
(GDP per capita at PPP, Poland = 100)**

Country	1989	2000	2004	2006	2008	2010	2011	2012	2013[a]
Poland	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Germany	279	243	227	224	206	191	190	185	183
France	268	238	216	209	188	174	168	162	160
Italy	274	243	211	202	184	163	158	151	146
UK	256	248	244	237	202	172	163	159	159
Spain	199	200	198	202	182	158	149	144	140
Ireland	195	271	280	280	233	205	198	193	192
Portugal	159	167	151	152	137	128	119	113	110
Greece	178	174	184	178	163	139	124	113	107
EU15 average	**262**	**238**	**222**	**217**	**196**	**175**	**169**	**164**	**162**
Bulgaria	122	60	69	74	76	70	71	70	69
Croatia	133	102	111	111	112	93	93	92	90
Czech Republic	197	145	153	154	143	128	125	121	119
Estonia	142	93	113	128	122	102	107	107	107
Hungary	146	112	124	122	114	105	103	100	99
Latvia	137	76	91	102	104	88	93	97	100
Lithuania	145	81	102	111	114	98	105	108	110
Romania	89	55	67	74	82	77	75	75	75
Slovakia	155	102	111	122	127	118	117	115	114
Slovenia	194	164	169	170	161	135	131	126	121

[a] Own estimates calculated using GDP growth rates for 2013 from the IMF data (for the EU15 group – weighted average calculated by the authors) and the 2012 Eurostat data for relative development levels.

Source: IMF, *World Economic Outlook Database*, September 2005 (for 1989); Eurostat, ec.europa.eu/eurostat (for 2000–2012); IMF, *World Economic Outlook Database*, October 2013 (for 2013); own calculations.

As the data in Table 5 show, at the time of the EU enlargement in 2004, the average level of economic development (or GDP per capita in PPP) in the EU15 was more than twice as high as in Poland (by 122%). During its first 10 years in the EU, Poland narrowed its gap to the "old" EU countries in terms of development level by 60 percentage points, i.e. at a rate of roughly 6 points a year. The process of real income convergence was the fastest with respect to Ireland (88 p.p.), the UK (85 p.p.) and Greece (77 p.p.). Under the most optimistic scenario, Poland is likely to close its development gap to Greece as well as Portugal and fully catch up with these two countries either this year or next at the latest.

As far as the new EU member countries are concerned, Poland was the most successful in real convergence—in terms of the level of economic development—with

regard to the region's wealthiest countries. It narrowed its gap with Slovenia by 48 p.p. and to the Czech Republic by 34 p.p. In terms of GDP per capita, Poland outpaced Hungary for the first time since World War II. On the other hand, Poland's development gap widened vis-à-vis Lithuania and Slovakia, testifying to a process of real income divergence. Meanwhile, some other CEE economies, notably Latvia and Romania, narrowed their income gap with Poland.

Table 6
Development gap in new EU member countries vis-à-vis the EU15 average, 1989–2013 (GDP per capita in PPP, EU15 = 100)

Country	1989	2004	2011	2012	2013[a]
Poland	**38**	**45**	**59**	**61**	**62**
Czech Republic	75	69	74	74	74
Slovakia	59	50	69	70	71
Slovenia	74	76	77	77	75
Hungary	56	56	61	61	61
Estonia	54	51	63	65	66
Lithuania	55	46	62	66	68
Latvia	52	41	55	59	62
Bulgaria	47	31	42	43	43
Romania	34	30	44	46	47
Croatia	51	50	55	56	56

[a] Own estimates calculated using GDP growth rates for 2013 from the IMF data (for the EU15 group – weighted average calculated by the authors) and the 2012 Eurostat data for relative development levels.

Source: IMF, *World Economic Outlook Database*, September 2005 (for 1989); Eurostat, ec.europa.eu/eurostat (for 2004–2012); IMF, *World Economic Outlook Database*, October 2013 (for 2013); own calculations.

As can be seen from the data in Table 6, in 2013 Poland's GDP per capita in PPP terms stood at 62% of the EU15 average. This was equivalent to a gain of 24 percentage points between 1989 and 2013, of which 17 points were gained since Poland's EU entry in May 2004.[5] These trends may be attributed to a remarkable acceleration in the real convergence process in Poland after EU accession. From 1990 to 2003, the gain was 0.5 p.p. per year on average; in 2004–2013 it more than tripled to 1.7 p.p.

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[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 2013 (to 38.533 million from 38.173 million, i.e. by 0.9%), EU15 countries experienced more pronounced 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 2.9% annually, the EU15 average for GDP per capita growth was 1.3% per annum.

Poland's growth and real convergence performance looks quite good compared with the remaining EU members from Central and Eastern Europe, particularly from the long-term perspective. i.e. the systemic transformation process so far. Overall, from 1990 to 2013, Poland was the undisputed leader in the process of catching up with the EU15 in terms of economic development. However, in the period following the EU's 2004 enlargement, the convergence process was the fastest in Lithuania, Latvia and Slovakia (which narrowed their respective income gaps vis-à-vis the EU15 by 22, 22 and 21 percentage points respectively). Further down the list were Poland and Romania, each with 17 p.p., followed by Estonia with 15 p.p. For the remaining EU11 countries, the gap either decreased insignificantly (in the case of the Czech Republic) or increased further.

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 EU countries.

The basic measure of socioeconomic development and standard of living is national income per inhabitant. Figure 1 shows the value of GDP per capita measured at PPS in EU28 countries in 2004 and 2013.[6] The figure enables us to compare the value of GDP per capita and to evaluate the growth of real income in individual countries in the period after the EU's 2004 enlargement. The GDP per capita data for 2013 are preliminary estimates. As already noted, GDP data for CEE countries calculated at PPS are imprecise and may be overestimated.

According to our calculations based on the preliminary Eurostat data, the average GDP per capita in the enlarged EU (EU28), calculated at PPS, was €25,600 in 2013. In the euro area (EU17 or EU18), the figure was €27,500, and in the "old" EU countries (EU15) it was €28,200.

The income levels recorded in individual EU countries vary greatly. Luxembourg leads the EU with a GDP per capita at PPS of €68,200 in 2013.[7] A high per capita GDP (€30,000 or more) is also recorded in the Netherlands, Austria, Ireland, Sweden, Denmark, Germany, Belgium, and Finland. France, Britain, Italy, and Spain—the largest EU countries apart from Germany—exhibit lower per capita GDP, ranging between €24,000 and €28,000. The less advanced countries of Southern Europe—Greece, Portugal, Cyprus and Malta—have much lower incomes (between €19,000 and €22,000). In CEE countries, GDP per capita ranges between around €12,000 in Bulgaria and €21,000 in Slovenia.

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[6] For the convenience of the reader, the per capita GDP data originally expressed in PPS are labelled here € (standardized euro). The same applies to the total GDP data shown in Table 3.

[7] The unusually high value of GDP per capita in Luxembourg is largely due to high incomes generated and earned by international banks, financial institutions, and headquarters of big multinational corporations located in that country. This does not adequately reflect the average living standard of inhabitants compared with other Western European countries.

Figure 1

EU28 member countries by GDP per capita in PPS (€)
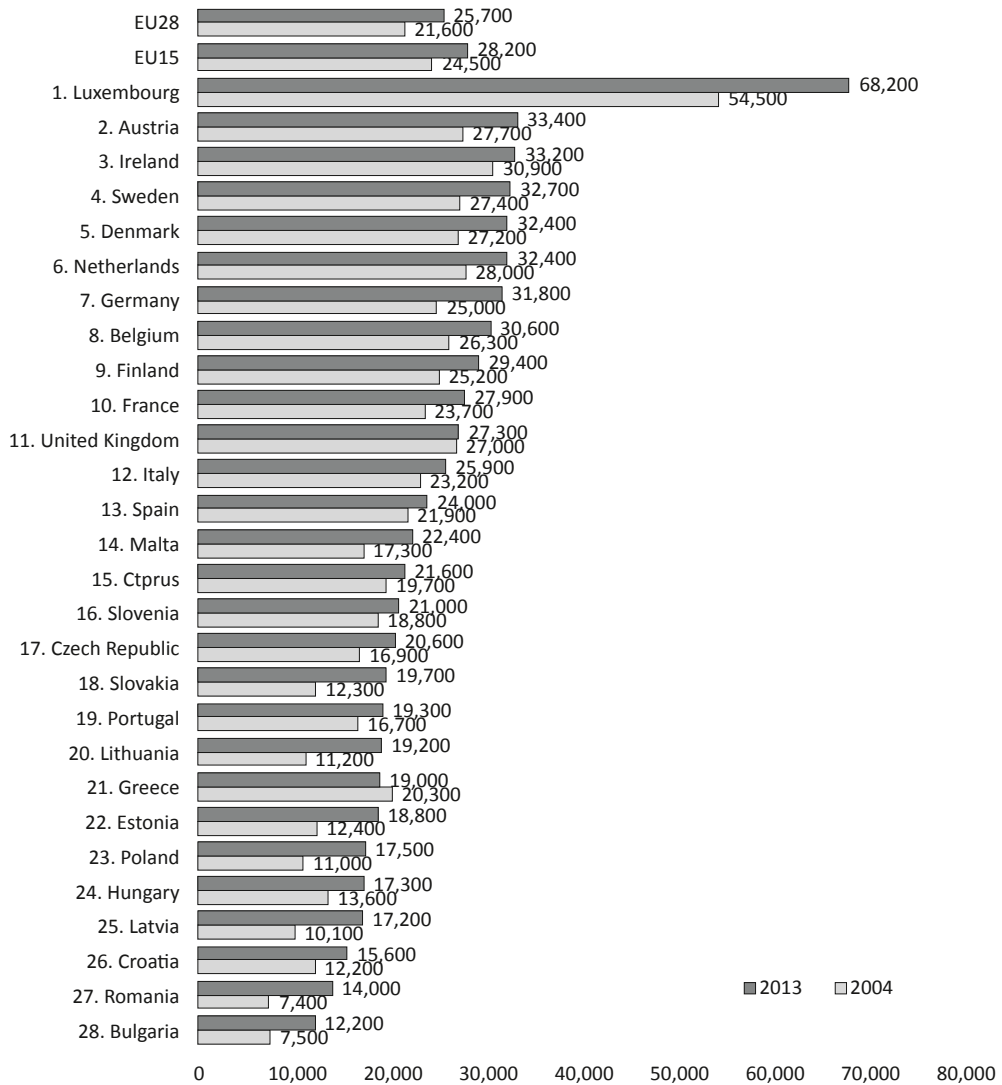
Note: The ranking is based on preliminary PPS GDP estimates for 2013. Reference data for 2004 illustrate the change observed in the period after EU enlargement. GDP per capita was calculated by dividing total GDP by total population at the beginning of the year.

Source: The figure is based on data taken from Eurostat Database (ec.europa.eu/eurostat), accessed Jan. 17, 2014.

Against this background, Poland's position in the per capita GDP rankings in the EU is unimpressive. With a per capita GDP at PPS of €17,500 in 2013, Poland is in the

lower part of the list in the enlarged EU. Only five other EU member countries, Hungary, Latvia, Croatia, Romania, and Bulgaria, display lower income per inhabitant.

In the last few years, this ranking has undergone substantial changes due to different responses of individual economies to the global financial crunch and the eurozone crisis. As a result, Poland has outdistanced Hungary and Latvia, and narrowed its income gap toward Estonia and Lithuania,[8] but the distance to Slovakia, the Czech Republic, and Slovenia remains substantial.

Comparing the GDP per capita data for 2004 and 2013, shown in Figure 1, we can see that since joining the EU, Poland has made significant progress in reducing its income gap with more advanced countries in Western Europe. Poland's per capita GDP at PPS increased by almost 60% from 2004 and 2013, while the EU15's per capita GDP at PPS rose by only 15%.

GDP per capita is a crude and tentative measure of the standard of living in a country. Living standards of inhabitants are also highly dependent on income distribution and wealth possessed. Unfortunately, international statistics do not offer much data on financial and real assets possessed by households. Information on income inequality, particularly poverty, is also incomplete and often outdated. The latest estimates of poverty rates using the international poverty line of $2 per day, made by the World Bank, show that the incidence of absolute poverty in all EU countries is small (below 2%). However, in most CEE countries, a considerable part of the population lives below the income and consumption level recognized as a poverty line using national standards. According to a recent OECD report on income distribution and poverty (OECD, 2013a), based on 2010 data, the relative poverty rate in Poland (the percentage of population living at less than half of the national median income) was about 11%, an indicator roughly equal to the OECD average, but almost twice as high as in the Czech Republic and Denmark.

A conventional gauge of income inequality is the Gini coefficient, which measures the overall concentration of household income. Poland is among the EU countries with relatively high income inequalities. The Gini coefficient for Poland, 30.9 in 2012, was slightly higher than the EU28 average. Among the new member states of the EU28, more egalitarian proportions of income distribution are reported by the Czech Republic, Slovakia, Slovenia, and Hungary. Among Western European countries, more equality can be seen in Austria, Belgium, Denmark, Luxembourg, the Netherlands, Sweden, Finland, and Germany, countries that strongly promote the welfare state idea. In a positive trend, the Gini coefficient in Poland has decreased gradually since 2005.

Another indicator of income inequality is the income gap between the poorest and the richest people in a country. According to the Eurostat data, the ratio between

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[8] The PPS data for Lithuania for the last few years published by the Eurostat suggest that, in terms of GDP per capita, Lithuania has outdistanced not only Poland and Hungary, but also Estonia. This fact, however, is not fully confirmed by the alternative estimates of GDP per capita at PPP provided by the IMF.

the income earned by the wealthiest 20% and the poorest 20% of families in Poland in 2012 was almost 5:1, roughly equal to the EU27 average. But in most EU countries this ratio was lower, and a significantly larger gap between the rich and the poor was only noted in Spain, Portugal, and Greece, as well as in Romania, Bulgaria, and Latvia. In the quintile distribution of household incomes observed in Poland, the wealthiest 20% of families accrue more than 40% of total household income, and the richest 10% gain almost 25% of total disposable income.[9]

A concise measure of social development and living standard is the Human Development Index (HDI), compiled by the UNDP. It is the geometric mean of three component indices reflecting GNI per capita, life expectancy at birth and 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 values range from 0 to 1; higher values imply a higher development level.

According to the latest *Human Development Report* (UNDP, 2013), based on 2012 data, the following countries lead the way in the global HDI classification: Norway, Australia, the United States, the Netherlands, and New Zealand. When it comes to EU members, the Netherlands, Germany, Ireland, and Sweden are also among the top 10 countries in the world. Slovenia is the highest ranked CEE state (21st), followed by the Czech Republic, Estonia, Slovakia, Hungary, Poland, Lithuania, Latvia, Croatia, Romania, and Bulgaria (57th). Poland, with an HDI of 0.821, is close to the CEE average, but behind most other EU28 countries and ahead of only Portugal, Lithuania, Latvia, Croatia, Romania, and Bulgaria. Poland is currently No. 39 in the global league table.

Poland's HDI has increased consistently, which testifies to the sustainability of the country's socioeconomic development. Since 2005, Poland has advanced in the HDI classification by three places – with most progress made in the last two years – and Poland's HDI has increased significantly. However, Poland's position in the worldwide HDI rankings is still close to that of developing countries such as Qatar, Brunei, and Barbados. Nor does Poland rank high in the HDI league table in terms of the three components of the index: income, health and education.

The same source gives estimates of the so-called inequality-adjusted HDI (IHDI). This index aims to capture the living standard and development level of the average person in society, which is less than the aggregate HDI when there is inequality in the distribution of income, education and health. Poland's IHDI is lower than the value of the original HDI, but this does not significantly change Poland's position in the global HDI rankings.[10]

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[9] More information on income inequality and poverty in Poland and in other EU countries can be found in part 1.3 of this chapter.

[10] In terms of the IHDI, Poland ranked 30th among 132 countries in the latest global standings, which is roughly equivalent to its 39th rank on the overall HDI ranking list covering 187 countries.

Certainly, the very concept of the HDI and the computation method used in compiling this index are disputable. The index does not cover all the dimensions of social development (e.g. it does not consider such human values as freedom, democracy, justice, and social cohesion). The component indices used to reflect material wealth, health condition and education also exhibit some deficiencies. The resulting scores of individual countries are sometimes controversial (e.g. in the newest HDI standings, the United Kingdom is just ahead of the Czech Republic and Greece, and Belarus is ahead of Russia). If the index were used to indicate countries that are best to live in and to identify those that should rather be avoided, its indications could sometimes be misleading. Nevertheless, the HDI is the most popular general indicator of living standards, widely used in international comparisons.

In 2011, the OECD launched the *Better Life Initiative*, a program dedicated to multidimensional analysis of social well-being and living standards in OECD member countries. The Better Life Index (BLI) compiled under this program seeks to assess and compare social well-being in various countries, taking into consideration 11 dimensions representing the essential aspects of living conditions and the quality of life: (1) income and wealth, (2) housing, (3) jobs, (4) work-life balance, (5) education, (6) health, (7) environment, (8) community, (9) civic engagement and governance, (10) personal safety, and (11) life satisfaction. Each dimension of social well-being is measured by one to four specific indicators, based on data taken from non-official sources. After normalization, the component indices representing various areas of social well-being as well as the aggregate BLI take values ranging from 0 to 10 (higher values mean a better performance). The exact values of the aggregate BLI for individual countries are not published, but they can be easily calculated as a simple average of the component indices available online (www.oecdbetterlifeindex.org). Users can also calculate a weighted aggregate index, using their own weights attributed to various dimensions of well-being. The newest edition of the BLI report (OECD, 2013b) brings an overall assessment of social well-being in the OECD area (covering 36 member and candidate countries) based on 2010–2012 data, and comparative analyses of performance in the main areas shaping social well-being.

According to the newest BLI data, the highest levels of social well-being in the OECD area are found in Australia, Canada, the United States, Switzerland and the Nordic countries; for all these countries, the unweighted BLI assumes values close to 8. The lowest levels of social well-being are in Russia, Turkey, Brazil, Chile, and Mexico; the unweighted BLI in these countries ranges between 3 and 4. Poland, with an unweighted BLI of about 5.5, is close to the OECD average. Among several dimensions of social well-being captured by the BLI, Poland has relatively high marks in areas such as personal security, education and social bonds, but relatively low marks for material living conditions, health, and life satisfaction.

One important aspect of social wealth is the availability of jobs and employment opportunities. This factor directly influences income and wealth, as well as the extent to which education and knowledge can be transformed into higher living standards.

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. The problem has become more acute in the last several years due to the global crisis and the turbulence in the eurozone. Unemployment levels in most EU countries remain high even though recession has phased out. This is because a large part of the jobless are affected by long-term structural unemployment and short-term frictional unemployment (both are unrelated to the current level of business activity), and because changes in employment and unemployment lag behind changes in output and are usually smaller. In 2013, the average unemployment rate in the EU28, as recorded in labor force surveys, was 10.9%. The highest unemployment was seen in Greece (27.3%), Spain (26.4%), Portugal (16.5%), and Ireland (13.1%). Among CEE countries, Croatia (17.6%), Slovakia (14.2%), and Bulgaria (12.9%) were the most affected.[11] Poland, with an unemployment rate of 10.4% reported in labor market surveys, was slightly below the EU average, but registered unemployment was much higher: 13.5% yearly on average (GUS, 2014a). A special problem is high unemployment among young people. On average in the EU28, the incidence of youth unemployment is two or three times higher as adults. In Poland, the unemployment rate among those aged under 25 was more than 27% in 2013 (Eurostat, 2014).

The global crisis of 2008–2009 and the subsequent debt crisis in the euro area, which slowed economic growth in Europe in 2012–13, strongly affected the well-being of people across Europe, reducing real incomes, increasing unemployment, and compounding many social problems related to living standards. The impact of the global crisis on living standards in CEE and other transition countries was scrutinized in a special study by World Bank experts (World Bank, 2011) as well as by the EBRD in its 2011 *Transition Report* (EBRD, 2011). The EBRD's 2012 *Transition Report* (EBRD, 2012) analyzed the impact of the eurozone crisis on economic development and social well-being in Central and Eastern Europe, while the most recent issue of the report (EBRD, 2013) highlighted the adverse implications of the economic slowdown and a halt to economic reforms on income convergence between transition countries and highly developed countries, and on attempts to catch up with the West in terms of living standards. The research shows that the adverse impact of the crisis on social well-being in transition countries has been much stronger than in Western Europe. The negative effects of the crisis on living standards have been reflected in high unemployment, lower real wages, reduced pensions and social remittances, in addition to decreased consumption and savings.

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[11] All the figures are the average unemployment rates recorded in the harmonized labor force surveys (LFS). Registered unemployment was usually higher.

Comparative assessment of macroeconomic performance

Our general assessment of the current condition of the Polish economy will be based on an analysis of five macroeconomic indicators commonly used in comparative assessments of macroeconomic performance: (a) the rate of economic growth, (b) unemployment rate, (c) inflation rate, (d) general government balance, and (e) current-account balance. The key tool used in this analysis is called the pentagon of macroeconomic performance.[12] It illustrates the extent to which individual countries meet five macroeconomic goals: (a) economic growth, (b) full employment, (c) internal equilibrium (no inflation), (d) public finance equilibrium, and (e) external payments equilibrium. The extent to which these goals have been achieved is expressed by variables marked on the pentagon axes.

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 budget surplus, as well as zero inflation or zero unemployment, may not be an optimal result. Another problem is interrelations (notably conflicts) between individual macroeconomic goals. For example, low unemployment (according to the Phillips curve) is often accompanied by high inflation, and vice versa. A separate question 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 should consider both their surface and shape. A larger surface of the pentagon is assumed to mean better 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 a given economy, its economic potential, or its development prospects. It does not even tell much about its possible performance in the next year, though an economy in good condition increases the chances of good future performance. Nevertheless, any analysis based on this method should be conducted with caution.

We shall now compare the overall performance of the Polish economy in 2013 with the situation in three other CEE countries: Hungary, the Czech Republic, and Slovakia, and in five Western European economies: Germany, France, Italy, 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 terms of development level, structure of the economy, advancement of the process of market reform, and the progress of integration with the European Union.

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[12] This method was also used in the comparative analysis of Poland's macroeconomic performance in earlier reports by this publisher. This is also where the merits and limitations of this kind of analysis are discussed in greater detail, along with a list of references (cf. Weresa, ed., 2013, pp. 27–33).

In Western Europe, Germany, France, and Italy are Poland's main trade partners and major sources of FDI inflows. Italy and Spain are similar to Poland in the size and structure of the economy, and face a number of similar macroeconomic problems, including a sizeable budget deficit, large public debt, and high unemployment. Sweden has been included in this comparison because of the similar value of its total GDP at CER and its good economic performance in the last few years, despite (or thanks to) its non-participation in the Economic and Monetary Union (EMU). Compared with the previous report (Weresa, eds., 2013), we have additionally included Italy.

Table 7
Key macroeconomic indicators in Poland and selected other EU countries in 2013

Country	GDP growth	Inflation	Unemployment	General government balance	Current-account balance
	%	%	%	% of GDP	% of GDP
Czech Republic	–1.2	1.4	7.0	–2.7	–2.4
France	0.3	1.0	10.8	–4.2	–1.9
Germany	0.4	1.6	5.3	–0.1	7.0
Hungary	1.1	1.7	10.2	–2.4	2.9
Italy	–1.9	1.3	12.2	–3.0	0.9
Poland	**1.6**	**0.9**	**10.4**	**–4.4**	**–1.6**
Slovakia	0.8	1.5	14.2	–2.5	2.0
Spain	–1.2	1.5	26.4	–7.2	1.1
Sweden	0.9	0.4	8.0	–1.1	6.2

Note: All the data are preliminary estimates. Data on unemployment are the harmonized unemployment rates based on labor market survey data (yearly average).

Source: Data on CPI inflation and unemployment according to the Eurostat Database, ec.europa.eu/eurostat, accessed on Feb. 25, 2014; the data on GDP growth, the general government balance and the current-account balance are preliminary estimates from the latest economic forecast by the European Commission (European Commission, 2014). The data on GDP growth and CPI inflation for Poland are in line with the latest estimates by Poland's Central Statistical Office (GUS, 2014a, 2014b).

Figure 2

Macroeconomic performance in Poland and selected other EU countries in 2013
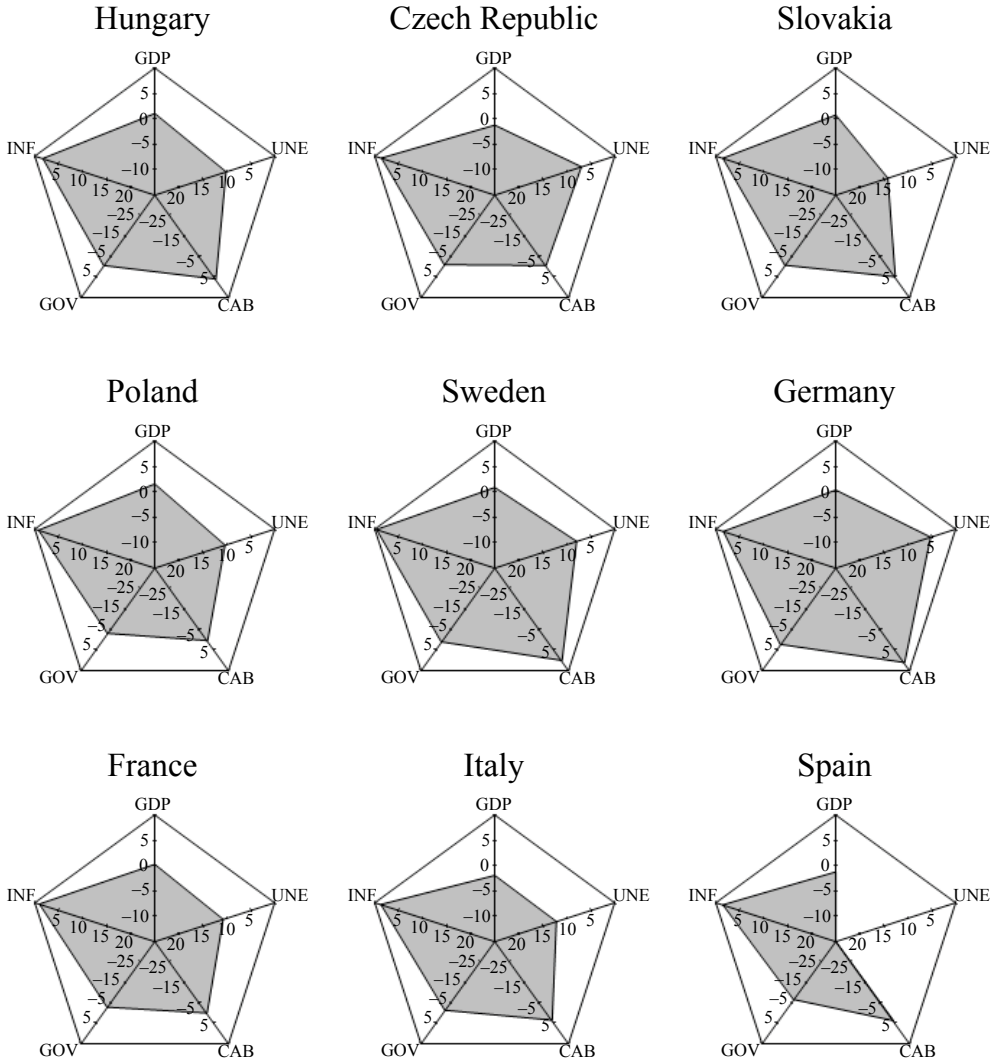
GDP   – GDP growth rate (%)
UNE   – unemployment (%)
INF   – CPI inflation (%)
GOV   – general government balance (% of GDP)
CAB   – current-account balance (% of GDP)

Source: Author's elaboration based on the data shown in Table 7.

Table 7 has data on the five macroeconomic indicators reflecting the performance of the analyzed economies in 2013. This is the most recent data available from the

Eurostat and the European Commission. Most of these data 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 preliminary data published by the Central Statistical Office (GUS) and the National Bank of Poland (NBP). Whatever minor differences exist do not significantly affect our general assessment of the condition of the Polish economy and the conclusions drawn from the analysis. Figure 2 presents the data in the form of pentagons, more convenient for a comparative analysis.

We begin our analysis with an inter-country comparison of the five macroeconomic indicators (in light of the overall economic situation in the EU28). Later we will compare the general performance of the studied economies in 2013 – from the point of view of the comparative position of the Polish economy-taking into account changes from the previous year.

The year 2013 was the fourth straight year of moderate growth in the world economy after the global economic crisis of 2008–2009. The slowdown in Europe, which began in 2012 as a result of the financial crisis in the euro area, continued in 2013, but the second half of the year brought some signs of recovery. Nevertheless, 2013 as a whole closed with zero growth in the EU28's total real GDP, and the euro-zone GDP decreased by 0.4%, according to preliminary data. This was mainly due to almost no growth in output in Germany and France, and continued recession in Italy and Spain. In the analyzed group, a rise in aggregate output (by around 1.0%-1.5%) was noted in Poland, Hungary, Slovakia, and Sweden, while the Czech Republic saw its output drop by about 1%.

The slowdown in output growth has been accompanied by a remarkable decline in inflation. For the EU28 as a whole, average consumer price inflation fell from 3% in 2011 to 2.5% in 2012 and 1.5% in 2013. Inflation subsided as a result of reduced output in the wake of restrained fiscal policies and tight monetary policies. In the analyzed sample, all the countries posted significantly lower inflation than in the previous year. In most countries, inflation is now in a safe range between 1% and 1.5%; in Sweden it was cut to about 0.5%. In some European countries, governments and central banks have faced the risk of deflation, but if the ongoing recovery gains momentum, inflation will probably speed up.

As mentioned in the previous section, unemployment has stayed at relatively high levels in most EU countries because output is not yet rising vigorously and unemployment is mainly of the long-term structural and short-term frictional type, which is unlikely to respond significantly to eventual acceleration of output growth. As a matter of fact, the average unemployment rate in the EU has shown an upward trend since the beginning of the global crisis. In 2013, the average unemployment rate in the EU28 was almost 11%, a little higher than in 2012. In the analyzed group, the unemployment rate in 2013 continued to be relatively low in Germany (about 5.5%), the Czech Republic (7%), and Sweden (8%). In Poland, Hungary, and France, unemployment hovered around 10 to 11%, roughly the EU28 average. In Italy and Slovakia, it was higher (12% and 14% respectively), and in Spain it reached a new record

of 26.5%. It should be remembered that the unemployment rates quoted here refer to the unemployment data recorded in labor market surveys; these are usually lower than the registered unemployment rates.

The last few years have seen some improvement in the state of public finance in the European Union, as reflected by a reduction in the average size of the general government deficit in the EU28 from 6.5% of GDP in 2010 to 3.5% of GDP in 2013. Nevertheless, the road toward meeting the budget deficit limit imposed by the Maastricht Treaty (3% of GDP) is still quite long for many EU member countries, including some EMU members. In the analyzed group, Germany was the only country with a full equilibrium between government expenditure and revenue in 2013, while Sweden was close behind. All the remaining countries reported significant budget deficits, ranging from 2.5% of GDP in the Czech Republic, Slovakia, and Hungary to 3% in Italy, 4% in France, and 7% in Spain. In Poland, the budget deficit calculated according to EU standards was around 4.5% of the GDP, a figure slightly higher than in 2012.[13]

Continued budget deficits lead to a rise in public debt, both in absolute terms and relative to the GDP value. By the end of 2013, the total gross public debt in the EU28 had risen to about €11,700 billion, or almost 90% of the total GDP produced that year, according to preliminary data. In the analyzed group, the public debt-to-GDP ratio at the end of 2013 ranged from 41% in Sweden to 46% in the Czech Republic, 54% in Slovakia, 58% in Poland, about 80% in Germany and Hungary, around 95% in France and Spain, and 130% in Italy (European Commission, 2014). In most countries, the public debt burden is growing, though at a slightly slower rate in recent years.

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, current international payments, current income transfers, and short-term capital flows. The current-account deficits or surpluses in individual countries are to a large extent structural in nature. At the same time, cyclical changes in the current account-balance do not follow a regular pattern and are difficult to forecast. In 2013, most countries in the analyzed group saw some improvement in their current accounts, which was a normal outcome of recession or slowdown. According to the preliminary balance-of-payments data, Poland has reduced its current-account deficit to around 1.5% of GDP. The Czech Republic, as well as France, also had a small deficit (of less than 2% of GDP), while the remaining countries in the group reported surpluses. The largest surpluses (6–7% of GDP) were recorded in Germany and Sweden.

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[13] In 2014 Poland's budget deficit, calculated according to EU standards, will probably be reduced as a result of a substantial transfer of funds from the private to the public tiers of the pension system. However, this artificial "improvement" in public finances will be a one-off effect that will disappear in 2015, much as it happened in Hungary in 2011 after authorities dismantled the private component of that country's pension system.

When analyzing the changes in the five macroeconomic performance indicators in 2013 compared with the previous year, we arrive at the following conclusion. The year 2013, similarly as 2012, was marked by a slowdown in Europe, with a complete stagnation in output in the EU28 as a whole and a slight drop in total output in the euro area. The same occurred in the analyzed group: some countries noted a slowdown in economic growth, while others reported almost no growth or even a small drop in output. The second half of the year brought some signs of recovery, but it remains quite fragile. The slowdown was accompanied by typical cyclical changes in the remaining economic indicators: a decline in inflation, an increase or no change in unemployment levels, and some improvement in the current-account balance.

Most countries in the sample also further reduced their budget deficits (in relation to GDP), though the relative size of the budget deficits in Poland, France and Spain was well in excess of the desired deficit limit (3% of GDP).

Let us now turn to the general assessment of Poland's current economic performance in terms of the five macroeconomic indicators considered here, 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 2013 are most similar to those shown by the economies of the Czech Republic, Hungary, 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. Unlike the Czech Republic, which was in recession during the last two years, and unlike Hungary and France whose economies were actually stagnating, Poland noted a considerable—though relatively low—rise in output in both 2012 and 2013. Inflation was cut in all four countries, but unemployment remained high (except perhaps in the Czech Republic). The relative size of the budget deficit in Poland was comparable to that in France, but larger than in Hungary and the Czech Republic. All four countries saw some improvement in their balance of payments, but all of them except Hungary continued to produce a current-account deficit. The Polish economy also performed well when compared with Slovakia, which noted a marked slowdown in economic growth in 2012 and 2013, accompanied by significantly higher unemployment. Still, Slovakia has been doing better than Poland in terms of the current-account balance and public finances.

The shape of the pentagon drawn for Poland is also similar to the shapes for 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 2013 were generally poorer. GDP growth in Poland was much faster than in Germany and Sweden, and inflation, according to official estimates, was lower than in Germany, but in all other respects Germany and Sweden had better scores. Unemployment in Sweden and Germany is considerably lower. Both countries have

a sizeable current-account surplus and both have achieved better results in bringing their budgets into equilibrium. Poland continued to perform better economically than Spain, which has been stuck in recession since 2008 and is plagued by huge unemployment; Spain has restored equilibrium to its current account (mostly due to the recession), but Spain's public finances are in much worse shape than Poland's, both when it comes to the relative size of the budget deficit and the public debt. Much the same can be said about general macroeconomic performance in Poland and Italy, although Italy has a better track record in the general government balance and much lower unemployment than Spain.

Compared with the preceding year, the overall performance of the Polish economy did not change significantly in 2013. GDP growth was slightly slower than in 2012, inflation decreased, and the current-account deficit was reduced. However, unemployment remained high, the budget deficit was far above the required EU ceiling, and public debt, expressed as a percentage of GDP, approached or even surpassed the limit imposed by Polish law. A positive feature was an acceleration in GDP growth in the second half of the year, which may be an early sign of revival.

Overall, much as in the previous year, Poland did relatively well in 2013 in terms of the five basic macroeconomic performance indicators, especially in the context of Europe's economic woes. However, the Polish economy is not free from problems and threats to further development.

The Polish economy in 2013 and the outlook for the years ahead

Poland was the only EU member country that managed to avoid a recession during the global economic and financial crisis of 2008–2009. Even though this was mainly the result of a improvement in the country's foreign trade balance (a deeper fall in imports than in exports), the very fact that the Polish economy was able to avoid a decrease in real GDP during the crisis shows that Poland proved resilient to external shocks and it is generally in good shape. After two years of relatively fast GDP growth (3.9% in 2010 and 4.5% in 2011), the last two years were marked by a considerable deceleration in Poland's economic growth, to 1.9% in 2012 and 1.6% in 2013 (according to preliminary GUS data). The economic slowdown in Poland was a direct outcome of the stagnation or even a fall in output in Western Europe. It also stemmed from the global economic crisis and the debt crisis in the euro area. The moderate acceleration in GDP growth in the second half of last year and at the beginning of this year is an early sign of recovery, but the question is how permanent this trend will be in terms of the outlook for this year and the years ahead.

Table 8

Contribution of final demand components to changes in real GDP in Poland, 2012–2013 (%)

Output and demand	2012				2013			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
GDP[a]	3.6	2.4	1.3	0.7	0.5	0.8	1.9	2.7
Domestic demand	2.5	–0.3	–0.7	–1.3	–0.8	–1.7	0.5	1.7
Consumption	1.0	1.1	0.6	0.2	0.0	0.9	0.9	1.7
private	1.1	1.0	0.4	0.1	0.0	0.1	0.6	1.1
public[b]	–0.1	0.1	0.2	0.1	0.0	0.8	0.3	0.6
Gross capital formation	1.5	–1.4	–1.3	–1.5	–0.8	–2.6	–0.4	0.0
fixed investment	0.7	0.1	–0.5	–1.3	–0.3	–0.6	0.1	0.5
change in stocks[c]	0.8	–1.5	–0.8	–0.2	–0.5	–2.0	–0.5	–0.5
Net exports	1.1	2.7	2.0	2.0	1.3	2.5	1.4	1.0

[a] The percentage change in real GDP against the corresponding period of the preceding year without seasonal adjustment.
[b] The difference between the impact of total consumption and private consumption.
[c] The 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.

Some opinion on this subject can be formulated after examining the changes in the main components of final demand, which determined the dynamics of GDP during the slowdown in the last two years. This analysis is a follow-up to similar studies made in previous years and included in previous editions of this report (e.g. Weresa, ed., 2013). The analysis makes it possible to identify the demand components that helped either maintain or speed up GDP growth and those that hampered economic growth. It also enables us to establish whether the observed output growth was adequately matched by an increase in internal and external demand, which is essential for a further rise in output. The results of the analysis may be also helpful in assessing the growth prospects of the Polish economy in 2014 and beyond.

The impact of individual final demand components on real GDP growth in the consecutive quarters of the 2012–2013 period is illustrated by data in Table 8. The table shows the direct contribution of individual demand components to real GDP growth (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.[14] The first row of the table shows the growth rate of real GDP measured against the same quarter of the preceding year (without seasonal adjustment). It is equal to the

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[14] More precisely, it is the product of the growth of a given demand component (at constant prices) and of its share in GDP in the corresponding period of the preceding year, according to the well-known method of decomposition of the GDP growth rate.

combined impact of the demand components (domestic and external) shown in the given column. Public consumption is calculated as the residual of total consumption over private consumption. The change in stocks is calculated as the difference between gross capital formation and fixed investments. Net exports are the difference between exports and imports. All the components are measured in constant prices.

Looking at the data in Table 8, we can see that the meager growth in real GDP in the last two years was almost exclusively due to an improved foreign trade balance. Domestic demand was relatively weak throughout the analyzed period, and its total volume tended to decline, due to a continuous fall in accumulation, in terms of both fixed investment and inventory investment (change in stocks). With private consumption stagnating, the rise in government expenditure was insufficient to offset the deep decrease in investment. Looking at the annual data, we can see that the volume of domestic demand showed zero growth in the last two years, but the quarterly data indicate that it actually fell between the second quarter of 2012 and the second quarter of 2013. Undoubtedly, without the positive changes in the foreign trade balance, we would have a picture of complete stagnation in output during the last two years, or even a small recession, rather than the meager growth reflected in the annual and quarterly GDP data. Rising exports have been the main driver of growth in the Polish economy in the last two years, despite unfavorable developments on Poland's key export markets in Western Europe.

The rise in net exports in 2012 and 2013 – as in 2009 – was the result of exports growing at a faster rate than imports. In 2012, the volume of exports increased by almost 4%, while the volume of imports decreased slightly from the previous year. In 2013, the volume of exports increased by around 4%, while the volume of imports rose by only 1%. The resulting improvement in the trade balance enabled some output growth despite no increase in aggregate domestic demand. Paradoxically, the positive changes in Poland's trade balance, which occurred despite unfavorable developments abroad, helped the Polish economy avoid a recession twice: during the crisis and at a time of renewed turbulence in the external environment.

The analysis of demand components also shows that in order to sustain and accelerate growth in the Polish economy, a strong growth impulse is needed from autonomous demand components, chiefly investment and exports. Private consumption, as a major part of total demand, is the most important factor in maintaining output growth, but it cannot stimulate it forever because an increase in consumer spending ultimately depends on a rise in output and income. Much the same can be said of government expenditure, especially in the form of public consumption and transfer spending. An increase in government expenditure largely depends on an increase in tax revenue, which in turn depends on GDP growth. In the Keynesian approach, the government can play an active role in getting the economy out of a slump by increasing its spending financed by a budget deficit, and this kind of expansionary fiscal policy was actually pursued in many countries during the global crisis in order to alleviate the recession. But since the Polish government today is most concerned about the

state of public finances, deliberate expansionary policies aimed at stimulating the economy through increased government spending are unlikely to be employed. If the economy speeds up, bringing about an increase in tax revenue, the government will eagerly spend the extra money gained in this way. However, it will probably continue to pursue a relatively restrictive fiscal policy aimed at reducing the budget deficit and stopping public debt from rising. The 2014 budget has been already drawn up, and there is little room for a further rise in government spending.[15]

Therefore, in order to sustain and reinforce the ongoing revival and to accelerate Poland's economic growth, a considerable increase in the total volume of investment outlays (both private and public) is needed, along with a further rise in the volume of exports. Sustained growth requires not just a one-off impulse, but a continual substantial increase in the volume of investment and exports. It is not certain when these conditions will be fulfilled, if at all.

Continued growth in Poland's exports will chiefly depend on what happens in the European economy, i.e. on the future growth of demand on Poland's key export markets. The ongoing recovery in Western Europe may not be strong enough to allow a substantial rise in Polish exports. At least in the short run, it is necessary to consider the probable adverse effect of the recent political turmoil in Ukraine and the Russian involvement there on Polish exports to Eastern Europe. Of course, an increase in Polish exports will also depend on efforts made by Polish producers and exporters to maintain and increase the attractiveness and competitiveness of their products. However, even if exports accelerate, the revival in the Polish economy will probably be accompanied by a considerable increase in imports. The strength of the growth impulse coming from foreign trade depends on the trade balance, or the difference between exports and imports. It is not certain whether the rise in exports will be strong enough to outweigh the increase in imports. A lot depends on the further evolution of the exchange rate, a factor difficult to foresee.

Even less probable is a rapid increase in investment outlays, whose total volume actually declined in the last two years. The inflow of foreign investment is decreasing because the list of attractive public assets still left for sale is short, and the number of companies interested in carrying out new greenfield projects is limited. Both Polish and foreign enterprises already active in the country are putting new projects on hold as long as business conditions on the domestic and foreign markets are uninspiring and future prospects are uncertain. One of the factors hampering private investment spending is the low financial liquidity of many enterprises after a long slack period on the market. This obstacle, however, could be overcome by increased borrowing,

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[15] According to official estimates (European Commission, 2014), general government expenditure counted as public consumption will increase by 3.1% in 2014 and 2.6% in 2015, while public investment will rise by 4.0% and 3.9% respectively. When assessing the possible impact of the increased government spending on aggregate demand and output, it is necessary to consider the share of government expenditure in GDP and the probable multiplier effects.

especially as many banks have recently expanded their range of loans and relaxed credit requirements for both enterprises and consumers. But in order to invest, one needs not only promising projects and sufficient financial means, but also—above all—the wish to do so, and the investment climate is generally weak.

A significant portion of total investment in Poland is public projects, mainly those in infrastructure, co-financed from the EU budget. While large-scale infrastructure projects will continue to drive business in the construction industry, they are unlikely to significantly increase the total level of investment in the economy. Companies have limited ability to absorb available EU funding, they do not have enough funds on their own and their capacity to undertake large projects is also insufficient.

Overall, some modest revival in investment this year is possible, but the increase in the total investment volume will probably be unimpressive. Without a significant rise in exports and investment, the chances of a solid and long-lasting revival in the economy are slim.

Meanwhile, there are clear signs of recovery in the Polish economy. The country's GDP growth increased from 0.5% in the first quarter of 2013 to 0.8% in the second quarter, 1.9% in the third quarter, and 2.7% in the fourth quarter on a year-to-year basis, according to preliminary GUS data. However, this upward trend is not fully confirmed by other indicators of economic activity; for the time being, the revival is not strong enough to encompass the entire economy.

Industrial production is 4%-5% higher than a year earlier, but in mid-2013, after a seasonal adjustment, it stopped growing. As usual, construction and assembly output increased at the end of the year as builders strived to complete their projects before winter, but after seasonal adjustment, output was considerably lower than in 2012. One optimistic sign is an upward trend in the retail sales of commodities, whose volume increased by 4% last year (the greatest rise was noted in the second half of the year). But the stock of commodities continued at a level comparable to that recorded in 2012, and inventories did not show an upward trend typical of a recovery phase. Following a prolonged lull on the housing market, last year saw a considerable increase in sales, but the number of new housing units completed in 2013 was smaller than in 2012.

Another positive trend is a significant growth in exports, despite the economic doldrums in Western Europe. The value of Poland's exports (in current prices) increased by 5.8% in 2013, according to the latest GUS data. But on the negative side is complete stagnation in investment, whose total volume did not rise for two consecutive years. The labor market is not improving, either. A marked rise in employment would require GDP to grow by at least 3% a year; while the current rate is about 2%. As a result, jobs in the enterprise sector and in the economy as a whole are not increasing, and registered unemployment remains high. Business sentiment indicators in industry, construction, and trade are rising, but remain negative. Consumer confidence improved at the end of last year, but is still relatively low, and the same is true of businesses' assessment of their own financial situation and of the general situation in the economy.

The growth prospects for the Polish economy in the years ahead will strongly depend on future developments in Europe and the global economy. Forecasts predict an acceleration in global output in the next two years as a result of a revival in the United States and Western Europe. The World Bank (World Bank, 2014) predicts that the global economy will grow 3.2% in 2014 and 3.4% in 2015. The IMF (IMF, 2014) projects slightly faster growth in global output – 3.6% in 2014 and 4.0% in 2015. For the euro area, both the World Bank and the IMF predict a gradual recovery and a return to modest growth: 1.0% in 2014 and 1.4% in 2015. The European Commission (European Commission, 2014) expects that the EU28 GDP will expand by 1.5% in 2014 and 2.0% in 2015, while the eurozone GDP is expected to grow 1.2% in 2014 and 1.8% in 2015.

The European Commission's latest GDP growth forecast for Poland is 2.9% in 2014 and 3.2% in 2015. The IMF's autumn forecast (IMF, 2013) predicts the Polish economy will grow 2.7% in 2014 and 3.3% in 2015, while the OECD's autumn forecast (OECD, 2013) lists 2.7% for Poland in 2014 and 3.3% in 2015.

A number of domestic and foreign institutions have upgraded their growth projections for Poland. The EBRD's latest GDP growth forecast for Poland is 2.7% in 2014 and 3.5% in 2015 (EBRD, 2014). Poland's own Gdańsk Institute for Market Economics (IBnGR, 2014) predicts that the country's GDP will expand by 2.8% in 2014 and 3.5% in 2015. Some optimists believe that Poland's economic growth may reach 3% or even 3.5% this year.

The medium-term IMF growth forecast until 2018 (IMF, 2014), published in the autumn of 2013 and revised in January 2014, assumed that both the euro area and the EU as a whole would return to their "usual" growth rates of around 1.5% and 2.0% respectively by 2015. For Poland, the IMF predicts some acceleration in GDP growth in the next few years – to 3% in 2016 and 3.5% in 2018.

Several analyses of growth factors for Poland published in the last few years suggest that the development potential of the Polish economy is still considerable and, if properly utilized and supported by an active growth-oriented economic policy, it could ensure a sustainable growth rate of about 4% a year (provided there is a sufficient rise in demand on the domestic and foreign markets).[16] However, some recent studies by both domestic and foreign authors warn that the future growth of the Polish economy may be significantly reduced, to around 2% a year or even less, due to adverse demographic trends.

Even if economic growth in Poland picks up to about 3% a year in the next two years, as suggested by these short-run forecasts, it is quite unlikely that the country returns soon to the kind of growth it experienced before the outbreak of the global crisis, when Poland's GDP expanded at a healthy rate of 4%-5% a year. Moreover,

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[16] Such a long-term growth rate was assumed in many growth projections for the Polish economy for the next 10–20 years-see e.g. Boni (ed.), 2009; Kleer *et al.* (eds.), 2011; Matkowski (2010); Rapacki, 2012; Kołodko, 2013.

long-run growth forecasts taking into account supply constraints related to demography are extremely unfavorable to Poland and other CEE countries.

Long-term growth forecasts (until 2060) released by the European Commission and the OECD (European Commission, 2012; OECD, 2012) suggest Poland and other CEE countries will experience a gradual slowdown in economic growth after 2015. The European Commission predicts that Poland's GDP growth will decrease from 3.9% in 2010 to 3.3% in 2015, 2.0% in 2020, 1.5% in 2030, 1.2% in 2040, and 0.5% in 2050, followed by 0.6% in 2060. According to the OECD, Poland's GDP growth will decelerate from 4.3% in 1995–2011 to 2.6% in 2011–2030, and 1.0% in 2030–2060. Both these forecasts say the slowdown will be chiefly due to unfavorable demographic changes, including population aging, a drop in fertility, and a massive outflow of workers, especially young, well-educated working-age people.

If these forecasts come true, Poland will face not only slower growth in incomes and social well-being, but also a potential reversal of its catching-up process around 2045, coupled with a renewed widening in the country's income gap with Western Europe. In order to avoid such a scenario, the government should come up with a set of proper socioeconomic policies to neutralize the risks and keep GDP growth at a satisfactory rate. The same is true of other CEE countries facing similar risks to economic growth.[17]

Meanwhile, the growth of the Polish economy will be still critically dependent on further economic developments in Europe and worldwide. A big challenge for Poland in the years to come is the consolidation of its public finances. A serious threat is posed by the aging of the population and the growing burden imposed on the economy by the costs of retirement payments. In any case, the basic condition for sustained economic growth in the coming years is a continuous rise in exports and a strong rebound in investment.

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[17] For more on this, see section 1.2 of this report, which discusses the implications of this long-term growth forecast for the income convergence process between CEE and Western Europe.

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1.2. Real Income Convergence in the EU: Current Performance and Future Opportunities for Poland

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Convergence between EU11 and EU15

This subchapter intends to assess income convergence among the 11 Central and Eastern European (CEE) countries that joined the EU in 2004, 2007, and 2013: Poland, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Slovakia, and Slovenia (EU11).[18] Convergence in these countries is analyzed in relation to the old EU members (EU15). A detailed analysis of convergence inside the group of the new EU member countries (except Croatia) is included in previous editions of the report. This analysis covers the 1993–2013 period. The key topic of this edition is an assessment of the competitive position of the Polish economy in the EU and an analysis of how this position changed during Poland's first 10 years in the bloc. Calculations were also made for two shorter subperiods, 1993–2004 and 2004–2013. The inclusion of these subperiods allows us to assess the pace of the catching-up process before and after EU enlargement. The 2004–2013 period is treated as the after-accession period although three CEE countries—Bulgaria, Romania and Croatia—joined the EU a few years later (Bulgaria and Romania in January 2007 and Croatia in July 2013). 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.

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

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[18] 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, 2013). The 2013 edition includes an analysis of regional convergence in regions across the EU. The methodology of the analysis is described in detail in the 2008 edition of the report (Próchniak, 2008).

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

(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 e_t is the random factor. If parameter $a1$ is negative and statistically significant, β-convergence exists. In such a case we can calculate the value of coefficient b, which measures the speed of convergence, from (see e.g. Barro and Sala-i-Martin, 2003, p. 467):

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

(2)

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

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

(3)

The explained variable is the standard deviation of log GDP per capita levels between the economies, the explanatory variable is the time variable ($t = 1,..., 21$ for the 1993–2013 period), while e_t, as previously, is a random factor. If parameter $a1$ is negative and statistically significant, σ-convergence exists.

The calculations are based on the time series of real GDP per capita at purchasing power parity (PPP in $) , extracted from the International Monetary Fund database (IMF, 2014). 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.

This edition of the report is expanded to include Croatia, the 11th and youngest EU member country from Central and Eastern Europe. Although Croatia joined the EU in 2013, its inclusion does not violate the assumption that the analyzed group is homogeneous. Economic reforms in Croatia began at about the same time as in Romania and Bulgaria, and Croatia does not lag behind other new EU member states in terms of the advancement of the reform process. Therefore, we may adopt a research hypothesis that the EU11 countries should exhibit income convergence both with regard to one another and toward the EU15. Although this study only examines convergence toward the EU15, some figures will also show the catching-up process inside the EU11 group.

The existence of income convergence in the examined countries is due to a number of factors, including their similar development level and economic structures, a similar course of system reforms, mutual economic cooperation, liberalization of international trade, and reduced restrictions in the flows of factors of production (including labor and capital) between countries. The convergence process was strengthened by EU structural and regional policies aimed at reducing development differences. Financial aid was mainly targeted at less developed regions and countries to accelerate their economic growth. All these factors stimulated the process of convergence both in the

pre-accession period and after the entry of the new member countries to the EU, but the strength of these factors and their impact on the pace of convergence can vary for different countries and years.

In the study, we assess the pace of convergence throughout the analyzed period, and we also try to indicate how the catching-up process evolved over time. To do this, the studied period is divided into two subperiods: 1993–2004, the years before EU enlargement, and 2004–2013, the membership period of the EU8 economies. If convergence before EU enlargement turned out to be faster, that would mean that many of the benefits of EU accession (including a significant improvement in the competitiveness of individual economies) were gained in the years prior to 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 EU membership was a key factor that enabled the Central and Eastern European countries to catch up with Western Europe more rapidly and to significantly increase their competitiveness. Such time frames of the study enable us to better evaluate the track record of the first 10 years after the EU's eastward enlargement.

β-convergence

The results of testing β-convergence between the EU11 countries and the EU15 are presented in Table 9 and Figure 3. The convergence is analyzed among the 26 EU countries as well as between the EU11 and EU15 areas. The aggregated data for the two regions, EU11 and EU15, are weighted averages with variable weights reflecting the population of a given country included in a specific group in a given year.

Table 9 shows the results of estimating regression equation (1) along with the estimated convergence coefficients calculated according to formula (2). The first column in Table 9 indicates the period. The next columns give the estimated values of parameters a_0 and a_1, t-statistics, p-values (significance levels), and R^2 (the R-squared coefficient for the two-region model equals 1 by definition). The next column provides information about the existence of β-convergence. The answer is "yes" if the GDP growth rate is negatively and statistically significantly correlated with the initial income level. It is so if the estimated $a1$ coefficient is negative and the corresponding p-value is less than 0.1 (assuming a 10% significance level). The last column gives the estimated value of coefficient b.

Table 9

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
26 countries of the enlarged EU									
1993-2013	0.2039	–0.0186	7.02	–6.23	0.000	0.000	0.6182	yes	0.0232
1993-2004	0.1921	–0.0163	4.47	–3.70	0.000	0.001	0.3636	yes	0.0180
2004-2013	0.2574	–0.0244	5.04	–4.83	0.000	0.000	0.4934	yes	0.0276
2 regions (EU11 and EU15)									
1993-2013	0.2319	–0.0216	.	.	.	.	1.0000	yes	0.0283
1993-2004	0.2117	–0.0188	.	.	.	.	1.0000	yes	0.0211
2004-2013	0.3301	–0.0316	.	.	.	.	1.0000	yes	0.0371

Source: Own calculations.

Figure 3

GDP per capita growth rate over the 1993–2013 period and the initial GDP per capita level
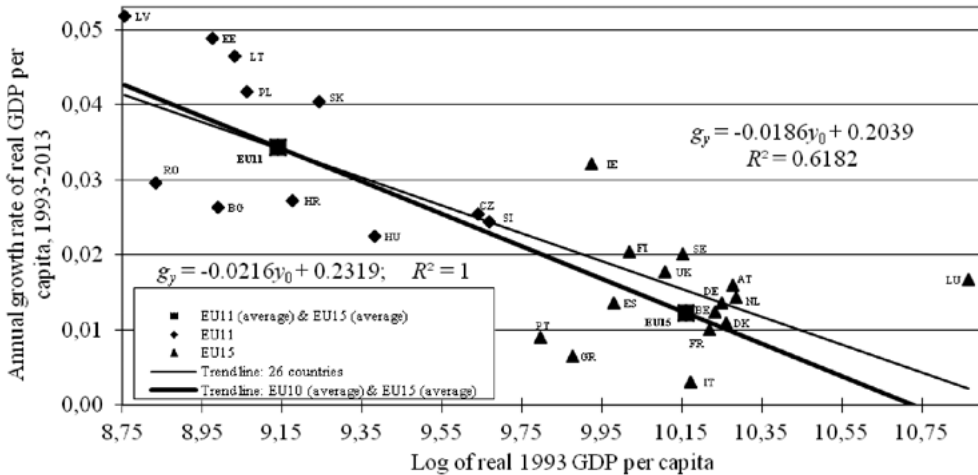
Source: Own calculations.

The results confirm the existence of a clear-cut income-level convergence of the EU11 countries toward the EU15 throughout the 1993–2013 period. The catching-up process took place both among the 26 countries of the examined sample and between the two regions, EU11 and EU15. For the 26 countries of the enlarged EU, the slope of the regression line is negative with *t*-statistics at –6.23, *p*-value at 0.000, and the *R*-squared coefficient at 62%. This shows the existence of strong convergence trends inside the enlarged European Union. Countries with lower 1993 income levels recorded more rapid economic growth on average in 1993–2013 than those countries that were

initially more developed. Since the Central and Eastern European economies were less developed in 1993, these results demonstrate an evident catching-up process by the EU11 countries with Western Europe.

The existence of β-convergence in 1993–2013 among the 26 EU countries is illustrated in Figure 3. In the figure, the EU11 countries are marked by rhombuses, while the EU15 countries are marked by triangles. As we can see, the points representing the EU11 countries appear in the upper left part of the chart, while the points representing the EU15 economies are located in the lower right part. This means that the EU11 countries recorded more rapid economic growth from 1993 to 2013, while their initial income level was lower.

Figure 3 shows that the dispersion of the points representing individual countries is not large from the negatively sloped trend line. This results in a relatively high value of the R-squared coefficient, at 62%. Differences in the initial income level account for almost two-thirds of the differences in the economic growth rates for the 1993–2013 period.

The points marked in the figure make it possible to compare the outcomes recorded by individual countries and to assess changes in their competitive position during the studied period. The most rapid economic growth rates were reported by the Baltic states. GDP per capita in Latvia, Estonia, and Lithuania grew at a rate of about 5% annually throughout the studied period, although these countries' initial income levels were relatively low. The results noted by the Baltics helped strengthen convergence inside the group. The position of Poland was also favorable compared with other CEE countries. Poland ranked fourth in terms of the rate of economic growth among the 26 EU countries. Rapid economic growth in Poland was one of the factors leading to an improvement in the country's competitive position. Given the relatively low income level in Poland in 1993, these results strengthened convergence in the group as a whole.

The average results of the catching-up process of the EU11 group toward Western Europe are weakened by Romania and Bulgaria. These two countries had a relatively low GDP per capita level in 1993, and they also recorded relatively slow economic growth throughout the 1993–2013 period. As a result, the points representing these two countries are located far below the trend line and negatively affect its gradient. Croatia's economic growth was also relatively slow, but its initial development level was higher (in 1993, Croatia was wealthier than Poland, the Baltic states, Romania, and Bulgaria).

Figure 3 also shows some differences in the economic growth paths of Western European countries. Two countries, Ireland and Luxembourg, exhibited relatively fast economic growth compared with their initial income level. As a result, the points representing these two countries appear significantly above the trend line. The situation of Luxembourg, however, is atypical because the high level of income per inhabitant in Luxembourg and the country's rapid growth stem mainly from the fact that Luxembourg is a tax haven and hosts a number of enterprises from the financial and high-tech sectors. By contrast, three Mediterranean countries, Italy, Greece, and Portugal, recorded a slow rate of economic growth.

In Figure 3, the analysis of individual countries demonstrates that convergence exists not only among the 26 EU countries but also inside the EU11 area. In the EU11 group, the highest initial income level was noted by the Czech Republic and Slovenia, while their economic growth rate between 1993 and 2013 was relatively low compared with other CEE countries. These results were one of the factors stimulating convergence in the CEE area.

Aggregated data for two regions, the EU11 and EU15, further confirm the existence of convergence in the 1993–2013 period. In Figure 3, the points representing these two regions are marked by squares. The EU11 group as a whole recorded more rapid economic growth than the EU15 area, while the group's initial income level was much lower.

The β-coefficients, which measure the speed of convergence and are calculated according to formula (2), stand at 2.32% for the 26 countries and at 2.83% for the two regions. The β-coefficients allow us to estimate the time needed to reduce the development gap between the studied countries. If the average growth patterns observed in 1993–2013 continue, the countries of the enlarged EU will need about 25–30 years to reduce the gap to their common hypothetical steady state by half (the value is calculated as follows: $-\ln(0.5)/0.0232 = 29.9$ years and $-\ln(0.5)/0.0283 = 24.5$ years).[19] The above results point to a slow catching-up process by the EU11 countries toward Western Europe. Based on these estimates, it is not expected that the income levels in Poland and other Central and Eastern European countries will become equal to those in Western Europe in the medium term. Of course, we should treat these results with caution because such a simulation does not take into account unexpected internal or external shocks that may change a country's economic growth path. A good recent example is the global economic crisis, which hampered the catching-up process for the whole group. 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.

Comparing the results for 1993–2004 with those for 2004–2013, it turns out that β-convergence occurred in both periods. However, the b catching-up process accelerated after EU enlargement, from 2004 to 2013. The relationship between the initial income level and the rate of economic growth was negative and statistically significant (p-values less than 0.1) in the two periods. This applies to the analysis for both the 26 countries and the two regions. The acceleration of convergence is evidenced by a greater slope of the trend line and, consequently, by higher b-coefficients. The b-coefficient for the EU26 countries increased from 1.80% in 1993–2004 to 2.76% in 2004–2013, while the β-coefficient for the two regions rose from 2.11% to 3.71% in the same period.[20] The acceleration of the catching-up process resulted from many factors, including further trade and capital liberalization that led to significant tariff cuts and an inflow of foreign

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[19] The half-life (t^*) is the solution of the equation: $e{-\beta}t^* = 0.5$, where β is the rate of decrease (Romer 2000, p. 41). By taking logs of the above formula, we get: $t^* = -\ln 0.5/\beta$.

[20] Próchniak and Witkowski (2013) apply more advanced econometric models—based on the Bayesian Model Averaging method—to analyze the time stability of conditional β-convergence in the EU.

direct investment, 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. A big role in accelerating the convergence process was also played by EU structural funds, earmarked for the development of poorer EU countries and regions. The flow of funds from the EU budget intensified after the new member states joined the bloc, leading to these countries' rapid growth. This can be clearly seen in the case of Poland, a key recipient of funds from the EU's 2007–2013 budget. The amount of money granted by the EU in the form of various types of aid and structural funds positively influenced the Polish economy on both the demand and supply sides. As a result, Poland recorded relatively good economic growth figures in the last few years, becoming the only EU country to avoid recession during the global crisis. The EU's 2014–2020 budget sets aside more structural funds for new member states and should prove to be a major driver of convergence in Poland and other Central and Eastern European countries in the coming years.

The results of β-convergence presented here are the average results for the whole region. As shown in Figure 3, individual EU11 countries displayed different rates of GDP growth and different degres of convergence toward Western Europe. It is worth taking a look at the nature of the catching-up process in individual EU11 countries toward the EU15 in the period before and after EU enlargement.

Figure 4
The reduction in individual EU11 countries' income gap toward the EU15 in the period before and after EU enlargement[a]
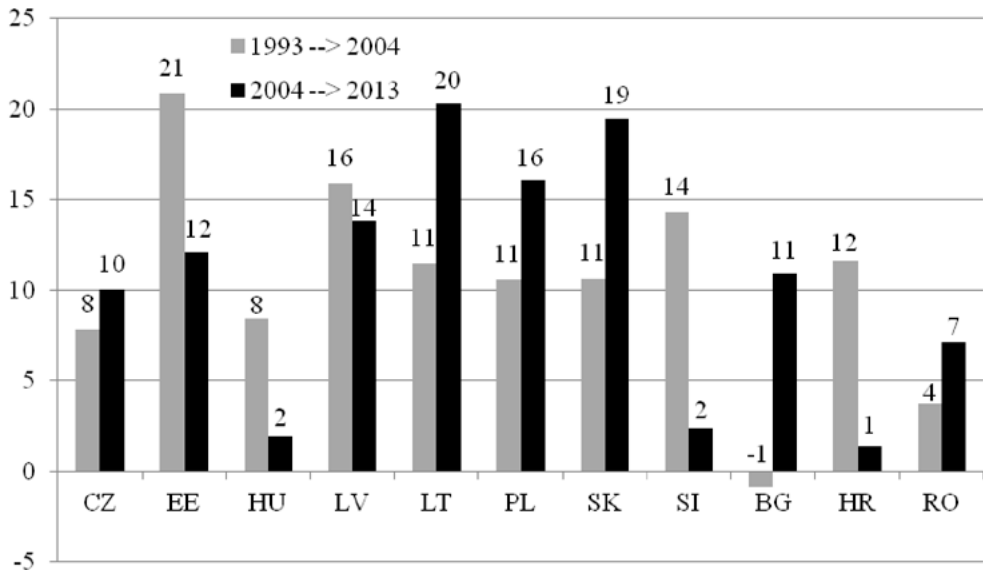
[a] The changes are expressed in percentage points; in each year the GDP per capita at PPP for the EU15 is taken as a base equal to 100.

Source: Own calculations based on IMF data.

Figure 4 shows by how many percentage points the income gap of a given EU11 country to the EU15 area decreased in the 1993–2004 and 2004–2013 periods. It turns out that only six countries saw an acceleration in the catching-up process after EU enlargement. On the one hand, in two Baltic states (Estonia and Latvia) as well as Slovenia, Croatia and Hungary, the income gap toward the EU15 narrowed faster in the period before EU enlargement (although it should be noted this period is longer). On the other hand, in Poland, the Czech Republic, Slovakia, Lithuania, Bulgaria, and Romania, the reduction in the income gap with Western Europe was more rapid after EU enlargement (since Bulgaria and Romania joined the EU in 2007, the 2004–2013 convergence analysis for these two countries covers a part of the pre-accession period). In Poland, European funds probably played a big role in accelerating the pace of convergence after EU enlargement, which increased the competitiveness of the Polish economy.

Individual EU11 countries used different paths to reduce their income gaps. Some countries took advantage of the substantial benefits from European integration before EU enlargement, while others benefited in terms of income level equalization, mostly after EU accession.

To sum up, despite the existence of a clear-cut tendency towards convergence between the old and new EU member states, the pace of the catching-up process suggests that no major changes can be expected in either the short or medium term in competitiveness measured by real GDP per capita between Poland and other EU11 countries, on the one hand, and the old EU members, on the other. Moreover, the economic performance of the EU11 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 EU11 countries compared with the EU15 area.

σ-convergence

σ-convergence of the Central and Eastern European countries toward Western Europe is measured by changes in the standard deviation of GDP per capita levels between the 26 EU countries as well as between the EU11 and EU15 areas. The results of the trend line estimation for standard deviations are shown in Table 10. Figure 5 offers a graphical illustration of the outcomes.

The data in Table 10 show that during all the considered time periods there existed σ-convergence both among the 26 EU countries and between the EU11 and EU15 areas. The slopes of all the estimated trend lines are negative and statistically significant at high significance levels (*p*-values do not exceed 0.001). The high values of the *R*-squared coefficients reflect a very good fit of empirical points to the trend line.

Figure 5 shows the standard deviation of log GDP per capita levels. As we can see, income differences between the EU11 countries and the old EU members generally displayed a downward trend. Income differences decreased most obviously and consistently

in the second half of the analyzed period, which means after 2000. In 2009–2010, due to the economic crisis and decelerated economic growth in many rapidly developing countries, income differences among the 26 countries of the analyzed group increased, although the average data for the two regions do not support this evidence.

The analysis of Figure 5 in terms of the benefits of EU membership shows that EU entry has contributed to a decrease in income level differences between the countries. In the 1990s, when EU membership was still a distant prospect, the development disparities in the considered group were relatively constant over time (of course, this applies to aggregated data for the 26 countries; an earlier analysis has shown that individual countries followed different paths of economic growth). Differences between countries in income levels decreased as the date of EU entry approached. After accession, aid and structural funds transferred to poorer countries and regions constituted an important factor behind reduced income disparities.

Figure 5 shows that convergence is not an automatic process and that the development differences will not necessarily continue to narrow in the future; divergence tendencies may appear. The latest global crisis is a good example; it has led to an increase in income level differences. Such unexpected shocks as well as any other future potential disruptions may hamper convergence trends in Europe. Consequently, it is essential to pursue the right economic policies (fiscal and monetary policies, combined with institutional environment reforms) in order to keep the process of income level equalization inside the enlarged European Union on track. If such high-quality policies are in place and if the external environment is favorable, a further decline may be expected in income differences in the next few years, along with an accelerated convergence of the EU11 countries toward the EU15.

Table 10
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
26 countries of the enlarged EU								
1993-2013	0.6001	–0.0103	69.84	–15.01	0.000	0.000	0.9222	yes
1993-2004	0.5797	–0.0062	58.51	–4.63	0.000	0.001	0.6822	yes
2004-2013	0.4723	–0.0088	65.88	–7.65	0.000	0.000	0.8797	yes
2 regions (EU11 and EU15)								
1993-2013	0.5406	–0.0121	73.00	–20.52	0.000	0.000	0.9568	yes
1993-2004	0.5179	–0.0078	76.17	–8.48	0.000	0.000	0.8779	yes
2004-2013	0.4046	–0.0125	61.66	–11.86	0.000	0.000	0.9462	yes

Source: Own calculations.

Figure 5
Standard deviation of GDP per capita, 1993–2013
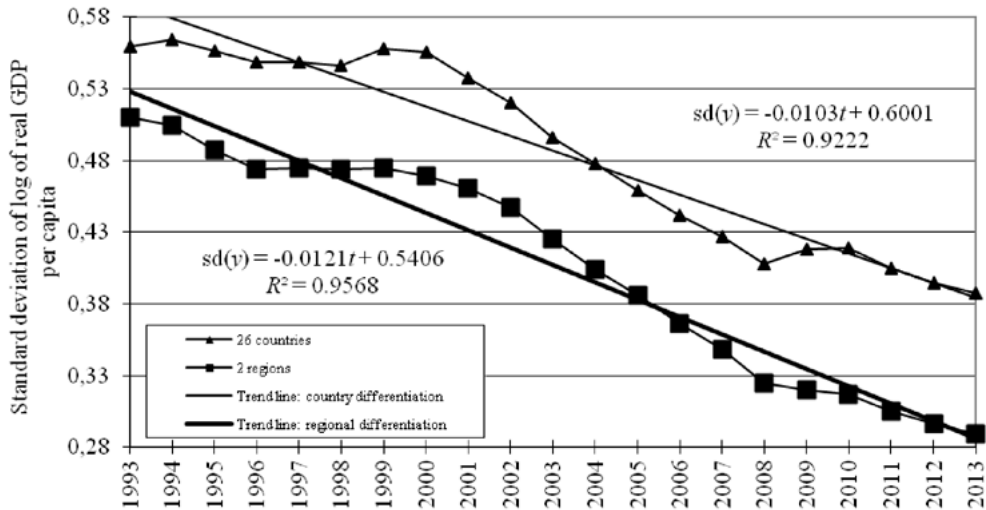
Source: Own calculations.

Closing the income gap – a forecast

In the preceding section, income convergence between the CEE countries and Western Europe in the 1993–2013 period was analyzed with the help of some econometric methods. This section presents a simulative forecast of the catching-up process between the CEE countries (EU10 or EU11)[21] and Western Europe (EU15). Our forecast (or, more precisely, simulation) of the further pace of income convergence between the two groups of countries will be made according to three hypothetical scenarios. The first two scenarios update our earlier forecasts based on similar assumptions, presented in earlier editions of this report (e.g. Weresa, ed., 2013); the third scenario is repeated with some minor numerical corrections.

The first scenario, which is a simple extrapolation of the past growth trends, assumes that individual CEE countries and the EU15 group as a whole will in the future maintain the average yearly per capita GDP growth rates noted in the 1993–2013 period.[22] For most CEE countries, and particularly for Poland, this is a very optimistic scenario from the point of view of the period needed to close the income gap between the two groups of countries.

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[21] Croatia, which entered the EU in 2013, has been included here in the forecast made under the first scenario, but it could not be considered in the two other forecasting variants due to a lack of the required input data related to long-run economic and demographic forecasts.

[22] The GDP per capita growth rates quoted here refer to the growth of real GDP measured at constant prices in national currencies (euro in the case of the EU15); they differ slightly from the growth rates calculated from PPS GDP data, which were used in the calculations made in the previous section.

The second scenario is more analytical in nature. It is based on a medium-term GDP forecast given by the IMF (IMF, 2014) and on a long-term demographic forecast published by Eurostat (Eurostat, 2014). The scenario assumes that during the next five years, CEE economies and the EU15 group as a whole will grow in line with the IMF's GDP growth forecast until 2018. A further assumption is that from 2020 onward these countries will continue to grow at the constant GDP growth rate foreseen by the IMF for 2018, with a minor correction for Hungary.[23] The data for 2019 have been inserted by interpolation and the assumed total GDP growth rates have been transformed into per capita terms using demographic projections.[24] Compared with the first scenario, this second scenario seems more realistic, though the assumptions about future GDP growth in the CEE countries are also quite optimistic.[25]

The common feature of both these scenarios is the assumption that the CEE countries will maintain some lead over the EU15 group as regards the growth of per capita GDP and, as the result, the catching-up process will continue. We shall focus on calculating the probable length of the period needed to close the income gap (against the average per capita GDP level in the EU15). The only difference between the two variants is that the ratios of the growth rates between the CEE countries and the EU15 group in the first scenario are assumed to remain the same as in the 1993–2013 period, while in the second scenario, these ratios may change, according to the current growth trends and the assumed future growth rates.

In both of the above scenarios, the reference point in our forecast is the relative level of GDP per capita in 2013. The period necessary to close the income gap depends on the initial income gap and on the assumed future growth rate of per capita GDP, i.e. on the assumed growth of total GDP and the expected change in population numbers. The algorithm used to calculate the length of the catching-up period was presented and discussed in an earlier edition of this report (Weresa, ed., 2012, p. 57).

Our calculations have been made in two versions as regards estimating 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 done 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 whether the GDP per capita at PPS figures for CEE countries are adequate rather than overestimated.

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[23] For Hungary, the target GDP growth rate was increased by 0.5% (compared with the IMF forecast), from 1.6% to 2.1%, which seems to be more plausible and is more comparable with the growth rates assumed for the remaining CEE countries.

[24] After 2060, due to the lack of comparable demographic data, we have assumed no further change in population numbers.

[25] The assumed GDP growth rates for Poland after 2020 (3.5% per year) lie within the range accepted as feasible in several growth forecasts for Poland for the next 10–20 years (cf. the literature quoted in the discussion about the growth prospects of the Polish economy, given in part 1.1 of this chapter), though it may not be sustained in a longer time horizon due to the demographic barrier.

Table 11

Closing the income gap – scenario 1

Country	GDP per capita growth rate (%)	GDP per capita in 2013 (EU15 = 100)		Number of years necessary to reach the average level of GDP per capita in the EU15	
		PPS	CER	PPS	CER
Bulgaria	3.0	43	19	48	94
Croatia	3.4	55	35	28	49
Czech Republic	2.5	73	47	25	59
Estonia	5.3	67	47	10	19
Hungary	2.3	61	33	46	103
Latvia	5.5	61	39	12	23
Lithuania	5.0	68	39	10	26
Poland	**4.3**	**62**	**34**	**16**	**36**
Romania	3.3	50	24	34	69
Slovakia	4.2	70	45	12	27
Slovenia	2.8	74	57	19	36
EU15	1.2	100	100	–	–

Source: Author's calculation based on data from the Eurostat Database, ec.europa.eu/eurostat, supplemented when necessary by auxiliary data from the IMF and World Bank, (2014), www.imf.org; databank.worldbank.org, accessed Feb. 25, 2014.

Table 12

Closing the income gap – scenario 2

Country	Growth rate of GDP		GDP per capita in 2013 (EU15 = 100)		Number of years necessary to reach the average level of GDP per capita in the EU15	
	2013-2019	2020	PPS	CER	PPS	CER
Bulgaria	2.6	3.0	43	19	42	100
Czech Republic	2.2	2.4	73	47	37	93
Estonia	3.5	3.7	67	47	17	32
Hungary	1.6	2.1	61	33	77	202
Latvia	4.1	4.0	61	39	16	31
Lithuania	3.6	3.7	68	39	15	37
Poland	**3.1**	**3.5**	**62**	**34**	**23**	**50**
Romania	3.0	3.5	50	24	31	66
Slovakia	3.2	3.5	70	45	19	40
Slovenia	1.5	2.6	74	57	35	60
EU15	1.5	1.6	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, accessed Feb. 25, 2014.

It should be remembered that the EU15 group, used here as a reference frame to represent the average income level in Western Europe, is meant as composed of 15 countries that belonged to the EU before its major enlargement in 2004 and 2007 (it does not coincide exactly with the group of the 15 Western European countries that belong to the euro area, usually denoted as the EA15). The average per capita GDP level in the EU15 group was calculated by dividing the total GDP value for this group by the sum of the population. The growth rates of per capita GDP for the EU15 group used in the first scenario refer exactly to this group, but under the second and third scenarios, because of the lack of the respective data for the so-defined group, we used the GDP growth rates given by the IMF or European Commission for the euro area (EU17), which do not differ much from those for the EU15 group and are an acceptable substitute.

The assumptions made in the first two scenarios and the results of our calculations are presented in Table 11 and Table 12. The first column in both tables shows the assumed growth rates of per capita GDP or total 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 2013, GDP per capita in all the CEE countries belonging to the EU was much lower than the EU15 average. The lowest level of GDP per capita was noted in Bulgaria (43% of the EU15 average at PPS and 19% at CER) and Romania (50% and 24% respectively), while the highest level was seen in Slovenia (74% at PPS and 57% at CER) and in the Czech Republic (73% and 47%). In Poland, GDP per capita in 2013 accounted for 62% of the EU15 average when calculated at PPS and for 34% when calculated at CER. For all the CEE countries, the per capita GDP values calculated at PPS are much higher than those converted at CER. Consequently, the period necessary to close the income gap calculated at PPS is considerably shorter than the period required for closing the income gap calculated at CER.

Scenario 1 is a simple extrapolation of the past trend of GDP per capita, assuming that the CEE countries (EU11) and the EU15 group will maintain the average yearly growth rates of GDP per capita noted in the 1993–2013 period. Under this assumption, individual EU11 countries would need 10 to 48 years to reach the average level of GDP per capita seen in the EU15 group if the initial income gap is calculated at PPS, but 19 to 103 years if it is calculated at CER. Estonia has the best position in the catching-up process; it would need only 10 years at PPS or 19 years at CER to reach the average income level in the EU15. Lithuania would need 10 or 26 years for the same, and Latvia 12 or 23 years. For Slovakia, the respective catching-up periods are 12 or 27 years, for Slovenia 19 or 36 years, for the Czech Republic 27 or 59 years, and for Croatia 29 or 49 years. Poland would need 16 years if the initial income gap is calculated at PPS or 36 years if it is calculated at CER. Hungary, Romania and Bulgaria are in the worst position: keeping up its earlier growth trend, revealed in the

above period, Hungary would need 46 years to achieve the average income level at PPS seen in the EU15 or 103 years at CER, and Romania and Bulgaria would need 34 or 69 years and 48 or 94 years respectively.

The time required to close the income gap against the EU15 under scenario 2 differs from that obtained in scenario 1 because the current and future GDP growth rates assumed here differ from the past trends. For most CEE countries, the catching-up period turns out to be longer than in the first scenario. The convergence period becomes a little shorter for Romania (31 years at PPS and 66 years at CER) and possibly for Bulgaria (42 years at PPS, but 100 years at CER). For all the remaining countries in the group, the catching-up period becomes considerably longer. For Estonia, Latvia and Lithuania, the catching-up period rises to 15–17 years at PPS or 31–37 years at CER; for Slovakia it rises to 19 or 40 years respectively, for Slovenia to 35 or 60 years, and for the Czech Republic to 37 or 93 years. For Hungary, the catching-up period becomes extremely long: 77 years at PPS and 202 years at CER (despite our upward correction of the future growth rate). Poland ranks in the middle of the group in this respect, with a chance to bridge the income gap toward Western Europe within 23 years if the initial income gap is calculated at PPS, or 50 years if it is calculated at CER.

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 at constant prices and exchange rates noted at the starting point, on the assumption that current price differentials between the CEE and EU15 will not change. In fact, due to the gradual equalization of price levels within the EU28, the purchasing power of the future income earned in any of the CEE countries may turn to be lower than expected on the basis of constant price calculations, with the resulting increase in the period needed to close the income gap.

In addition to the purely extrapolative forecast presented under scenario 1, based on the growth trends observed in the whole transition period 1993–2013, or instead of it, we could also develop a similar extrapolative forecast of income convergence based on the growth pattern observed in the 2004–2013 period, after the EU's major enlargement towards the CEE. The retrospective analysis of the catching-up process, presented in the preceding section, brings some empirical evidence of the acceleration of income convergence between the CEE countries and Western Europe after their EU accession, though identification of the specific effect of the integration on the speed of convergence would require further research. But the growth patterns seen in that period, influenced by the global financial and economic crisis as well as the debt crisis in the euro area, were atypical and are unlikely to be repeated. Therefore, the average growth rates noted by various EU countries in that period and the resulting growth differentials cannot be directly applied to any reasoning about possible future developments. For instance Poland, thanks to its continuous growth, reported a substantial increase in the real GDP volume over the whole period. Reinforced by population declines, this was reflected in a relatively high GDP per capita growth rate of 3.8% per year, whereas the average growth rate for the EU15 group in the same period was

only 0.3%, a growth differential between Poland and the EU15 of almost 13:1. There is no doubt that such a big difference in the growth rates between member countries of the same integrated economic area cannot be sustained. Therefore the growth patterns seen during that period cannot be used to forecast the future course of the convergence process.

More meaningful in this respect may be the long-term growth patterns observed throughout the transition period (used in the forecast developed under scenario 1), though the question remains open whether the growth lead revealed in the past by the less developed CEE countries over the more developed EU15 countries may be maintained in the future.

We have also analyzed some other scenarios of the convergence process, including some alternative extrapolation variants with longer and shorter backward observation periods as well as some other variants of analytical forecasts, with different assumptions as to the future growth rates in the CEE countries and in the EU15 group (cf. Matkowski, 2010; Matkowski, Próchniak, Rapacki, 2013a, 2013b). In all the analyzed variants, the period necessary for Poland to close the income gap toward the EU15, measured at PPS and adjusted for the 2013 starting point, is between 15 and 25 years. We can therefore conclude that, under all realistic assumptions, the minimum period necessary for Poland to catch up with the EU15 in terms of the average PPS income level is now about 20 years.

Expectations voiced by some optimistic authors (cf. Rybiński, 2009)—that Poland can reach the income level in Western Europe within 10 years—are entirely unrealistic. This could happen if the Polish economy began to grow almost 5% per year, while the EU15 countries would stop growing altogether.[26] However, such a long stagnation in Western Europe is improbable and, furthermore, it would dampen Poland's economy, which is highly dependent on exports to Western markets and on the inflow of foreign investment. Therefore Poland needs to accept the fact that it may be capable of closing the income gap with Western Europe, but this requires a lot of time and effort. Likewise, a future economic slowdown in Poland and other CEE countries could bring down the rate of the convergence process and eventually reverse it into divergence. Such a possibility is implied by the third scenario, presented below. Scenario 3 is based on a long-term growth forecast for EU countries until 2060, developed under the auspices of the European Commission (European Commission, 2012). This forecast, already mentioned in the preceding section of this chapter, is based on a thorough analysis of the unfavorable demographic trends and their effect on employment and labor productivity, as well as of the expected changes in total factor productivity (TFP). Under the forecast, beginning in 2015 or 2010, economic growth in Poland and most other CEE countries will slow down, mainly as a result of population aging and the outflow of

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[26] Even if the unique growth differential between Poland and the EU15 noted in the 2004–2013 period (13:1) could hold in the future—which is improbable—the time required to close the existing income gap measured at PPS would be 14 years.

young working-age people seeking jobs and better living conditions abroad. This would lead to a gradual decrease in the growth rate differential between the CEE countries and Western Europe and ultimately the disappearance of any growth advantage and the reversal of the growth ratio between the two groups, at a very low level of growth rates. One of the consequences of the changing growth patterns would be a decrease in the rate of income convergence between the two groups of countries, leading to a reversal in the convergence process and a renewed widening of the income gap. It should be noted that this forecast is highly pessimistic not only because it excludes the chance of bridging the income gap toward Western Europe within the lifetime of a single generation, but also because it foresees very slow growth in real income and wealth (about 1%-2% a year in terms of per capita GDP) over the next 50 years for both the EU15 and most CEE countries.

The implications of this scenario for the catching-up process between the CEE countries and Western Europe are shown in Table 13. Unlike the first two scenarios, which indicated the length of the period needed to close the income gap, this scenario—because of the reversal of the convergence process within the forecast horizon—gives only the relative income levels foreseen at the beginning of the consecutive decades and the minimum size of the income gap at the turning point from convergence to divergence. For the sake of simplicity, the relative income levels illustrating the size of the income gap are only given in terms of GDP per capita calculated at PPS (the alternative estimates of the relative income level against the EU15 in terms of GDP per capita calculated at CER would be much lower). The starting point in this scenario is 2010, in line with the timing of the underlying growth forecast. The initial income gap in 2010 was calculated against the EU15 average, but the future GDP per capita growth rate for the reference group was assumed to be equal to the EU17 average given in the European Commission forecast. The figures given in the table differ slightly from those shown in last year's edition of the report (Weresa, ed., 2013) because the whole forecast was recalculated using the revised data for the initial income gap at a starting point, but this does not significantly change the results.

As can be seen from Table 13, in most CEE countries the switch from convergence to divergence against Western Europe would appear around 2045 (in the case of Slovenia and Slovakia a little earlier). At their turning points from convergence to divergence, individual CEE countries can reach the following income levels relative to Western Europe (EU15 = 100), illustrating the minimum size of the income gap: Slovakia – 89, Czech Republic – 87, Slovenia – 83, Estonia – 78, Latvia and Lithuania – 70, Hungary – 64, Romania – 51. Poland would reach the minimum income gap toward Western Europe in 2044, with the relative income level of 75% against the EU15 average. Bulgaria is the only CEE country that will be not affected by the divergence (at least not within the forecast horizon), but at the end of the forecasting period it can only enjoy 55% of the average income standard in the EU15. Of course, this scenario does not give any indication as to the further development of the con-

vergence vs. divergence process after 2060, which is beyond the time scope of the underlying forecast.

Table 13

Closing the income gap – scenario 3

Country	GDP per capita growth rate, 2010–2060 (% per year)	Income gap (GDP per capita at PPS, EU15 = 100)						The minimum income gap
		2010	2020	2030	2040	2050	2060	
Bulgaria	1.9	40	46	50	54	55	55	.
Czech Rep.	1.6	73	79	82	86	86	85	87 (2046)
Estonia	1.8	58	63	70	77	77	76	78 (2046)
Hungary	1.4	59	57	60	63	63	62	64 (2045)
Latvia	1.8	50	55	63	69	69	67	70 (2044)
Lithuania	1.7	52	57	62	68	70	68	70 (2048)
Poland	**1.8**	**57**	67	71	75	74	71	75 (2044)
Romania	1.5	43	48	49	51	51	49	51 (2044)
Slovakia	1.8	66	79	87	89	86	83	89 (2038)
Slovenia	1.3	77	82	83	83	81	80	83 (2037)
EU15	1.3	100	100	100	100	100	100	.

Source: Author's calculations based on data from the Eurostat Database, ec.europa.eu/eurostat and the European Commission (2012).

One can hope that this depressing scenario, which precludes bridging the income gap within one generation, will not come true. Nevertheless, the possibility of such undesirable developments, under *laissez-faire* conditions, cannot be ignored. It should be noted that the alarming forecast is supported by another long-term growth projection produced by the OECD (OECD, 2012). To prevent this eventuality, well-coordinated, multidirectional efforts must be undertaken as soon as possible by the governments of the countries concerned and also as part of common European policy, aimed at overcoming the emerging threats to future economic growth. In the case of Poland, a complex development program is needed dedicated to the maintenance and accelera-tion of economic growth, which should focus on correcting unfavorable demographic trends, creating better institutional conditions for enterprise development, further expanding and modernizing the infrastructure, better use of existing labor and material resources, and promoting education, knowledge and innovativeness—all the crucial factors of growth in a highly competitive international environment.

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1.3. Income Inequality and Poverty in Poland: The Impact of Poland's EU Membership on Income Inequality

Patrycja Graca-Gelert

This subchapter outlines the main income inequality and poverty trends in Poland compared with other European Union countries between 2003 and 2012. This edition of the report assesses the impact of Poland's EU membership on income inequality in the country.

Methodological remarks

Income inequality and poverty are complex issues. The interpretation of inequality and poverty—their dimension and change—depend to a large extent on the adopted assumptions. In this subchapter, we assume what follows.
1. We refer to household disposable income unless specified otherwise.
2. We refer mainly to equivalised income unless specified otherwise. The adopted equivalence scale is the modified OECD scale. The equivalence scale makes it possible to compare incomes of households with different characteristics. The modified OECD equivalence scale assigns a value of 1 to the household head, 0.5 to each person aged 14 and above, and 0.3 to each child.
3. The following inequality measures are used in this subchapter:
    a. the Gini coefficient—it ranges from 0 for perfect equality to 1 for extreme inequality,[27]
    b. the S80/S20 income quintile share ratio (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) and other kinds of quintile share ratios (the ratio of the mean income of one quintile group to the mean income of another quintile group).
4. Unless specified otherwise, a relative approach to poverty has been adopted. Poverty—"the lack of, or the inability to achieve, a socially acceptable standard of living" (FAO, 2005, p. 2)—referred to its relative approach is closely related to the notion of inequality (here: of income), where the standard of living (poverty line) is defined in relation to other people in the distribution (here: of income), (FAO, 2005). The information on the adopted poverty lines is to be found in subsequent parts of this subchapter.

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[27] It may also be expressed as a percentage (from 0 to 100%), as for the most part of this subchapter.

5. The data used throughout this survey come mainly from *Budżety Gospodarstw Domowych* publications by Poland's Central Statistical Office (GUS) and directly from the office's household budget surveys (HBS) and EU-SILC. The analysis of income inequality and poverty was possible only up to 2012, 2010 or in some cases only up to 2008 due to problems with data availability and because information on household incomes (inequality) and poverty is published with a delay.
6. The calculations based on the HBS data and regarding the impact of EU membership on income inequality in Poland were performed using the DAD 4.6 software for distributive analysis (Jean-Yves Duclos, Abdelkrim Araar and Carl Fortin, "DAD: A Software for Distributive Analysis/Analyse Distributive," MIMAP programme, International Development Research Centre, Government of Canada, and CIRPÉE, Université Laval).

Differences in per capita income among EU countries and intra-country income inequality: Sen's social welfare function

Country rankings by GDP per capita (PPS), income inequality between countries and trends in regional income inequality (convergence/divergence) within countries are in principle not directly related to household income inequality in individual countries. EU countries experienced all possible combinations of regional convergence/divergence of mean income (NUTS 2) and a decrease/increase in household income inequality (Weresa, (ed.), 2013, p. 69). However, the inter- and intra-inequality of income in EU countries can be analyzed jointly. One of the possible ways of analysis is the abbreviated Sen's social welfare function, which incorporates the problems of efficiency and equality. The social welfare function proposed by Sen is as follows (Sen, 1976; Sen, 1979):

$$W = e\,(1-G)$$

where e denotes mean income and G is the Gini coefficient of the country's income distribution. In Table 14, e denotes GDP per capita (PPS). Sen's social welfare function adjusts GDP per capita—the traditional measure of welfare—by income inequality within a given country. The ranking of countries by Sen's social welfare function is obviously arbitrary and the function itself is not free of deficiencies (see e.g. Mukhopadhaya, 2001; Jacobs, Šlaus, 2010).

Table 14 shows data on GDP per capita (PPS) and the calculations of Sen's social welfare function. As the availability of data in 2003 and 2004 was limited, the base year for comparison was set at 2005.

Table 14

Ranking of EU countries by GDP per capita (PPS, €) and Sen's social welfare function (SWF), 2005 and 2012

No.	Ranking	GDP 2005	Ranking	GDP 2012	Ranking	Sen's SWF 2005	Ranking	Sen's SWF 2012
1	Luxembourg	57,100	Luxembourg	67,000	Luxembourg	41,969	Luxembourg	48,240
2	Ireland	32,500	Austria	33,300	Ireland	22,133	Sweden	24,558
3	Netherlands	29,400	Ireland	33,200	Netherlands	21,491	Netherlands	24,469
4	Austria	28,200	Netherlands	32,800	Denmark	21,156	Austria	24,109
5	United Kingdom	27,900	Sweden	32,700	Sweden	20,988	Ireland[a]	23,306
6	Denmark	27,800	Denmark	32,100	Austria	20,812	Denmark	23,080
7	Sweden	27,400	Germany	31,300	Belgium	19,440	Germany	22,442
8	Belgium	27,000	Belgium	30,400	Germany	19,288	Belgium	22,344
9	Germany	26,100	Finland	29,100	Finland	19,018	Finland	21,563
10	Finland	25,700	United Kingdom	28,500	United Kingdom	18,247	United Kingdom	19,152
11	France	24,700	France	27,500	France	17,858	France	19,113
12	Italy	23,700	EU28	25,600	Italy	15,926	EU28	17,766
13	Spain	22,900	EU27	25,600	EU27	15,684	EU27	17,766
14	EU27	22,600	Italy	25,200	EU28	.	Italy	17,161
15	EU28	22,500	Spain	24,400	Spain	15,618	Cyprus	16,215
16	Cyprus	20,900	Cyprus	23,500	Slovenia	14,935	Malta	16,089
17	Greece	20,400	Malta	22,100	Cyprus	14,902	Slovenia	15,947
18	Slovenia	19,600	Slovenia	20,900	Greece	13,627	Spain	15,860
19	Malta	18,100	Czech Republic	20,300	Malta	13,231	Czech Republic	15,245
20	Portugal	17,900	Greece	19,200	Czech Republic	13,172	Slovakia	14,268
21	Czech Republic	17,800	Portugal	19,200	Portugal	11,080	Greece	12,614
22	Hungary	14,200	Slovakia	19,100	Hungary	10,281	Portugal	12,576
23	Estonia	13,800	Estonia	18,000	Slovakia	9,963	Hungary	12,208
24	Slovakia	13,500	Lithuania	17,900	Estonia	9,094	Lithuania	12,172
25	Croatia	12,800	Poland	16,800	Croatia	8,960	Estonia	12,150
26	Lithuania	12,300	Hungary	16,700	Lithuania	7,835	Poland	11,609
27	Poland	11,500	Latvia	15,900	Poland	7,406	Croatia	10,842
28	Latvia	11,100	Croatia	15,600	Latvia	7,093	Latvia	10,192
29	Bulgaria	8,200	Romania	12,600	Bulgaria	6,150	Romania	8,417
30	Romania	7,900	Bulgaria	12,100	Romania	5,451	Bulgaria	8,034

[a] Data on income inequality (Gini index) refer to 2011.

Source: Own calculation based on Eurostat data.

As Table 14 shows, the application of Sen's social welfare function does not significantly alter the ranking of countries by GDP per capita. The most important conclusions resulting from Table 14 are as follows. First, three countries were ranked two positions higher according to Sen's social welfare function in 2005—Denmark, Sweden, and Slovenia. These countries recorded the lowest income inequality that year. Three other countries were ranked two or more positions lower according to Sen's social welfare function—Austria, Spain, and the United Kingdom (five positions lower). Sweden and Hungary were ranked three positions higher (Slovakia two positions higher), and Spain three positions lower (Austria, Ireland, and Estonia two positions lower) in 2012 according to Sen's social welfare function. Second, the rankings differ in the number of countries that changed their rank by two or more positions—14 countries according to the ranking by GDP per capita and 12 according to Sen's social welfare function. Interestingly, the United Kingdom experienced a fall by five notches between 2005 and 2012 according to the ranking by GDP per capita, whereas its rank did not change according to Sen's social welfare function. Third, if we compare welfare at the extremes of both rankings, greater relative disparities result from Sen's social welfare function; however, the relative differences in welfare decreased between 2005 and 2012 according to both rankings (a change from 623% to 458% for GDP per capita and from 670% to 500% for Sen's social welfare function[28]).

Income inequality and poverty in Poland after the country's EU entry

The data on income inequality in Poland presented in Figure 6 show a decrease in income disparities after Poland's EU entry. The dimension of this decrease depends on the data taken into consideration, and the differences between the data result mainly from the adopted definition of income and the equivalence scale. According to the Central Statistical Office, income inequality in Poland increased rather than decreased in 2010 compared with the 2006–2009 period.

Table 15 presents data on households' mean monthly income for individual quintile groups and quintile share ratios. While the Gini coefficient measures changes across the income distribution spectrum, the quintile share ratios only take into account changes between particular quintiles of the income distribution. The quintile share ratios calculated from Poland's GUS data on disposable income do not show monotonic changes in income inequality in the analyzed period. However, it can be clearly seen that income disparities at the extremes of the income distribution and between the middle and the first quintile have been increasing since 2010.

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[28] If we treat Luxembourg as an outlier and take into consideration the country with the second-highest position, then the change in welfare disparities is as follows: from 311% to 175% for GDP per capita and from 306% to 206% for Sen's social welfare function.

Figure 6
Income inequality[a] in Poland, 1989–2012
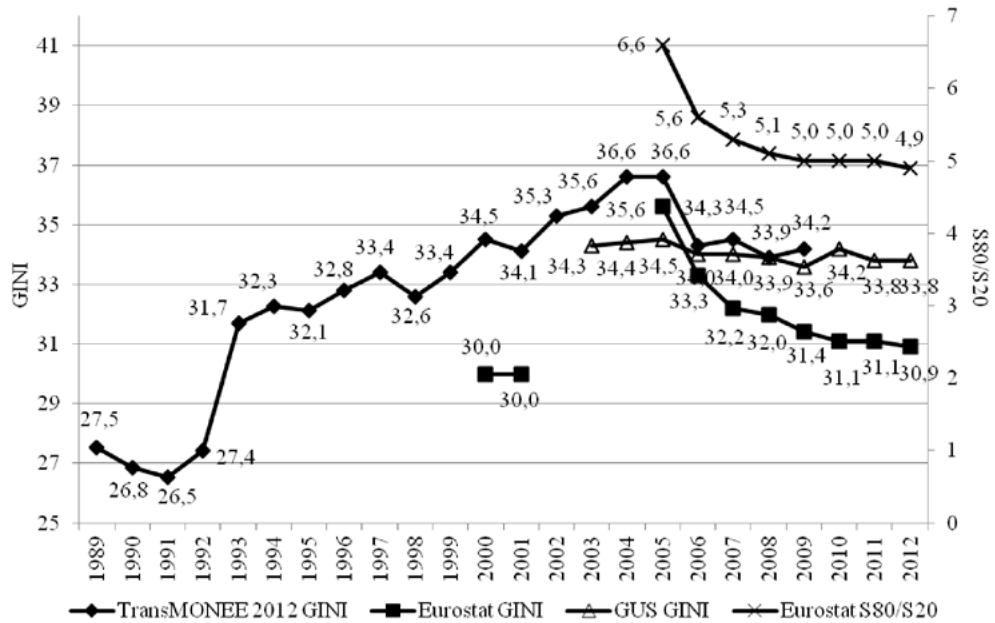
Note: [a] Disposable income in the case of TransMONEE and Eurostat data; available income for GUS data. Per capita income in the case of TransMONEE and GUS data; equivalised income for Eurostat data.

Source: Eurostat; TransMONEE 2012 Database, UNICEF Regional Office for CEE/CIS, Geneva; GUS, 2013, Table 5, p. 267.

Table 15
Households' mean monthly income[a] in Poland by quintile groups, 2006–2012

Measure	2006	2007	2008	2009	2010	2011	2012
Total	802.43	894.53	1,006.57	1,071.67	1,147.18	1,183.66	1,232.85
I quintile	268.07	308.39	343.15	359.95	398.95	389.25	400.45
II quintile	490.16	552.41	631.11	671.72	710.69	739.81	764.16
III quintile	674.65	749.40	853.36	911.55	964.34	1,004.32	1,046.51
IV quintile	915.88	1,004.19	1,140.19	1,224.31	1,293.95	1,342.90	1,402.79
V quintile	1,667.26	1,862.22	2,068.89	2,196.16	2,373.77	2,446.12	2,556.19
V quintile/I quintile	6.22	6.04	6.03	6.10	5.95	6.28	6.38
III quintile/I quintile	2.52	2.43	2.49	2.53	2.42	2.58	2.61
V quintile/III quintile	2.47	2.48	2.42	2.41	2.46	2.44	2.44

Note: [a] Disposable per capita income. Rows 2–6 in zlotys.

Source: Calculated from GUS, (2004–2013), *Budżety Gospodarstw Domowych*.

Income inequality trends were different in individual socioeconomic groups throughout the analyzed period. The largest variability of income inequality was experienced by farmer households, while retirees and pensioners were the groups with the lowest variability of income disparities. The largest fluctuations of income inequality among all socioeconomic groups were observed until 2008. The most significant rise in income disparities occurred for farmer households, while the greatest decrease was experienced by self-employed households during the analyzed period. Rural income inequality was higher than urban income inequality for most of the time between 2006 and 2012.

Table 16
Income inequality[a] in individual socioeconomic groups in Poland, 2003–2012

Households	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Employees	36.4	37.1	37.1	35.8	35.2	34.0	34.3	34.7	34.6	34.3
Farmers	47.3	49.1	49.7	49.6	54.8	57.2	53.6	53.3	53.9	55.9
Self-employed	40.8	40.3	39.7	41.5	41.3	38.7	37.8	37.5	37.3	38.2
Retirees	25.2	24.3	24.1	24.5	23.6	24.2	24.1	24.9	24.4	24.2
Pensioners	28.2	29.0	28.1	28.3	28.9	29.4	28.7	29.1	29.2	27.9
Urban	33.0	33.1	33.3	32.9	32.5	31.5	31.2	32.3	31.7	31.7
Rural	32.6	33.0	33.6	33.1	34.1	34.3	33.8	33.9	33.7	34.3

Note: [a] Available per capita income. Income inequality is measured by the Gini index.

Source: GUS, 2013, Table 5, p. 267.

Income inequality can be considered *within* socioeconomic groups (as above), but it can also be considered *between* individual groups or in comparison to the mean total income. Figure 7 shows the relations of individual groups' mean income to the mean total income. Farmers were the group with the largest variability of income in comparison to the mean total income throughout the analyzed period. In addition, farmers experienced a continuous and significant improvement in their income position between 2003 and 2007. A similar trend can be observed in the case of the self-employed, although their relative income position worsened in subsequent years, falling below the 2003 level in 2009. The income position of retirees and pensioners worsened somewhat between 2003 and 2012, although it was relatively stable for the two groups analyzed jointly. As the data in Figure 7 were not adjusted by any equivalence scale, it is possible that adjusted data could yield different conclusions.

Figure 7

Relation[a] of socioeconomic groups' mean income to mean total income in Poland, 2003–2012 – main trends
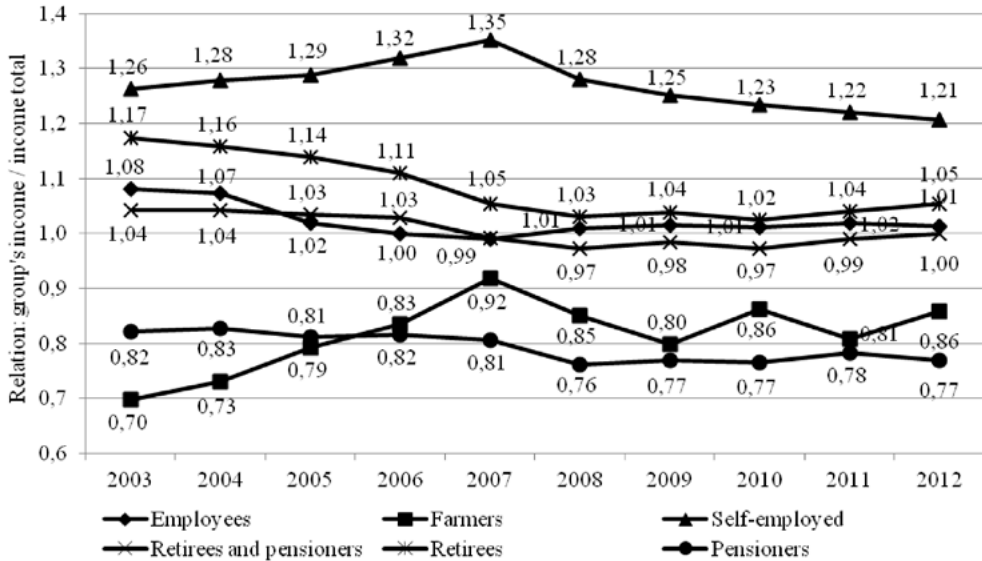
Note: [a] Relation of individual socioeconomic groups' mean monthly disposable per capita income to the mean monthly disposable per capita income in Poland.

Source: Calculated from GUS, (2004–2013), *Budżety Gospodarstw Domowych*.

In the case of poverty analysis, Poland's Central Statistical Office uses three key poverty measures. The first one is the relative poverty rate or rather the relative at-risk-of-poverty rate, which is defined as the share of households living below the poverty line determined by 50% of the mean monthly household expenditures. The two other poverty measures are the subsistence-level poverty rate and the poverty rate based on the statutory poverty line. The subsistence poverty rate is the share of households living below the extreme poverty line calculated by the Institute of Labor and Social Studies. The poverty rate based on the statutory poverty line is the share of households living below "the amount [of monthly income] that entitles one to social benefits" (GUS, 2013, p. 14). In the case of the subsistence-level and the at-risk-of-poverty rates, expenditures are adjusted by the so-called original equivalence scale. Figure 8 shows the trends of all the aforementioned poverty measures in Poland between 2003 and 2012 and the Eurostat main at-risk-of-poverty rate (relative poverty measure) for comparison. The Eurostat at-risk-of-poverty rate is defined as the percentage of people with an income below the poverty line, set at 60% of the median equivalised disposable income. Figure 8 shows that all the analyzed poverty measures decreased after 2004. This trend stopped in 2008 and some measures even began to increase. The poverty rate based on the statutory poverty line decreased significantly

in the analyzed period, which was mainly caused by the fact that the nominal statutory threshold was not adjusted between Oct. 1, 2006 and Oct. 1, 2012.

Figure 8
Poverty in Poland at different poverty thresholds, 2003–2012
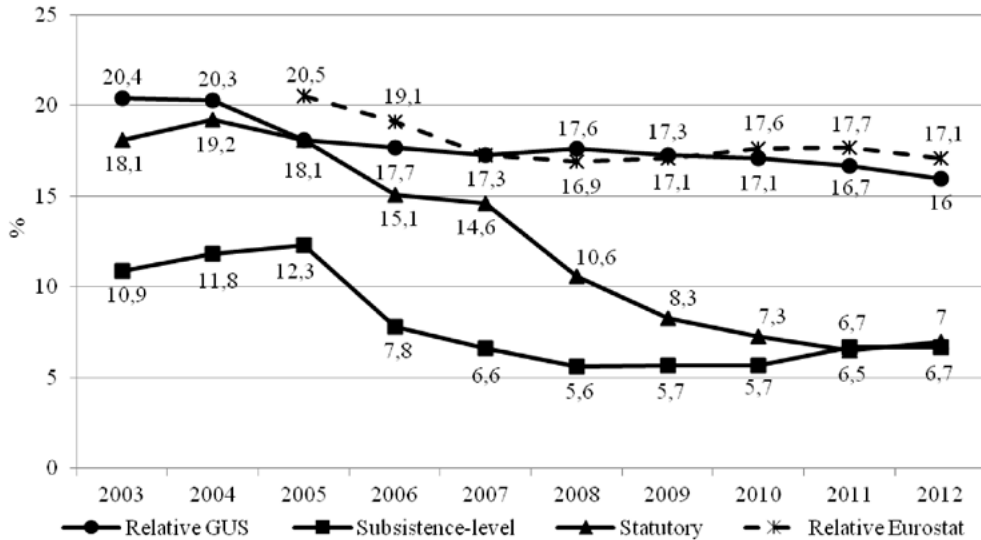
Source: Eurostat; GUS, (2007–2013a), *Budżety Gospodarstw Domowych*; GUS, (2013b).

Income inequality and poverty in Poland compared with other EU countries

Income inequality has been relatively stable in most EU countries since 2003. The lowest variability of income disparities in the analyzed period was reported in Finland, Austria, the Czech Republic, and Slovenia. These countries also recorded the lowest income inequality levels (Figure 9), while Latvia, Spain, and Portugal were the countries with the highest income inequality in 2012. Portugal saw a large relative and absolute decrease in income inequality between 2005 and 2012. Other countries with large income inequality changes in this period were Bulgaria (an increase of more than 25%, by 8.6 p.p.), Denmark (increase), France (increase), Estonia (increase), Lithuania (decrease), and Poland (decrease)—Figure 10. Contrary to popular belief, Poland is not among the EU countries with the greatest income disparities. Income inequality in Poland was close to the EU average in 2012.

Figure 9

Income[a] inequality (Gini index) in 2003, 2005, 2008 and 2012[b]; Poland compared with other EU countries
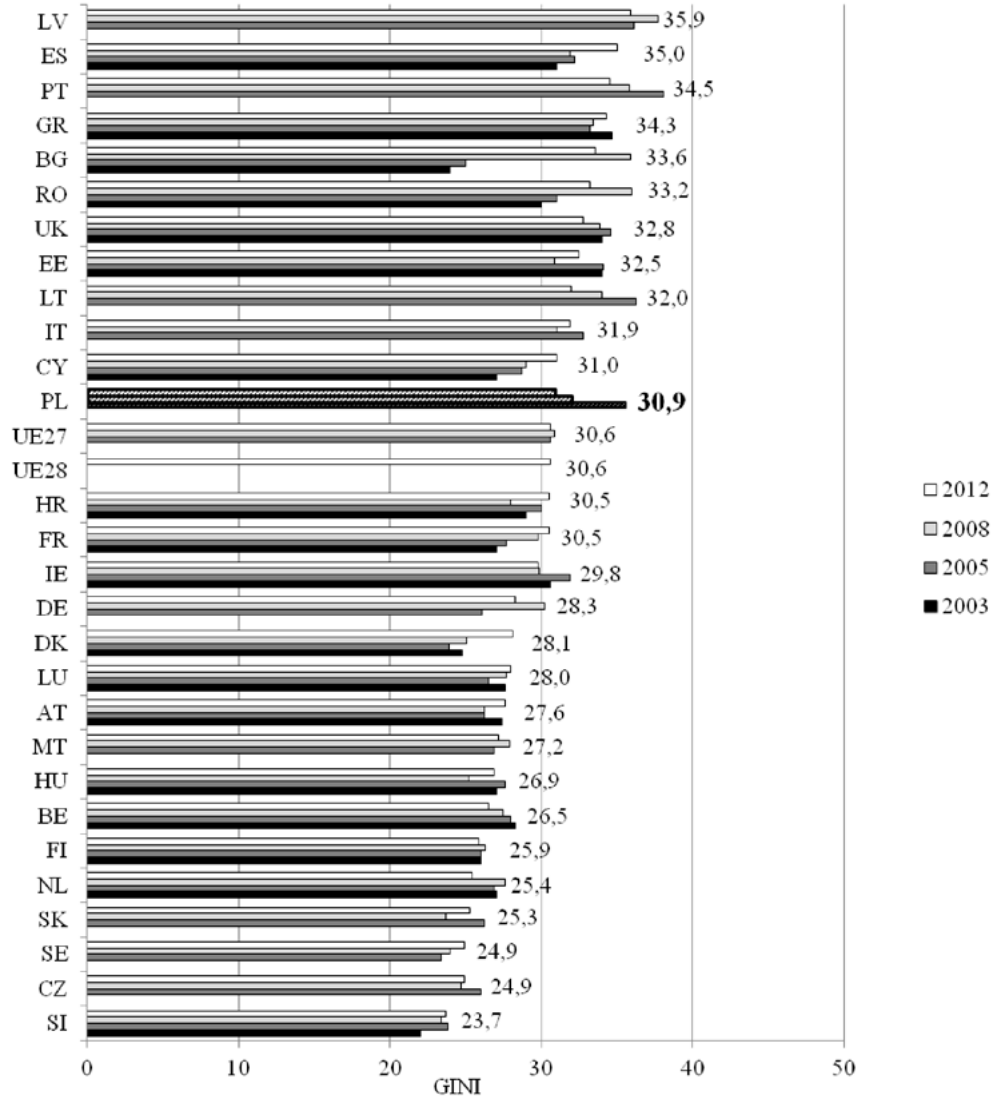
Note: [a] Equivalised disposable income. [b] The data labels refer to 2012 with the exception of Ireland (2011).

Source: Eurostat.

Figure 10

EU countries with the most significant change[a] in income inequality between 2005 and 2012[b]
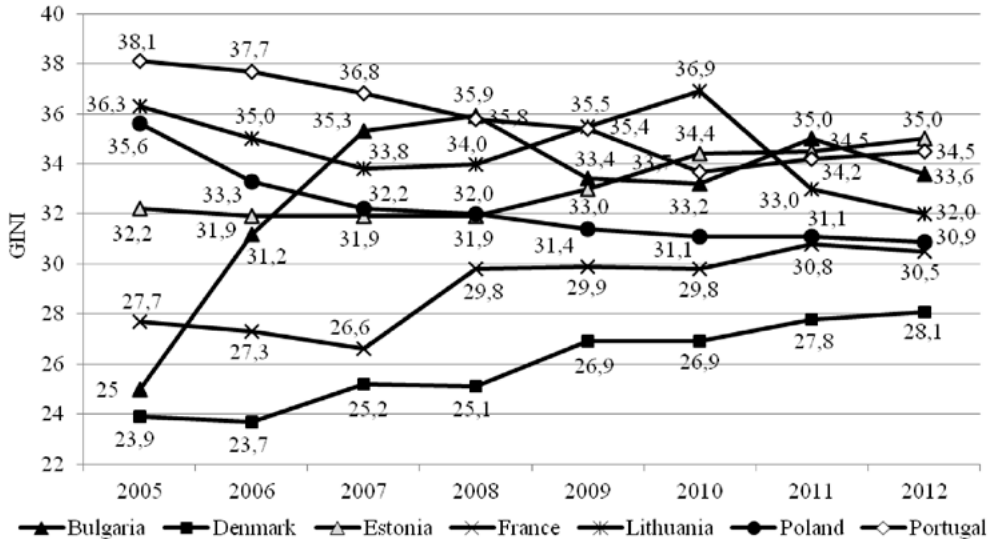
Note: [a] Absolute change by at least 2.8 p.p. [b] A comparison with 2003 was not possible because of problems with data availability.

Source: Eurostat.

Some countries also experienced large changes in the at-risk-of-poverty rate[29] between 2005 and 2012. A significant increase in the relative and absolute at-risk-of-poverty was observed in Bulgaria, Sweden, Romania, Germany, and Greece, whereas Ireland and Poland were countries with the largest decrease in at-risk-of-poverty. The greatest variability of this poverty measure occurred in Bulgaria and Latvia, while somewhat lower variability—though much larger than in other EU countries—could be observed in Germany, Ireland, Croatia, Sweden, and Estonia. A clear pattern can be seen in the case of countries with the highest at-risk-of-poverty rate. These are either post-socialist or Mediterranean countries. Among the countries with the lowest at-risk-of-poverty rates were Nordic and several post-socialist countries as well as the Netherlands. The at-risk-of-poverty rate in Poland was close to the EU average.

Important conclusions can be drawn from the comparative analysis of two variables, the at-risk-of-poverty rate and the poverty threshold expressed in PPS (€), in 2005 and 2012 (Figure 12). Large at-risk-of-poverty combined with a low absolute poverty threshold indicate severe poverty, a real problem. Among the countries with this characteristic in 2005 were Lithuania, Latvia, Poland, Romania, and Portugal,

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[29] The definition of this poverty measure is given in the previous part of this survey.

Figure 11

At-risk-of-poverty rates in 2003, 2005, 2008 and 2012[a]; Poland compared with other EU countries
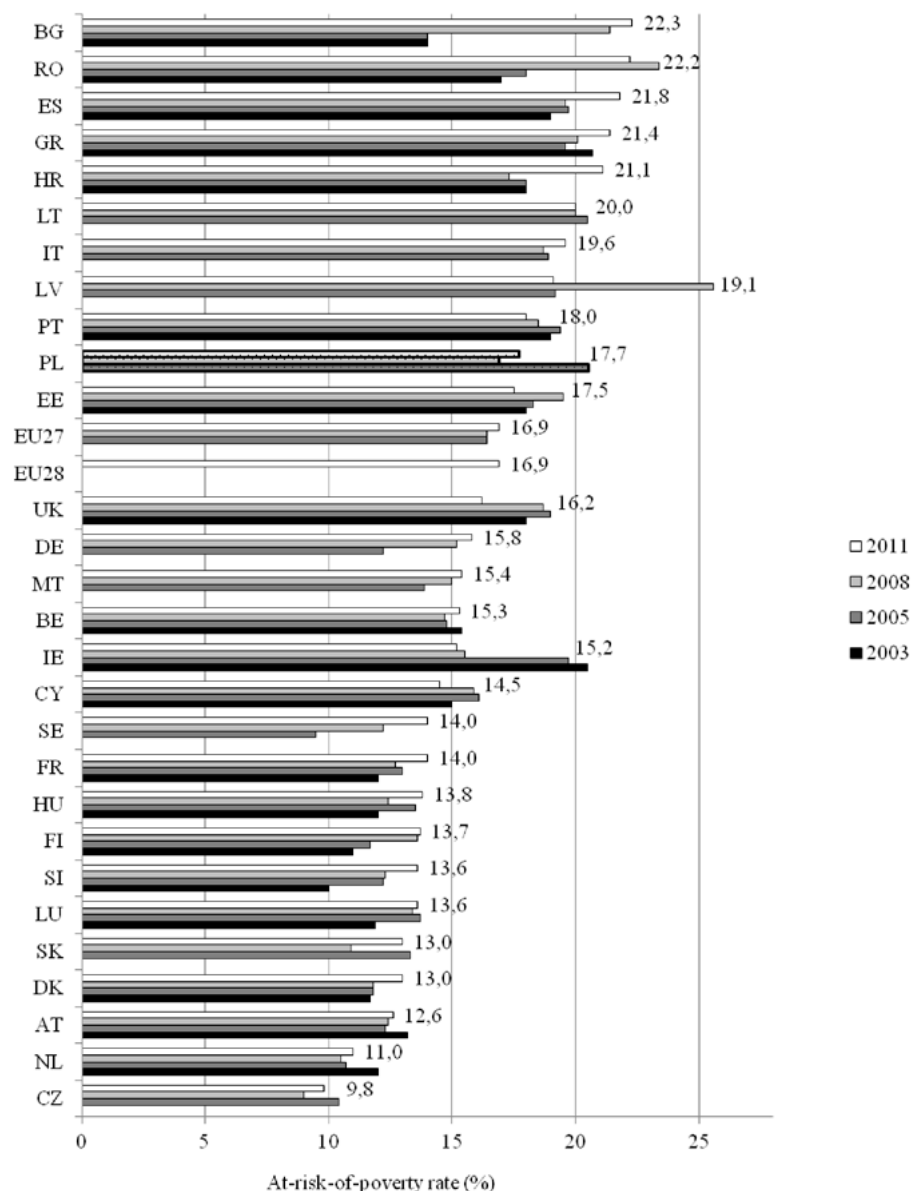
Note: [a] Data for Romania in 2005 refer to 2004. The data labels refer to 2012 with the exception of Ireland (2011).

Source: Eurostat.

and in 2012 the same was true of Romania, Bulgaria, Croatia, and Greece. Poland's relative situation improved on both these counts. By contrast, a significant deterioration was observed in Bulgaria and Romania. On the other hand, Nordic countries, the Netherlands, Germany, and Austria recorded low at-risk-of-poverty rates combined with a high absolute poverty threshold in 2005 (Luxembourg was excluded from the comparison because of its exceptionally high absolute poverty threshold). Germany left this group of countries with favorable indicators in 2012.

Figure 12

At-risk-of-poverty rates and poverty thresholds in 2005 (upper graph) and 2012 (lower graph)[a]; Poland compared with other EU countries
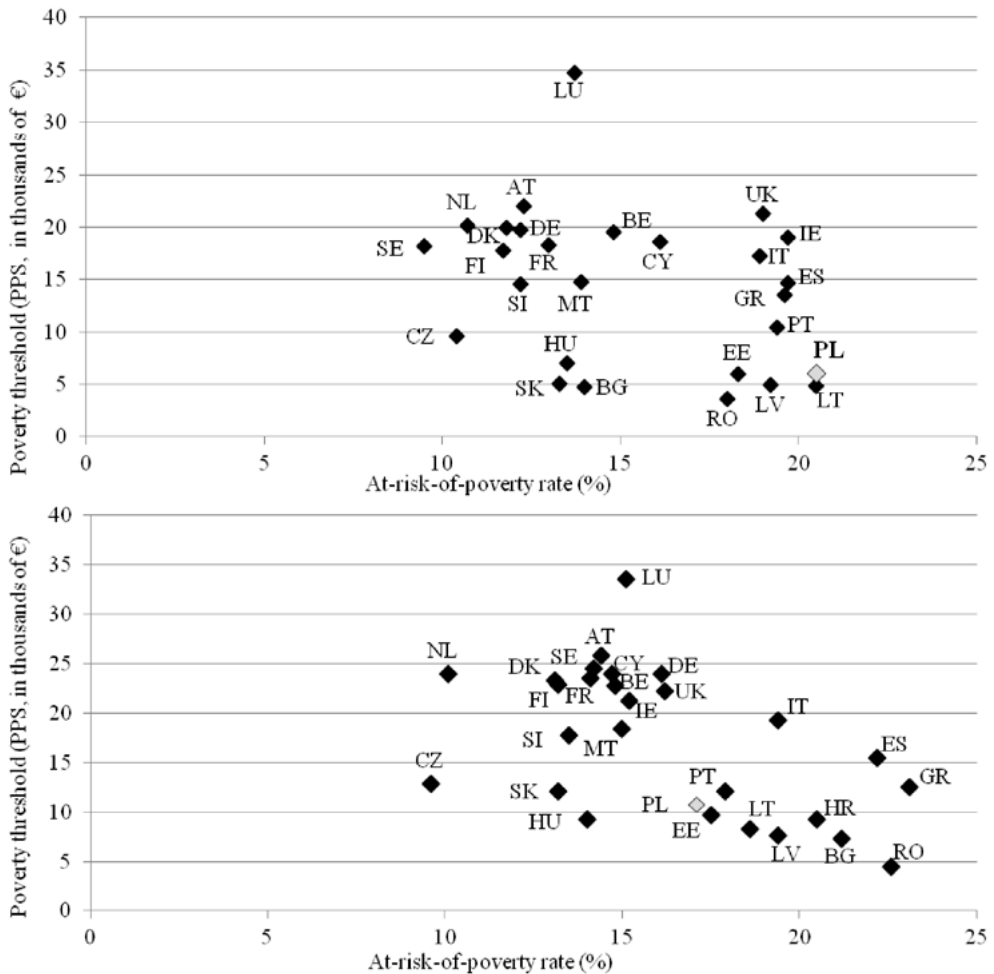
Note: [a] Data for Romania in 2005 refer to 2004 (at-risk-of-poverty rate) and 2007 (poverty threshold). Data (2005) for Croatia was not available. A comparison with 2003 was not possible because of problems with data availability.

Source: Eurostat.

Figure 13

Relative at-risk-of-poverty gap in 2005 (upper graph) and 2012 (lower graph)ᵃ; Poland compared with other EU countries
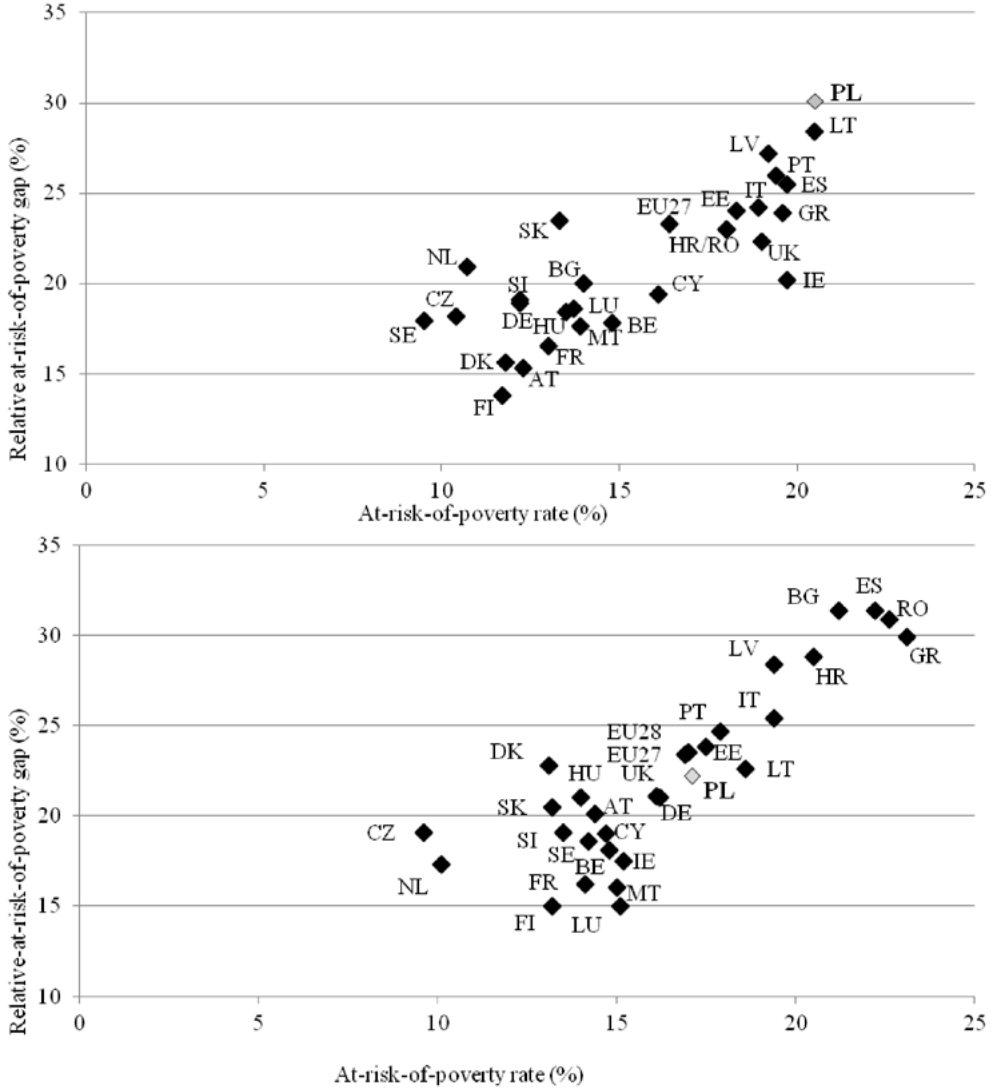
Note: ᵃ Data for Romania in 2005 refer to 2004. Data for Ireland in 2012 refer to 2011.

Source: Eurostat.

Another important variable characterizing poverty—apart from the at-risk-of-poverty rate and the absolute poverty threshold—is the depth of poverty (the relative at-risk-of-poverty gap). The relative at-risk-of-poverty gap shows the difference between the median equivalised 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. Figure 13 has data on the depth of poverty and the at-risk-of-poverty in individual EU countries. The conclusions drawn from the data are similar to those resulting from Figure 12. Poland, Lithuania, Latvia, Portugal, and Spain experienced the deepest poverty in 2005, while the lowest relative at-risk-of-poverty gap was observed in Nordic countries, Austria, France, the Czech Republic, and Germany. Poland's situation improved significantly in 2012 compared with 2005, whereas Bulgaria and Romania deteriorated considerably. The Netherlands joined the group of countries with the lowest relative at-risk-of-poverty rates, while Germany, Austria, and Sweden left this group of countries.

Three measures adopted in a long-term EU socioeconomic program known as Europe 2020 make it possible to monitor poverty and social exclusion—the at-risk-of-poverty rate (analyzed previously), the severe material deprivation rate, and the proportion of people living in households with very low work intensity. The severe material deprivation rate defined by Eurostat shows the percentage of people who are unable to pay for at least four of the following items: 1) to pay the rent, mortgage or utility bills, 2) to keep the home adequately warm, 3) to face unexpected expenses, 4) to eat meat or protein regularly, 5) to go on holiday, 6) to buy a television set, 7) to buy a washing machine, 8) to own a car, 9) to have a telephone. Households with very low work intensity are "people of all ages (from 0–59 years) living in households where the members of working age worked less than 20% of their total potential during the previous 12 months" (Eurostat).

Although the Europe 2020 program was approved in 2010, replacing the Lisbon Strategy launched in 2000, Figure 14 shows all three measures for monitoring poverty and social exclusion adopted in the new program in 2005 and 2012 for comparative purposes. The countries listed in the upper and lower graphs are ranked according to the sum of the three indicators, although it has to be emphasized that the dimensions represented by the three measures overlap.

A clear picture emerges from an analysis of the data. There were no post-socialist countries among those with the lowest sums of the three indices in 2005, while all the countries with the largest sums were post-socialist countries. The situation changed had changed by 2012, mainly due to Poland and the Czech Republic, which both significantly improved their positions. By contrast, most of the Mediterranean countries declined in the rankings in the analyzed period.

Figure 14

Three main indicators under the Europe 2020 strategy for promoting social inclusion in 2005 (upper graph) and 2012 (lower graph)[a]; Poland compared with other EU countries
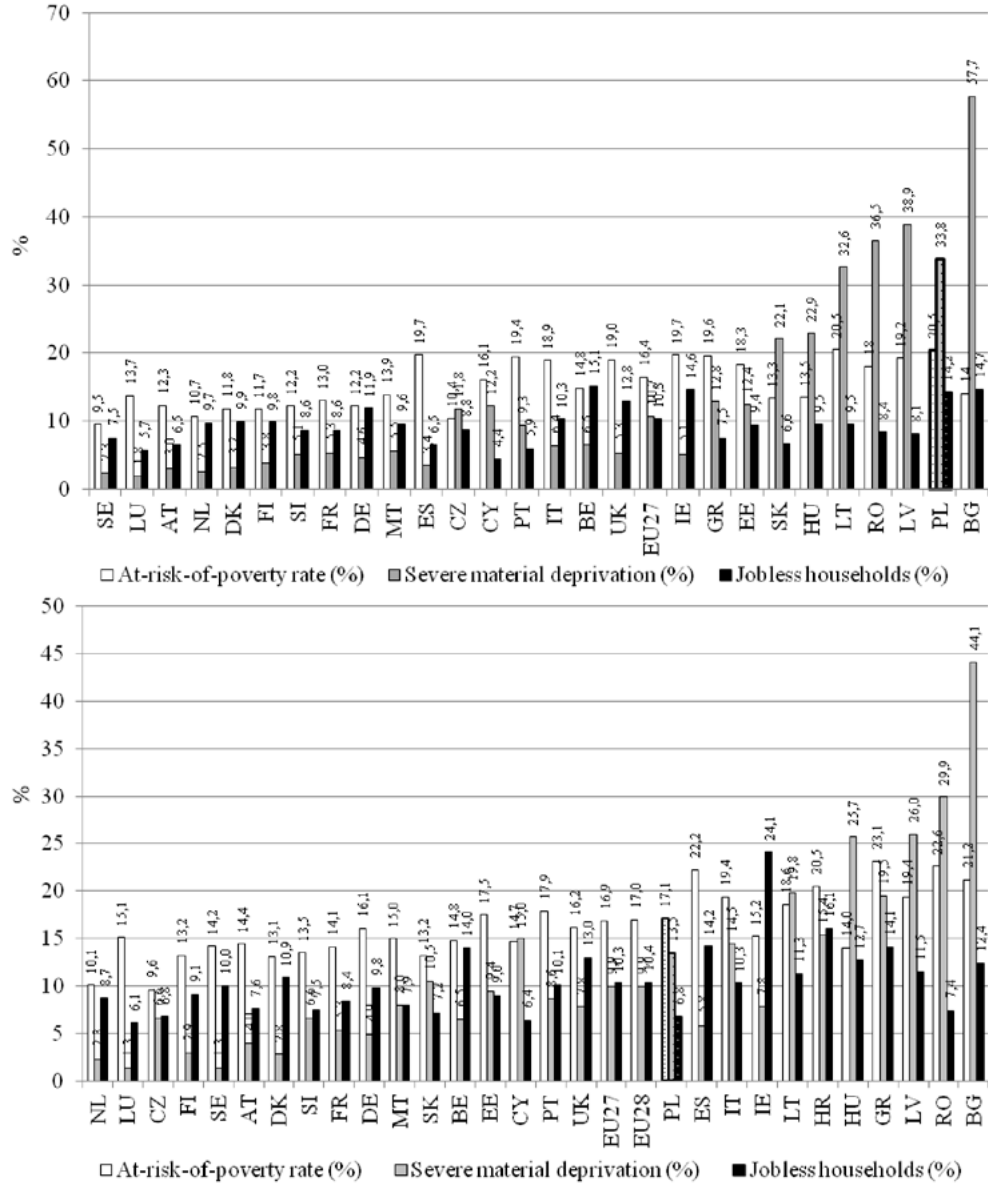
Note [a] Data for Romania in 2005 refer to 2004, 2007 and 2006 for the at-risk-of-poverty rate, severe material deprivation and jobless households respectively. Data for Bulgaria in 2005 refer to 2006 for severe material deprivation and jobless households. Data for Ireland in 2012 refer to 2011. Data for Croatia was not available.

Source: Eurostat.

The impact of EU membership on income inequality in Poland

EU membership can be considered from the moment of accession, but it is also possible to take into account the period of anticipated membership preceding actual EU entry. Recent studies have shown that the period of anticipated membership may have had a considerable impact on some areas of the economy and, in consequence, on income inequality. The analysis in this part of the study will therefore go beyond the first 10 years of Poland's EU membership. Part of the analysis will start as early as 1997, when Poland began its EU accession negotiations.

Income inequality in Poland increased for most of the 1990s. Many comments critical of European integration were made at the beginning of Poland's political and economic transition in the early 1990s. Critics argued that EU membership would lead to an increase in income disparities. However, available data on income inequality show that income disparities decreased after Poland's EU entry (Figure 6). Eurostat data point to a significant drop in income inequality, marking a change from the early 1990s when inequality sharply rose. As Poland's EU entry coincided with a decrease in income disparities, it would be interesting to know if there was a causal relationship between the two.

Studies show that EU accession has had a significant impact on many areas of the Polish economy (see e.g. Orłowski, 2003; Balcerowicz, 2007; UKIE, 2009; Breuss, 2001; Pelkmans, 2002; Lejour, Mooij, Nahuis, 2001). One of the approaches to analyze the impact of Poland's EU entry on income inequality is to investigate changes in inequality related to economic processes most influenced by accession. These include intensified international trade, increased foreign direct investment, migration of workers to other EU countries that opened their labor markets to employees from new member states (2004), and the inflow of European funds. A precise analysis of the changes in income disparities in the listed areas is a very complex research issue. However, it is possible to offer a general analysis of the changes in income inequality resulting from Poland's EU membership, with a special focus on some aspects of these changes.

Below we present the main theoretical aspects of the aforementioned income inequality determinants – the increase in international trade and foreign direct investment, labor force migration, and the inflow of European funds.

Many studies on income inequality determinants focus on trade liberalization and capital flows, especially foreign direct investment (FDI). Both factors have been extensively investigated, separately or jointly, as part of studies dealing with "globalization." Studies on trade liberalization and capital flows refer mainly to two theorems, the Heckscher-Ohlin Theorem (H-O) and the Stolper-Samuelson Theorem (S-S). As can be derived from both theorems, an increase in the trade volume (openness of the economy) leads to a decrease in income inequality in developing or relatively poor countries (labor- or unskilled-labor-abundant countries), while income inequality in developed or relatively richer countries (capital- or skilled-labor-abundant countries) tends to increase. Most empirical research does not confirm these relationships. Many of the contemporary theoretical studies go beyond the H-O and S-S theorems and

try to explain changes in income inequality resulting from trade liberalization. These studies overrule the assumptions of traditional trade models and seek to find specific economic and institutional circumstances that would explain the inconsistency of empirical studies with the H-O and S-S theorems. The inconsistency of FDI's impact on income inequality with the traditional theory results mainly from the assumption of capital immobility between countries. Most studies to date have shown that FDI leads to an increase in earning and income disparities. Some authors have presented evidence to support a nonlinear relationship between these variables.

As mentioned earlier, there are many theoretical studies dedicated to the influence of trade liberalization and capital flows on income inequality. The most important ones that cite a relationship between those variables inconsistent with the traditional models concern unequal access to technology, transfer of technology and know-how between countries (Anderson, 2005; Wood, 2000), production factor mobility between countries and outsourcing[30] (Feenstra, Hanson, 1996), the local and global abundance of factors of production (Davis, 1996), the introduction of additional factors of production and the disaggregation of factors of production (Anderson, 2005; Milanovic, 2005), and the introduction of additional assumptions with regard to the relationship between factors of production (Meschi, Vivarelli, 2009; Goldberg, Pavcnik, 2007). The most important studies concerning the impact of FDI on income disparities emphasize the role of the transfer of new technologies (Figini, Görg, 1999; Te Velde, Morrisey, 2002), the migration of product-cycle goods (Zhu, 2005), and the payment of a wage premium over local firms by foreign companies (Jensen, Rosas, 2007; Lipsey, Sjöholm, 2001; Aitken, Harrison, Lipsey, 1996).

Far fewer studies on the influence of migration on income inequality have been published compared with the literature on the role of trade liberalization and FDI in shaping income distribution. Studies concerning migration and income inequality refer mainly to the problem of the impact of remittances on income disparities in the home country of migrants or to the influence of the inflow of migrants on income inequality in the destination country (mainly the United States). Conclusions resulting from these studies vary, which indicates that the impact of migration on income inequality is almost completely dependent on the individual characteristics of a given country or its population and the specific features of the migration process. It is therefore especially difficult, if not impossible, to determine some general relationships in this area. The most important studies focusing on migration as one of the determinants of income inequality are articles by the following authors: Stark, Taylor and Yitzhaki (1986)—the role of migration networks in determining income inequality and the application of the Gini index decomposition to calculate the effect of remittances on income inequality; Taylor (1992)—the direct, indirect and intertemporal effects of remittances on income inequality; numerous empirical studies—Stark, Taylor, Yitzhaki (1988); Taylor, Wyatt

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[30] Many studies on the impact of FDI on income inequality refer to this article.

(1996); Mackenzie, Rapoport (2007); Barham, Boucher (1998); Brown, Jimenez (2007); Adams (1989); Oberai, Singh (1980); Rodrigues (1998); and Ahlburg (1996).

Not much research has been published on the impact of European funds on income inequality. Fragmentary analysis can be found in a study by Jimeno, Cantó, Cardoso, Izquierdo and Rodrigues (2000) focusing on the influence of Spain's and Portugal's integration and accession to the European Community on income inequality in these countries.

There are only a few studies on the impact of European integration and accession on income inequality in member countries. The available literature does not yield unambiguous conclusions about the resulting changes in income disparities.

A preliminary analysis of the data on income inequality from the countries that joined the European Communities or the EU show (Figures 9–11) that the inequality trends just before and right after accession were different for each country. The data does not support the hypothesis that income inequality increased in new member countries after accession; on the other hand, a thorough analysis may yield different findings. There are numerous income inequality determinants; a given country could hypothetically experience a decrease in income disparities resulting from factors other than EU entry, although accession itself would appear to have a generally negative impact on income inequality.

The few available studies on the impact of European integration on income inequality show (Fredricksen, 2012) that income disparities began increasing in the European Communities in the 1980s, a trend that resulted from more factors than just the EU's enlargement. Income inequality had also been increasing in the old member states. This rise in inequality was mainly due to an increase in the incomes of the wealthiest 10% of the population in the member countries. Studies show that there were several important causes of the increase in income inequality in EU as well as OECD countries. These include changes in taxation, labor market institutions, globalization, and technological change (Fredricksen, 2012). Yet these factors are only a very general explanation of income inequality trends, since inequality determinants are different for every country.

Beckfield (2006) demonstrated in his sociological study that almost half of the increase in income inequality in EU countries may be attributed to regional integration, and not globalization—in other words, the effect of economic and political regional integration. However, a later study by Beckfield from 2009 indicates that regional integration led to an increase in income disparities within member countries and a decrease in inequality between individual EU countries (real convergence). The net effect was favorable for income inequality, i.e. regional integration caused a reduction in income inequality within the European Union.

An earlier study by Jimeno, Canto, Cardoso, Izquierdo, and Rodrigues (2000) on the impact of European Community membership on income disparities in Spain and Portugal showed that inequality trends in both these countries differed markedly between 1980 and 1995 (Figure 15). The analysis confirms that income inequality depends on individual conditions and country characteristics rather than the accession process alone.

Figure 15

Income inequality[a] in Spain and Portugal – 1980, 1990 and 1995–2012
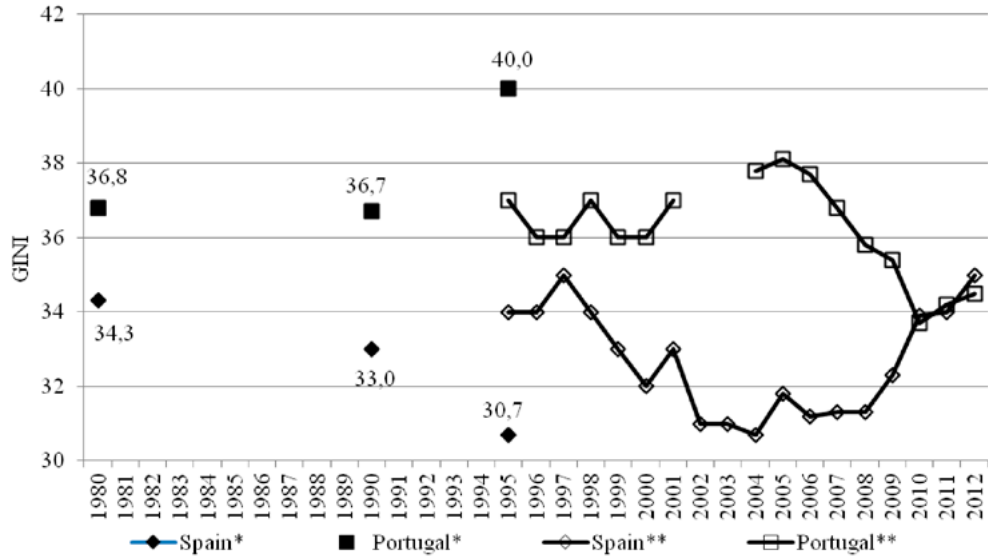
Note: [a] The data labels refer to data from Jimeno, Cantó, Cardoso, Izquierdo, Rodrigues, 2000. Eurostat data are presented for comparison.

Source: Jimeno, Cantó, Cardoso, Izquierdo, Rodrigues, 2000, Table 10, p. 36, (*); Eurostat, (**).

Figure 16

Income inequality in Austria, Sweden and Finland, 1995–2012
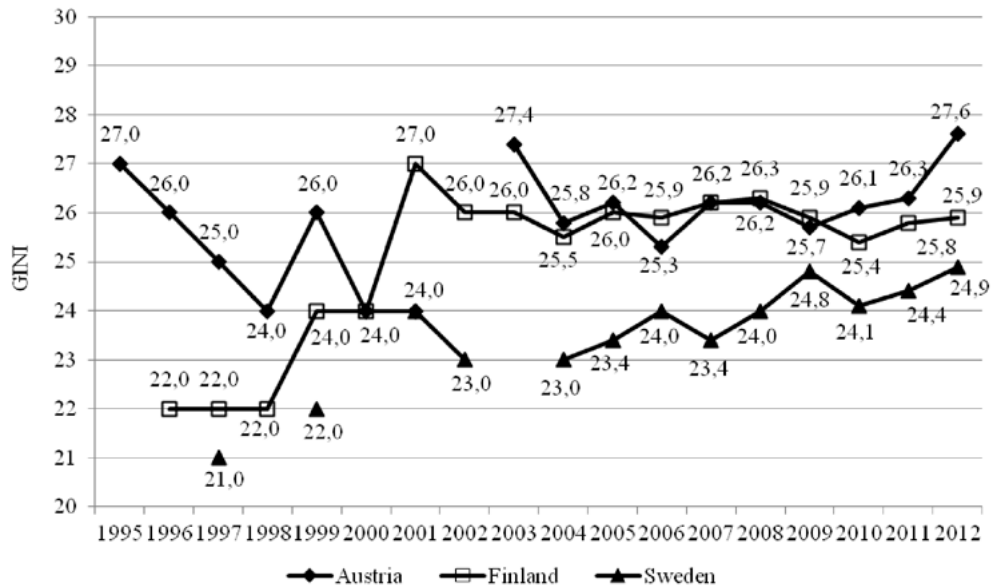
Source: Eurostat.

Figure 17
Income inequality in EU13 countries, 2001–2012
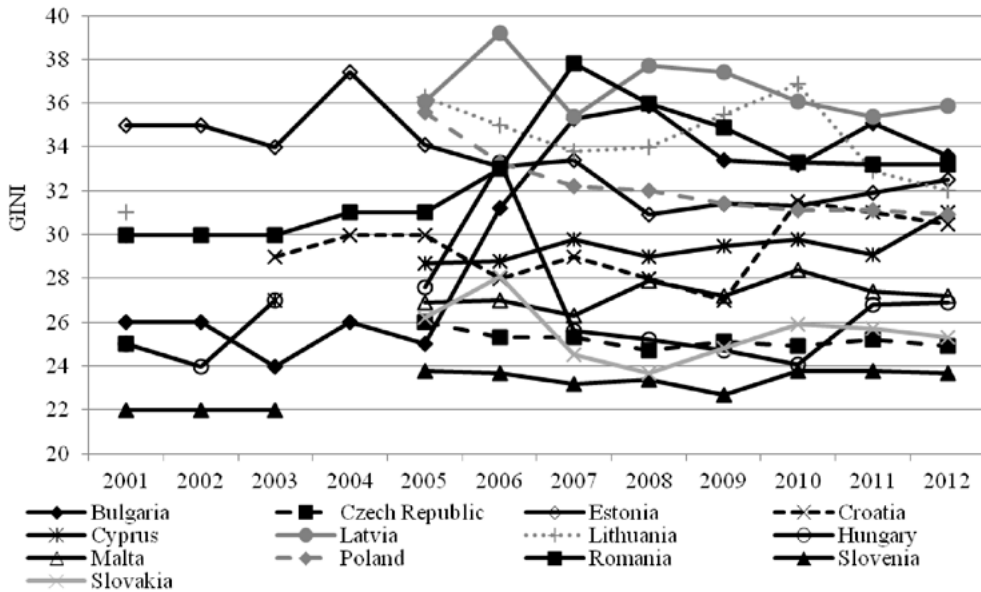
Source: Eurostat.

The studies mentioned at the beginning of this part of the analysis demonstrated that Poland's EU membership has so far mainly influenced four economic spheres (apart from the impact on economic growth): foreign trade, FDI inflow, labor force migration, and the inflow of European funds. Below we attempted to assess the impact of the changes in these spheres on income inequality in Poland. The analysis of the four factors was very general and limited to selected aspects of their influence on inequality.

The four income inequality determinants described above were analyzed in pairs. In order to determine the relationship between foreign trade, FDI and earnings (and income) inequality, we carried out a correlation analysis (4–6) between exports (billions of €), imports (billions of €), FDI (billions of €), and wage inequality (or skill premium, calculated as the relation of mean gross non-production wages and mean gross production wages). All the data were adjusted and the correlation analysis was carried out for current and lagged (1, 2, 3) data on foreign trade and FDI. Because of problems with data availability and data adjustment, the analysis of foreign trade was limited to industry and the analysis of FDI was limited to the following economic activities: industry, construction, trade and repair, transport and real estate, renting and business activities. The gray cells in Tables 17 and 18, which include statistically significant correlation coefficients, indicate a relationship between foreign trade and wage inequality that neither confirms nor invalidates the hypotheses from the

traditional models of foreign trade.[31] In the case of FDI (Table 19), the hypothesis of a positive relationship between the FDI stock and wage inequality seems feasible. It concerns above all those sections of economic activity that experienced the largest FDI inflow throughout the analyzed period. Problems with data availability did not permit consideration of such kinds of economic activity as financial services, which were of great importance to FDI inflow in the analyzed period. The results of this analysis should therefore be treated with caution: a correlation analysis does not make it possible to determine a causal relationship between the analyzed variables.

Figure 18 shows the relationship between wage inequality (defined in the same way as in the correlation analysis), the relation of the available income of non-production worker households to the available income of production worker households and income inequality for all worker households. The variables show similar general trends. The relations for wages (NPROD wages/PROD wages) and incomes (NPROD income/ PROD income) increased until Poland's EU entry, except in 1998. Then they began to decrease slightly, more significantly in the case of incomes. Similar changes occurred in the case of the Gini coefficient for employee household incomes.

Figure 19 shows income inequality for employee households as well as separately for households formed by non-production employees and households formed by production employees. It also shows total income inequality in Poland. The main finding is that income disparities for production employee households were much lower than total income inequality, whereas income disparities for non-production employee households were about the same as total income inequality although lower than for all employee households.

Two other determinants which can be analyzed jointly with the applied method of analysis are labor force migration after Poland's EU entry and the inflow of European funds. The analysis of both these factors is a very complex research problem. This study is limited to analyzing the impact of remittances, direct payments and structural pensions on income inequality in Poland.

All the calculations are based on individual data from household budget surveys (HBS) conducted by Poland's Central Statistical Office. The analysis of remittances was possible only from 2008, since information on foreign income sources was not added to the HBS until 2008. The analysis of European funds was carried out for the 2005–2010 period, although information on direct payments was also available for 2004. We decided to skip that year for the following reasons: 1) it is not consistent with European statistics, 2) the impact of this category of funds on income inequality was close to zero. Information on structural pensions was available from 2007.

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[31] Assuming that Poland is an unskilled-labor-abundant country.

Table 17

Pearson's correlation coefficients[a] between exports and the ratio of non-production and production wages and between imports and the ratio of non-production and production wages, 1997–2008

Type of economic activity[b]	Exports				Imports			
	Current	Lag 1	Lag 2	Lag 3	Current	Lag 1	Lag 2	Lag 3
Sektor przemysłowy	0.79*	0.72*	0.64*	0.52	0.76*	0.72*	0.67*	0.57
A	–0.25	–0.51	0.20	0.04	–0.45	–0.52	–0.38	–0.07
AA	–0.18	–0.41	–0.30	–0.47	–0.65*	–0.65*	–0.56	–0.61
B	0.69*	0.59	0.44	0.21	0.66*	0.58	0.48	0.27
BA	0.75*	0.64*	0.50	0.29	0.66*	0.61*	0.53	0.36
BB	0.68*	0.59	0.53	0.57	0.67*	0.53	0.38	0.22
BC	0.87*	0.79*	0.75*	0.60	0.92*	0.80*	0.81*	0.68*
BD	–0.24	0.16	0.28	0.36	0.18	0.15	–0.04	–0.25
BE	0.88*	0.90*	0.88*	0.68*	0.84*	0.81*	0.82*	0.70*
BF	0.73*	0.52	0.29	0.03	0.50	0.33	0.15	0.02
BG	0.65*	0.43	0.13	–0.45	0.64*	0.49	0.17	–0.53
BH	0.31	0.09	–0.28	–0.56	0.24	0.11	–0.21	–0.52
BI	0.49	0.50	0.61	0.83*	0.58*	0.62*	0.66*	0.77*
BJ	0.69*	0.61*	0.52	0.34	0.79*	0.75*	0.69*	0.56
BK	0.75*	0.66*	0.58	0.46	0.77*	0.70*	0.65*	0.54
BL	0.84*	0.75*	0.68*	0.59	0.67*	0.65*	0.81*	0.82*
BM	0.93*	0.95*	0.95*	0.91*	0.95*	0.98*	0.99*	0.96*
BN	0.64*	0.52	0.36	0.13	0.65*	0.54	0.42	0.20
BO	0.82*	0.74*	0.68*	0.59	0.79*	0.74*	0.71*	0.57
BP	0.03	–0.12	–0.61	–0.48	0.30	0.02	–0.81*	–0.69*
BR	0.82*	0.70*	0.64*	0.54	0.76*	0.67*	0.62	0.46
BS	0.34	0.25	0.06	0.00	0.41	0.37	0.07	–0.09
BT	0.49	0.41	0.40	0.53	0.63*	0.44	0.43	0.54
BU	0.74*	0.62*	0.47	0.26	0.63*	0.57	0.52	0.31
BV	0.91*	0.87*	0.64*	0.42	0.85*	0.77	0.58	0.26
C	0.49	0.43	0.60	0.76*	0.59*	0.54	0.40	0.22
CA	–0.39	–0.49	–0.18	0.10	–0.07	–0.16	–0.29	–0.46

Note: [a] Significant at p<0,05 in gray cells. [b] A – mining and quarrying; AA – mining of coal and lignite and extraction of peat; B – manufacturing; BA – manufacture of food products and beverages; BB – manufacture of tobacco products; BC – manufacture of textiles; BD – manufacture of wearing apparel and furriery; BE – processing of leather and manufacture of leather products; BF – manufacture of wood and wood, straw and wicker products; BG – manufacture of pulp and paper; BH – publishing, printing and reproduction of recorded media; BI – manufacture of coke, refined petroleum products; BJ – manufacture of chemicals and chemical products; BK – manufacture of rubber and plastic products; BL – manufacture of other non-metallic mineral products; BM – manufacture of base metals; BN – manufacture of metal products (without machinery and equipment); BO – manufacture of machinery and equipment; BP – manufacture of office machinery and computers; BR – manufacture of electrical machinery and apparatus; BS – manufacture of radio, television and communication equipment and apparatus; BT – manufacture of medical, precision and optical instruments, watches and clocks; BU – manufacture of motor vehicles, trailers and semi-trailers; BV – manufacture of other transport equipment; BW – manufacture of furniture, manufacturing n. e. c.; C – electricity, gas and water supply; CA – electricity, gas, steam and hot water supply.

Source: Own calculation based on *Rocznik Statystyczny* (GUS) from various years and OECD data.

Table 18

Pearson's correlation coefficients[a] between exports and the ratio of the number of non-production and production workers and between imports and the ratio of the number of non-production and production workers, 1997–2008

Type of economic activity[b]	Exports				Imports			
	Current	Lag 1	Lag 2	Lag 3	Current	Lag 1	Lag 2	Lag 3
Industry	0.70*	0.67*	0.70*	0.63	0.71*	0.70*	0.74*	0.66
A	0.51	0.58	0.56	0.58	0.89*	0.92*	0.90*	0.82*
AA	0.27	0.40	0.40	0.44	0.51	0.54	0.44	0.35
B	0.19	–0.04	–0.40	–0.44	0.22	0.01	–0.38	–0.43
BA	–0.07	–0.31	–0.64*	–0.52	–0.04	–0.24	–0.64*	–0.56
BB	0.06	–0.15	–0.34	–0.58	0.10	–0.22	–0.53	–0.76*
BC	–0.70*	–0.68*	–0.65*	–0.50	–0.71*	–0.68*	–0.68*	–0.59
BD	–0.70*	–0.73*	–0.69*	–0.45	0.88*	0.83*	0.81*	0.80*
BE	–0.59*	–0.76*	–0.94*	–0.87*	–0.75*	–0.77*	–0.80*	–0.71*
BF	–0.51	–0.27	–0.09	0.13	–0.24	–0.06	0.02	0.12
BG	0.78*	0.74*	0.54	0.30	0.75*	0.76*	0.55	0.28
BH	0.56	0.39	0.17	–0.06	0.48	0.25	0.03	0.03
BI	0.82*	0.79*	0.70*	0.68*	0.75*	0.67*	0.60	0.57
BJ	0.85*	0.83*	0.84*	0.86*	0.93*	0.93*	0.92*	0.92*
BK	–0.43	–0.71*	–0.83*	–0.86*	–0.38	–0.68*	–0.81*	–0.83*
BL	0.76*	0.76*	0.80*	0.73*	0.77*	0.80*	0.80*	0.76*
BM	–0.22	–0.50	–0.75*	–0.72*	–0.14	–0.45	–0.81*	–0.78*
BN	–0.58*	–0.77*	–0.82*	–0.78*	–0.54	–0.75*	–0.81*	–0.74*
BO	–0.79*	–0.88*	–0.88*	–0.85*	–0.76*	–0.84*	–0.90*	–0.82*
BP	–0.54	–0.60	–0.65*	–0.64	–0.41	–0.55	–0.65*	–0.53
BR	–0.73*	–0.58	–0.52	–0.43	–0.64*	–0.54	–0.54	–0.42
BS	–0.86*	–0.86*	–0.87*	–0.94*	–0.81*	–0.82*	–0.83*	–0.84*
BT	0.16	0.31	0.45	0.66	0.53	0.69*	0.52	0.65
BU	–0.90*	–0.83*	–0.78*	–0.69*	–0.84*	–0.79*	–0.77*	–0.67*
BV	–0.85*	–0.89*	–0.90*	–0.82*	–0.80*	–0.92*	–0.84*	–0.69*
C	0.92*	0.98*	0.95*	0.93*	0.76*	0.76*	0.84*	0.85*
CA	0.92*	0.98*	0.95*	0.93*	0.76*	0.75*	0.83*	0.85*

Note: [a] Significant at $p < 0.05$ in gray cells. [b] Notation as in Table 17.

Source: Own calculation based on *Rocznik Statystyczny* (GUS) from various years and OECD data.

Table 19

Pearson's correlation coefficients[a] between the stock of foreign direct investment and the ratio of non-production and production wages and between the stock of foreign direct investment and the ratio of the number of non-production and production workers, 1997–2008

Economic activity[b]	Wage ratio				Employment ratio			
	Current	Lag 1	Lag 2	Lag 3	Current	Lag 1	Lag 2	Lag 3
Total	0.78*	0.70*	0.73*	0.74*	0.81*	0.76*	0.78*	0.79*
A	−0.22	−0.70*	−0.44	0.08	0.77*	0.73*	0.58	0.57
B	0.72*	0.56	0.47	0.30	0.24	0.10	−0.29	−0.38
BA	0.87*	0.75*	0.70*	0.65	0.25	0.06	−0.60	−0.80*
BB	0.48	0.39	0.10	0.07	0.76*	0.82*	0.76*	0.61
BC	0.47	0.19	−0.14	−0.60	0.55	0.41	0.34	0.27
BD	0.36	0.48	0.64*	0.84*	0.88*	0.80*	0.73*	0.79*
BE	0.80*	0.69*	0.70*	0.69*	0.92*	0.95*	0.97*	0.97*
BF	0.78*	0.65*	0.50	0.39	−0.43	−0.66*	−0.72*	−0.78*
BG	0.45	0.26	0.18	0.01	−0.61*	−0.65*	−0.68*	−0.55
BH	0.81	0.71*	0.66*	0.60	−0.76*	−0.86*	−0.85*	−0.83*
BI	0.18	−0.27	−0.42	−0.23	−0.71*	−0.40	0.27	0.33
BJ	0.54	0.37	−0.05	0.09	−0.68*	−0.73*	−0.69*	−0.70*
BK	0.78*	0.56	0.39	0.18	−0.88*	−0.77*	−0.72*	−0.65
BL	0.49	0.43	0.50	0.52	−0.64*	−0.52	−0.52	−0.64
C	0.55	0.55	0.69*	0.70*	0.98*	0.97*	0.97*	0.94*
D	0.45	0.44	0.51	0.46	0.47	0.48	0.62	0.58
E	0.55	0.37	0.18	−0.09	0.90*	0.90*	0.92*	0.93*
FA	0.53	0.58	0.68*	0.78*	−0.35	0.00	0.47	0.08
FB[c]	0.80*	0.24	−0.98*	−1*	0.46	0.85*	0.96*	1*
FC	0.76*	0.64*	0.62	0.64	0.78*	0.60	0.38	0.24
F	0.87*	0.76*	0.73*	0.78*	0.82*	0.76*	0.65*	0.45
G	0.63*	0.55	0.50	0.55	0.18	0.44	0.70*	0.82*
GA	0.86*	0.86*	0.86*	0.86*	0.91*	0.92*	0.95*	0.97*
GB	0.13	−0.15	−0.80*	−0.67*	0.55	0.51	0.41	0.14

Note: [a] Significant at p<0,05 in gray cells. [b] A – mining and quarrying; B – manufacturing; BA – manufacture of food products and beverages; BB – manufacture of tobacco products; BC – manufacture of textiles; BD – manufacture of wearing apparel and furriery; BE – processing of leather and manufacture of leather products; BF – manufacture of wood and wood, straw and wicker products; BG – manufacture of pulp and paper; BH – publishing, printing and reproduction of recorded media; BI – manufacture of coke, refined petroleum products; BJ – manufacture of chemicals and chemical products; BK – manufacture of rubber and plastic products; BL – manufacture of other non-metallic mineral products; C – electricity, gas and water supply; D – construction; E – trade and repair; FA – land and pipeline transport; FB – water transport; FC – post and telecommunications; F – transport, storage and communication; G – real estate, renting and business activities; GA – real estate activities; GB – computer and related activities. [c] The significance of the correlation coefficient for "water transport" is questionable because it is based on five observations.

Source: Own calculation based on *Rocznik Statystyczny* (GUS) from various years and Eurostat data.

Figure 18

**The ratio of non-production and production wages (household income[a]
of non-production and production workers) – left axis – and employee household
income inequality – right axis – in Poland, 1997–2008**
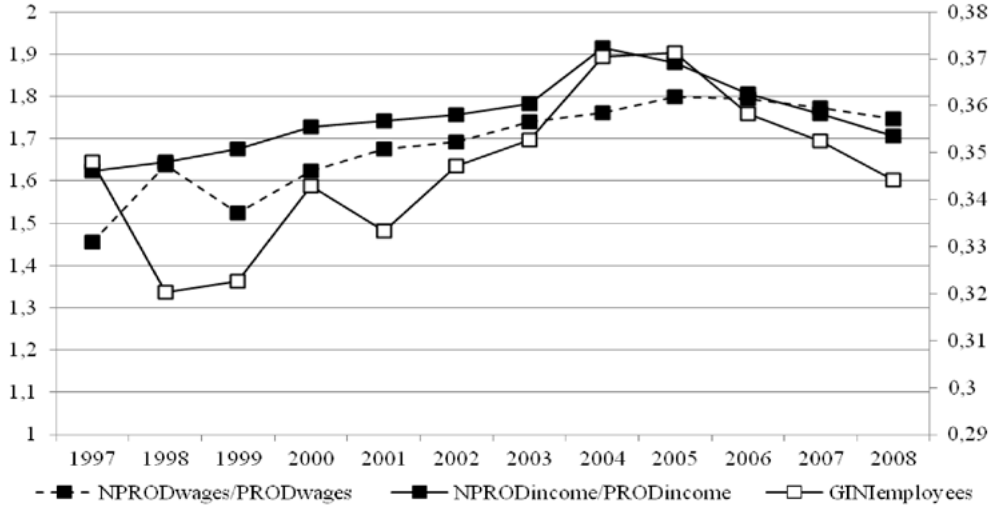
Note: [a] Per capita available income.

Source: Own calculation based on HBS data, *Rocznik Statystyczny* (GUS) from 1998–2009 and information made available by GUS.

Figure 19

**Income[a] inequality in Poland – for employee households in general, for households
formed by non-production employees, and for households formed by production
employees, 1997–2008**
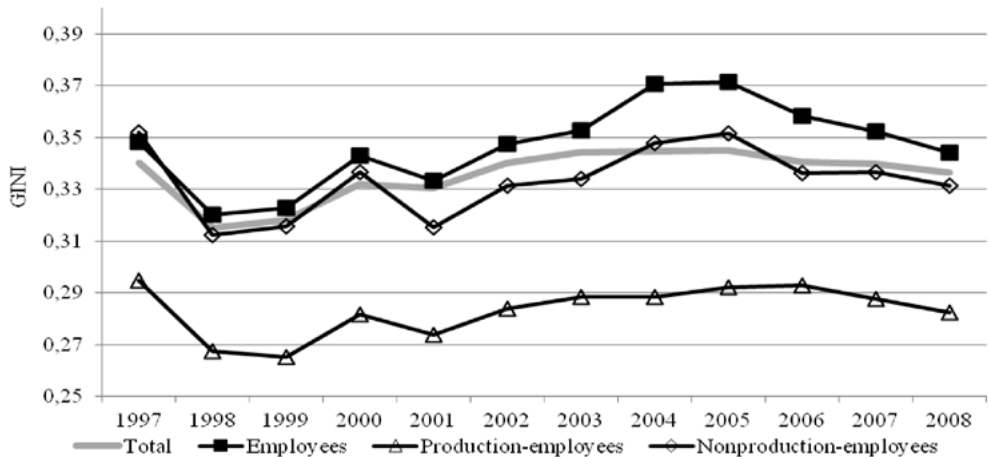
Note: [a] Per capita available income.

Source: Own calculation based on HBS data (GUS).

A detailed analysis of the influence of remittances, direct payments and structural rents on income inequality would require a decomposition of the Gini coefficient using an approach developed by Stark, Yitzhaki and Taylor (1986). However, due to the concise form of this survey, we limited our analysis to discussing the differences between the Gini coefficients for income before and after including remittances, direct payments and structural pensions. A counterfactual analysis that would take into account the change in economic incentives in the presence of remittances influencing income from other sources as well as income inequality was not carried out.

Since it was impossible to identify the remittances strictly related to Poland's EU membership, we selected those income categories that probably resulted from membership and we also took into account total remittances. Thus the analysis shows the impact, on income inequality, of all the remittances and those categories of remittances that were most probably related to Poland's EU membership. The result is a value within a range. The selected income sources most probably related to Poland's EU membership are the following: income from permanent work abroad, income from temporary work abroad, income from permanent self-employment abroad, income from casual self-employment abroad, other foreign social benefits, foreign unemployment benefits, other gifts from private persons from abroad, other income from abroad. The rest of remittances include income from property and land rental (not related to economic activity) from abroad, foreign pensions, foreign allowances, and alimony payments from private persons from abroad. Table 20 shows that remittances led to a decrease in income inequality in the analyzed period.

Table 20
Income[a] inequality (Gini coefficient) in Poland – total income and non-remittance income, 2008–2010

Category of income	2008	2009	2010
Total income	31.644	31.394	32.075
Total income w/o remittances most probably related with Poland's EU entry	32.279	31.911	32.666
Total income w/o remittances total	32.338	31.969	32.7

Note: [a] Equivalised disposable income (modified OECD equivalence scale).

Source: Own calculation based on HBS data (GUS).

The assessment of the impact of direct payments and structural pensions on income inequality is simpler than the analysis of remittances of Polish migrants, since there is no doubt that both direct payments and structural pensions result from Poland's membership in the European Union. It was possible to select two sources of income coming directly from funds transferred from the EU to Poland—direct payments and structural pensions. Table 21 shows that both categories of income taken jointly caused income inequality to decrease between 2007 and 2010. A more detailed analysis

indicates that structural pensions contributed to a reduction in income inequality in Poland, while direct payments had the opposite effect.

Table 21

Income[a] inequality (Gini coefficient) in Poland – total income and income w/o direct payments and structural pensions, 2005–2010

Category of income	2005	2006	2007	2008	2009	2010
Total income	31.45741	31.17071	31.79873	31.64391	31.39366	32.07494
Total income w/o direct payments	31.41444	31.11897	31.75904	31.61631	31.39255	31.93207
Total income w/o structural pensions	.	.	31.91393	31.76783	31.52512	32.22387
Total income w/o direct payments and structural pensions	.	.	31.8766	31.74287	31.5265	32.08364

Note: [a] Equivalised disposable income (modified OECD equivalence scale).

Source: Own calculation based on HBS data (GUS).

To conclude, both income inequality and poverty have clearly shown positive changes since Poland joined the EU in 2004. Even though the exact extent of these changes largely depends on the applied measures of income inequality and poverty, Poland improved its position in both relative and absolute terms compared with other EU countries.

A preliminary and general analysis of the impact of Poland's EU membership on income inequality within the country does not provide enough evidence to determine if accession has contributed to a decrease in income disparities in Poland. Our fragmentary analysis of the four considered factors—intensified foreign trade, FDI inflow, remittances and the inflow of European funds—makes it possible to conclude that remittances and structural pensions had a moderating effect on income inequality, while direct payments for farmers, and probably also FDI, contributed to an increase in income disparities in Poland.

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Chapter 2
Poland's Competitive Position in External Economic Relations

Poland's membership in the European Union—combined with agreements[1] that preceded the country's EU entry—has significantly changed the volume, geographical structure and commodity patterns of Poland's foreign trade. Upon joining the bloc in 2004, Poland gained free access to the EU market and began adapting to EU norms and standards. Preparations for accession and the subsequent EU entry itself also contributed to an inflow of foreign investment to Poland. As a result, the economy received a further modernization boost—added to the incentives after the fall of communism and the political and economic reforms of the early 1990s—and there was a further increase in the international competitiveness of Poland's products. All these issues are analyzed in this chapter.

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[1] In December 1991, Poland signed an association agreement with the European Economic Community, known as the Europe Agreement. The part of that agreement regulating trade—referred to as the Interim Agreement—took effect in March 1992. Under that Interim Agreement, Poland and EEC countries undertook to create a free trade area for manufactured goods within 10 years. Most Polish goods gained access to the EU market in January 1996. The EU maintained restrictions in the trade of so-called sensitive goods, mainly labor- and raw material-intensive,such as iron and steel, chemical products, textiles, foodstuffs, and footwear), which accounted for 43% of Poland's total exports to the EU (see Rollo, Smith,1993) and Gabrisch (2000, pp. 214–215)). After the Europe Agreement took effect, Poland abolished duties on almost 29% of imports from the EU in terms of value, while maintaining barriers in the import of goods such as cars and agricultural products and foodstuffs,for more, see *Unia Europejska* (1997, pp. 150, 214–215, 381–386) and Czarny, Śledziewska (2009, pp. 174–182)).

2.1. The Geographical Structure and Commodity Patterns of Poland's Foreign Trade after the First Decade of EU Membership

Elżbieta Czarny, Katarzyna Śledziewska

In this section we analyze the changes that took place in Poland's foreign trade in the first 10 years of the country's membership of the European Union (2004–2013). For reasons of space, we will focus exclusively on trade in goods, while excluding trade in services.

We will separately analyze changes in Poland's trade in goods with the European Union and with the rest of the world, although we believe that EU membership has strongly enhanced Poland's trading opportunities with the world as a whole. This is due to factors including an improved quality of products meeting EU standards and made by leading global manufacturers opening production plants in Poland. However, the separate treatment of these two types of trading partners makes it possible to evaluate Poland's trading opportunities on a market to which they have free access (the EU market) and on markets to which access is constrained by barriers (non-EU markets).

We also look at Poland's trade with individual EU member states, identifying where Polish products are gaining and where they are losing importance. We study the EU as a group made up of 25 countries (EU25), which means the way it was in 2004, when Poland joined it. We also compare the geographical structures of trade for Poland, the Czech Republic, Slovakia, and Hungary, i.e. countries that all became EU members in May 2004[2] and together formed the Visegrad Group.[3]

We separately analyze imports and exports because first, the changes often vary in magnitude and direction, and second, the two types of trade flows illustrate different economic trends.

Poland's trade with the European Union and the rest of the world in 2004–2013

In this part of the study, we examine changes in Poland's imports and exports from/ to two groups of partners: the European Union and the rest of the world. In the case of trade within the European Union (denoted as "intra-EU exports/imports" in the tables and figures) we are dealing with a free movement of goods—because Poland

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[2] In addition to the abovementioned countries, Lithuania, Latvia and Estonia as well as Cyprus, Malta and Slovenia became EU members at the time. Due to different structures and capabilities, it is difficult to compare these economies with Poland, so we have decided against doing so.

[3] In February 1991, Poland, Czechoslovakia and Hungary established a free trade area based on terms and conditions agreed on in the Central European Free Trade Agreement,CEFTA) reached in the Hungarian town of Visegrad.

is part of the Single European Market, while trade with non-EU countries (extra-EU exports/imports) is subject to constraints. In imports, these limitations result from the EU trade policy, while in exports these are barriers imposed by trading partners. The intensity of Poland's intra-EU trade testifies to the level of the country's integration with fellow member states, while the intensity of Poland's extra-EU trade provides information about the country's economic ties with non-EU countries. Extra-EU imports are largely those that cannot be replaced or are difficult to replace by intra-EU sources of supply. In turn, extra-EU exports show that Polish goods are able to compete not only where trade is free from barriers, but also where the exchange of goods is constrained by barriers, because non-EU partners, even those who have agreements on trade preferences with the EU, often (temporarily or permanently) protect their own internal markets from the inflow of outside goods.

Table 1

Poland's intra- and extra-EU exports and imports in 2004–2013, in millions of euros

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Imports										
extra-EU	18,184	20,596	27,918	32,966	40,715	30,059	40,341	46,636	51,217	49,915
intra-EU	53,925	61,101	73,221	87,946	101,252	77,096	93,964	104,655	103,717	104,522
Exports										
extra-EU	12,609	16,393	19,911	23,584	28,020	21,605	27,229	32,375	37,337	41,693
intra-EU	47,723	55,496	68,318	78,675	87,875	76,261	93,254	103,182	106,946	110,441
Trade balance										
extra-EU	–5,575	–4,203	–8,007	–9,382	–12,695	–8,454	–13,113	–14,261	–13,880	–8,222
intra-EU	–6,202	–5,605	–4,903	–9,271	–13,377	–835	–710	–1,472	3,228	5,919

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

The value of Poland's exports and imports increased considerably in both intra- and extra-EU terms in 2004–2013 (Table 1). The biggest increase occurred in the value of Poland's intra-EU exports (almost €63 billion). The increase in extra-EU exports (at over €29 billion) was smaller than the increase in extra-EU imports (nearly €32 billion). Yet when added up, the values of Poland's intra-EU and extra-EU exports greatly exceed the corresponding figures for imports. This testifies to an improvement in the international position of Polish goods. Poland's intra-EU trade balance also improved. In 2013, a large deficit (which exceeded €6 billion in 2004) was replaced by a large surplus that more than compensated for the increased deficit in extra-EU trade (in 2013, the deficit was more than €8 billion, up from €5.6 billion in 2004). This means that the values of both Poland's intra-EU exports and imports more than doubled. Moreover, after years of a deepening deficit, Poland finally recorded a grow-

ing trade surplus. This could serve as the shortest description of the great importance of EU membership to Poland's foreign trade.

The improved international position of Polish goods is also reflected in the proportion of extra-EU exports in total exports, which has been growing steadily since 2009. It turns out that Polish goods are also doing well on markets to which access is constrained by trade barriers. This change is also beneficial because of the diversification of the markets to which Poland supplies goods and because the country can become less dependent on its EU partners.

Table 2

Poland's share of extra- and intra-EU25 trade in 2004–2013, in %, and changes in this share and in net exports, in percentage points

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	Change
Imports											
extra-EU	1.8	1.7	2.0	2.3	2.6	2.4	2.6	2.7	2.8	2.9	1.2
intra-EU	2.8	2.9	3.1	3.5	3.9	3.7	3.9	4.0	3.9	3.9	1.2
Exports											
extra-EU	1.3	1.5	1.7	1.9	2.1	1.9	2.0	2.0	2.2	2.4	1.1
intra-EU	2.4	2.6	2.8	3.0	3.3	3.6	3.8	3.8	3.9	4.1	1.7
Net exports											
extra-EU	–0.5	–0.2	–0.4	–0.4	–0.5	–0.5	–0.7	–0.6	–0.7	–0.6	
intra-EU	–0.4	–0.4	–0.3	–0.4	–0.6	–0.2	–0.1	–0.1	0.0	0.1	

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

From 2004 to 2013, Poland's contribution to all the trade flows shown in Table 2 increased by more than 1 percentage point (p.p.). The largest increase was recorded in the case of intra-EU exports (1.7 p.p.).

Table 2 also shows net exports defined as the difference between Poland's contribution to the EU's overall exports and its contribution to the EU's overall imports (in both intra- and extra-EU terms), in percentage points. A minus sign indicates a greater importance of imports than exports in Poland's trade. In 2004, Poland was a more important player in imports than in exports in both intra- and extra-EU trade. In 2013, Poland became a more important exporter than importer in intra-EU trade. In extra-EU trade, imports show a lasting prevalence (these differences are significant, except in 2005, ranging from -0.4 p.p. to -0.7 p.p.).

This study shows that Poland is increasing its role in international trade. The improved competitive position of Polish goods is reflected, for example, by the fact that Poland's contribution to intra-EU exports increased more than its contribution to intra-EU imports. This more than compensates for the slightly larger (by 0.1 p.p.) increase in extra-EU imports than in exports.

Poland's intra-EU trade

In this part of the study, we examine to what extent the value and geographical structure of Poland's exports and imports have changed in intra-EU trade. We analyze changes in the value of trade with other EU countries since 2004 and explore how the role of individual EU partners has changed in Poland's trade. We check whether the contribution of individual partners to Poland's trade changed in the studied period.

Table 3
Poland's exports to individual EU member states and imports from these countries in 2004–2013, in millions of euros

	Imports		Exports		Trade balance	
	2004	2013	2004	2013	2004	2013
Austria	1,664	3,512	1,191	2,688	–473	–824
Belgium	2,296	4,932	1928	3353	–368	–1,578
Cyprus	48	242	55	194	7	–48
Czech Republic	2,744	6,389	2,609	9,391	–135	3,001
Denmark	1,193	2,043	1,347	2,489	153	446
Estonia	76	151	212	822	136	671
Finland	981	1,212	479	1,157	–503	–55
France	4,721	6,244	3,640	8,499	–1,081	2,255
Greece	163	272	176	539	13	266
Spain	1,785	3,359	1,477	3,377	–307	17
Netherlands	3,861	8,797	2,592	6,024	–1,269	–2,773
Ireland	281	924	178	486	–104	–437
Lithuania	417	1,105	1,019	2,312	602	1,207
Luxembourg	131	427	63	170	–67	–257
Latvia	247	294	361	1287	113	993
Malta	34	16	38	53	5	37
Germany	20,176	40,450	18,092	38,027	–2,084	–2,422
Portugal	171	339	383	491	213	152
Slovakia	1,169	4,491	1,077	4,001	–92	–490
Slovenia	473	698	200	475	–273	–224
Sweden	2,020	3,726	2,109	4,169	89	443
Hungary	1,406	2,830	1,549	3,857	143	1,027
United Kingdom	2,473	4,248	3,263	9,884	791	5,636
Italy	5,394	7,820	3,685	6,540	–1,710	–1,280

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

When analyzing Poland's trade with 24 other EU member states (Table 3), we can see that in 2013 Poland had surpluses in the trade of goods with 13 countries, up from 11 in 2004. Poland's good position in intra-EU trade is shown not only by these surpluses, but also by the fact that the surpluses increased in the case of eight partners. Moreover, in the case of three countries, including the Czech Republic and France—both of which are among Poland's major trading partners—the deficits noted in 2004 were replaced by surpluses in 2013. Another piece of good news is that a large deficit has been replaced by a small surplus in trade with Spain.

The bad news, however, is that Poland's trade deficits widened in the case of most countries with which Poland had trade deficits in 2004. In trade with Cyprus, a small surplus in 2004 turned into a deficit that is several times larger. In general, the period saw deepening imbalances (surpluses and deficits) in Poland's trade with the majority of its EU partners.

Table 4

The shares of individual EU member states in Poland's intra-EU exports and imports in 2004–2013, in %, and changes in these shares in percentage points

	Imports		Exports		Net exports	
	2004	2013	2004	2013	2004	2013
Austria	3.1	3.4	2.5	2.4	–0.6	–0.9
Belgium	4.3	4.7	4.0	3.0	–0.2	–1.7
Cyprus	0.1	0.2	0.1	0.2	0.0	–0.1
Czech Republic	5.1	6.1	5.5	8.5	0.4	2.4
Denmark	2.2	2.0	2.8	2.3	0.6	0.3
Estonia	0.1	0.1	0.4	0.7	0.3	0.6
Finland	1.8	1.2	1.0	1.0	–0.8	–0.1
France	8.8	6.0	7.6	7.7	–1.1	1.7
Greece	0.3	0.3	0.4	0.5	0.1	0.2
Spain	3.3	3.2	3.1	3.1	–0.2	–0.2
Netherlands	7.2	8.4	5.4	5.5	–1.7	–3.0
Ireland	0.5	0.9	0.4	0.4	–0.1	–0.4
Lithuania	0.8	1.1	2.1	2.1	1.4	1.0
Luxembourg	0.2	0.4	0.1	0.2	–0.1	–0.3
Latvia	0.5	0.3	0.8	1.2	0.3	0.9
Malta	0.1	0.0	0.1	0.0	0.0	0.0
Germany	37.4	38.7	37.9	34.5	0.5	–4.2
Portugal	0.3	0.3	0.8	0.4	0.5	0.1
Slovakia	2.2	4.3	2.3	3.6	0.1	–0.7
Slovenia	0.9	0.7	0.4	0.4	–0.5	–0.2
Sweden	3.7	3.6	4.4	3.8	0.7	0.2
Hungary	2.6	2.7	3.2	3.5	0.6	0.8
United Kingdom	4.6	4.1	6.8	9.0	2.3	4.9
Italy	10.0	7.5	7.7	5.9	–2.3	–1.6

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

The period also saw changes in the shares of individual EU member states in Poland's intra-EU exports and imports (Table 4). Intra-EU imports and exports are a dominant portion of Poland's overall trade, and Germany plays a huge role in these. Germany's contribution to Poland's intra-EU imports increased from 37.4% in 2004 to 38.7% in 2013. Germany's share of Poland's intra-EU exports fell by 3.4 p.p., to 34.5% in 2013. Poland's intra-EU trade is strongly concentrated, and this concentration is increasingly deeper in imports, while becoming weaker in exports.

Except for Germany, which is the top country in both Poland's intra-EU imports and exports, Poland's key partners remained stable, although some changed places in the statistics. For example, Italy, which in 2004 was the second-largest supplier of goods to Poland and the second-largest buyer of Polish products, in 2013 defended its position only in imports (and lost its advantage over France, which was third on both counts). In Poland's exports, Italy declined to fifth place in 2013; the UK replaced it in second place. The improved position of the UK among buyers of Polish goods is probably due to the large number of Poles living and working in Britain. These expatriate Poles—some of them temporary expats, others accompanied by their families—are bringing in Polish goods. Meanwhile, these Poles discovered British goods, which helped make Britain an important supplier of goods to the Polish market. The Czech Republic is also among Poland's five largest trading partners, and its importance is growing. It advanced in intra-EU imports from fifth to fourth place (its share increased by 1 p.p.) and moved up in intra-EU exports from fifth to third place (its share rose by 3 p.p.).

Table 4 also shows Poland's net exports, i.e. the difference between Poland's share of total exports by individual EU countries and Poland's share of total imports from these countries (in percentage points). Net exports understood in this way determine Poland's competitive position. The analysis shows that, in 2004, in trade with 12 EU partners, Poland had larger shares in exports than in imports (positive net exports). In 2013, Poland had positive net export in trade with 11 partners. Moreover, Poland's net exports increased in the case of six of these partners. The greatest increase in net exports was recorded in trade with Britain and the Czech Republic (more than 2 p.p.).

At the same time, the number of member states with which Poland had a greater share in imports than in exports increased by two (from 10 in 2004 to 12 in 2013). The group was joined by Germany and Cyprus, in trade with which a balance was replaced by a small deficit.

Generally, it can be noted that in 2013 net exports often reinforced the direction observed in 2004 (positive or negative). Such is the case with 11 of Poland's 24 trading partners from the EU. Poland's export potential is certainly growing, but it is gaining the most trade with neighboring countries, which joined the EU together with Poland in 2004 (the Czech Republic and the Baltic states). Poland is not doing as well at winning markets in the most developed EU countries, in particular eurozone countries. The one exception is France—Poland has positive, and large, net exports in bilateral trade. However, the position of France has deteriorated substantially in

global trade since the start of the previous decade (for more see Czarny, Śledziewska (2012, 63–75)). France's trade with Poland mirrors its trade situation with other countries. Significantly, Poland's position as an exporter to the UK market has improved strongly, despite the geographical distance and Britain's traditional emphasis on economic ties with its former colonies. In our opinion, this testifies to a strong impact of labor migration on trade. At the same time, Poland is losing its position on the German market in a trend that is disturbing on the one hand, because Germany is a traditional buyer of Poland's goods, but gives Poland more latitude on the other hand because its trade is less concentrated and therefore less dependent on any single partner and its economic condition.

The importance of Poland in the intra-EU imports and exports of individual EU member states

In this part of the study, we investigate to what extent Poland is an important trading partner for other member states. We therefore look at how its position is changing in intra-EU trade conducted by individual member states. This time we conduct the analysis from the point of view of Poland's trading partners. Thus, for example, the imports presented in Table 5 are the imports of the country listed in the first column and are at the same time Poland's exports to this trading partner. In addition, we analyze Poland's exports and imports as a percentage of total intra-EU imports and exports, thus obtaining the EU average describing the position of Poland's trade in reference to a specific EU country.

In the analyzed period, Poland's contribution to overall intra-EU exports and imports increased strongly. In imports, Poland's share increased from 2.42% in 2004 to 4.25% in 2013, while in exports it rose from 2.83% to 4.13%. Again it is possible to see the importance of EU membership for the country's foreign trade. Poland also plays a growing role in the intra-EU imports and exports of its EU partners—Poland's shares increased in the intra-EU trade of most countries, except in the case of Malta's trade, Lithuania's imports, and the exports of the Czech Republic, Latvia and Slovenia. The greatest drop (2.93 p.p.) was noted in the case of Latvia's exports, or the sale of Latvian products on the Polish market. Significantly, the increases in Poland's shares in the imports of 18 of the 24 partners were greater than 1 p.p. Record growth was noted for the Czech Republic, at 5.02 p.p. Overall, Poland has a large share of Czech imports, at about 11.5%, which testifies to the importance of Polish exports to that country. This shows that Poland's role in the imports of Central European countries such as the Czech Republic, Hungary, Estonia, Latvia, Slovenia, and Slovakia is growing significantly.

Table 5
Poland's shares of the intra-EU exports and imports of individual member states in 2004–2013, in %, and changes in these shares in percentage points

	Imports		Exports		Change	
	2004	2013	2004	2013		Exports
Austria	1.61	2.59	2.80	3.97	0.99	1.17
Belgium	1.23	1.59	1.37	2.13	0.36	0.76
Cyprus	1.60	3.54	4.46	13.62	1.95	9.16
Czech Republic	6.48	11.49	6.97	6.90	5.02	–0.07
Denmark	3.54	4.85	3.00	4.14	1.31	1.14
Estonia	4.30	7.16	1.78	1.94	2.86	0.16
Finland	1.65	3.05	3.26	3.80	1.40	0.54
France	1.33	2.39	2.12	2.50	1.06	0.39
Greece	0.64	2.66	2.21	2.74	2.02	0.53
Spain	0.99	2.40	1.70	2.49	1.41	0.79
Netherlands	1.78	2.81	1.78	2.44	1.03	0.66
Ireland	0.47	1.22	0.50	1.63	0.75	1.13
Lithuania	17.48	17.15	8.78	9.19	–0.33	0.42
Luxembourg	0.45	1.00	1.01	3.30	0.55	2.30
Latvia	8.31	12.18	7.23	4.30	3.87	–2.93
Malta	1.45	1.31	3.01	1.04	–0.14	–1.97
Germany	4.54	6.65	4.35	6.85	2.12	2.50
Portugal	0.95	1.21	0.67	1.12	0.25	0.45
Slovakia	6.16	8.81	6.34	9.61	2.65	3.28
Slovenia	1.76	2.99	5.41	4.55	1.23	–0.86
Sweden	3.41	4.97	3.38	4.77	1.56	1.40
Hungary	4.74	7.77	4.36	5.46	3.03	1.10
United Kingdom	1.42	3.59	1.53	2.32	2.17	0.79
Italy	2.11	3.41	3.40	4.20	1.30	0.80
EU24 average	2.42	4.25	2.83	4.13	1.84	1.29

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

In exports, Poland's shares increased by more than 1 p.p. in 10 cases. The greatest increase was noted in the case of Cyprus (by 9.16 p.p.). In all, Polish goods account for over 17% of Lithuania's imports (nearly 17.5% in 2004) and for 12% of Latvia's imports (8.31% in 2004). Poland also has a relatively large share of Estonia's imports. Poland's considerable impact on the imports of all three Baltic states is not surprising because all these are small economies, located close to Poland geographically and conducting free trade with it, which promotes intensified trade in goods. Of course, the

data in Table 5 also show that Poland has not become as important a trading partner for these countries as Germany is for Poland.

This study clearly shows that the differences in the economic potential of trading partners are an important factor. Above we showed the importance of Poland's exports to the Baltic states (Poland's shares in these countries' imports and exports are higher than these countries' shares in the Polish trade flows—cf. the data in Tables 4 and 5). But a look at Poland's trade with Germany from the German perspective reveals that Poland accounted for 6.65% of Germany's imports in 2013 (6.85% in exports) and was one of many moderately significant partners (although, notably, these shares are far above the EU average, which means that trade with Poland is of considerable importance to Germany). In other words, Poland's shares in both German imports and exports are less than one-fifth the size of Germany's shares in Poland's imports and exports.

Poland, the Czech Republic, Hungary, and Slovakia on the global market

Another way to look at Poland's position in international trade after its first decade in the EU is to compare its position with those of other countries that joined the bloc along with Poland. The reference countries are the Czech Republic, Slovakia, and Hungary. We look at these countries' exports to all countries worldwide, with a special focus on their main export markets.

Table 6
The value of Poland's exports to its 10 largest export markets in 2013, in millions of euros; these markets' shares in the respective exports in %; changes in these shares in 2004–2013 in percentage points; changes in ranks in the studied period

Countries	Value	Share	Change in share	Change in rank
Germany	38,027	25.00	–4.99	0
United Kingdom	9,884	6.50	1.09	2
Czech Republic	9,391	6.17	1.85	2
France	8,499	5.59	–0.45	–1
Russia	8,110	5.33	1.47	2
Italy	6,540	4.30	–1.81	–4
Netherlands	6,024	3.96	–0.34	–1
Ukraine	4,295	2.82	0.08	2
Sweden	4,169	2.74	–0.75	–1
Slovakia	4,001	2.63	0.84	6

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

Table 7

The value of the Czech Republic's exports to its 10 largest export markets in 2013, in millions of euros; these markets' shares in the respective exports in %; changes in these shares in 2004–2013 in percentage points; changes in ranks in the studied period

Countries	Value	Share	Change in share	Change in rank
Germany	38,013	31.27	–5.52	0
Slovakia	10,811	8.89	0.62	0
Poland	7,233	5.95	0.80	1
France	6,011	4.94	0.42	3
United Kingdom	5,881	4.84	0.23	1
Austria	5,542	4.56	–1.33	–3
Russia	4,475	3.68	2.29	6
Italy	4,391	3.61	–0.65	0
Netherlands	3,404	2.80	–1.82	–4
Hungary	3,146	2.59	–0.03	–1

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

Table 8

The value of Slovakia's exports to its 10 largest export markets in 2013, in millions of euros; these markets' shares in the respective exports in %; changes in these shares in 2004–2013 in percentage points; changes in ranks in the studied period

Countries	Value	Share	Change in share	Change in rank
Germany	13,611	20.97	–7.70	0
Czech Republic	8,811	13.58	0.13	0
Poland	5,484	8.45	2.99	2
Hungary	4,186	6.45	1.26	2
Austria	3,949	6.08	–1.75	–2
France	3,270	5.04	1.41	2
United Kingdom	2,993	4.61	1.70	3
Italy	2,915	4.49	–1.85	–4
Russia	2,564	3.95	2.74	4
China	1,597	2.46	2.18	17

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

The data in Tables 6–9 show that the geographical structures of Polish, Czech, Slovak and Hungarian exports are characterized by both similarities and differences.

Taking similarities first, in each case, Germany is the top buyer (it is also first in these countries' imports, which are not discussed here—see Eurostat, accessed March 28, 2014). Other major buyers beside Germany include the other large EU member states: France, Britain, and Italy. Moreover, all the studied countries are among the 10 leading importers of goods from other analyzed countries (except for Hungary, which is only 11th among the largest importers of Polish goods). In general, EU25 countries dominated among the buyers of goods from Poland, the Czech Republic, Slovakia, and Hungary. In Czech exports, EU25 countries occupy nine of the top 10 places.

Russia is among the top 10 buyers of goods from Poland, the Czech Republic, Slovakia, and Hungary. Its role ranks from 5th place in Poland's exports to 10th place in Hungary's exports. Moreover, Russia's position in the exports of all these countries improved significantly in the examined 10-year period (up by two notches in Poland's exports and up by six notches in the exports of the Czech Republic and Hungary), which testifies to Russia's growing importance in these countries' exports.

Table 9

The value of Hungary's exports to its 10 largest export markets in 2013, in millions of euros; these markets' shares in the respective exports in %; changes in these shares in 2004–2013 in percentage points; changes in ranks in the studied period

Countries	Value	Share	Change in share	Change in rank
Germany	21,174	26.02	–5.54	0
Romania	4,628	5.69	2.49	5
Austria	4,526	5.56	–1.66	–1
Slovakia	4,315	5.30	3.38	11
Italy	3,911	4.81	–0.68	0
France	3,674	4.51	–1.04	–2
United Kingdom	3,244	3.99	–1.59	–4
Poland	3,198	3.93	1.07	1
Czech Republic	3,126	3.84	1.47	2
Russia	2,537	3.12	1.47	6

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

Similarities outnumber differences, which we believe further under scores the importance of EU membership from the point of view of trade by the studied member states, including Poland. Of course, the analyzed countries differ in terms of the value of exports. This can be seen from a comparison of the values of their exports and of the shares of the top 10 countries in these exports. For example, Germany's 25-percent share in Poland's exports means a value exceeding €38 billion, while Germany's 26-percent share of Hungary's exports means a value of just over €21 billion. There are contrasts as well in the shares of Germany in the exports of the studied

countries. These range from 20.97% in the case of Slovakia's exports to 31.27% in the case of Czech exports.[4]

Also visible is a close link between the Czech and Slovak economies (they are outranked only by Germany as trading partners). Also of note is the impact of historical ties on the current structure of trade. The top 10 importers of goods from the Czech Republic, Slovakia, and Hungary include Austria, which shares a common political past with these countries. Austria is also close geographically, which promotes more intense trade. Austria's role in these three countries' exports is decreasing, and its position among the top 10 importers is deteriorating. Despite this, in 2013 Austria's share of Czech exports exceeded 4.56%, its share of Slovakia's exports was over 6%, and its share of Hungary's exports was more than 5.5%.

In Hungary's exports, neighboring Romania—which is not part of the EU25, but has been an EU member since 2007—is in second place, while the United Kingdom is the runner-up in Poland's exports, largely because it absorbs a larger part of Polish expats.

China, the global leader in exports, is among the top 10 exporters only in the case of Slovakia, ranking 10th. In the case of the remaining countries, China did not make it into the top 10. In Poland's exports, China is outside the top 20. This further shows the importance of intra-EU trade from the perspective of the new member states, in particular Poland.

The commodity pattern of Poland's trade in 2004–2013

In this part of the analysis, we explore changes in the structure of Poland's imports and exports by major groups of goods. Again, we separately examine Poland's trade with EU member states and with countries outside the bloc. We analyze both the values and the shares of individual groups of goods in Poland's imports and exports. Changes in these values and shares in imports show the scale of Poland's dependence on buying any of these goods abroad. In turn, changes in exports show the developing and declining industries which are Poland's export specialties. This part is supplemented by a study of revealed comparative advantages and disadvantages in Poland's trade. We use the BEC nomenclature.[5]

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[4] Of course, Germany's share in Poland's total exports, at 25%, is lower than its share in Poland's intra-EU exports as shown in Table 4.

[5] According to the Broad Economic Categories, (BEC), nomenclature developed by the United Nations Statistics Divisions in the second half of the 1960s and used since 1970, goods are classified according to their economic use. They are divided into 19 categories—for details see Czarny, Śledziewska (2012, pp. 126–127).

Table 10

The value of Poland's intra-EU imports and exports and the trade balance in 2004 and 2013 by major groups of goods, in millions of euros

Group of goods	Imports		Exports		Trade balance	
	2004	2013	2004	2013	2004	2013
Food and beverages, primary, mainly for industry	183	991	245	837	62	–154
Food and beverages, primary, mainly for household consumption	610	2390	754	1792	143	–598
Food and beverages, processed, mainly for industry	431	1159	215	815	–216	–345
Food and beverages, processed, mainly for household consumption	1,255	5,118	2,290	8,916	1,035	3,798
Industrial supplies not elsewhere specified, primary	804	2,124	944	2,187	140	63
Industrial supplies not elsewhere specified, processed	20,343	36,590	12,892	29,916	–7,451	–6,673
Fuels and lubricants, primary	205	504	1,115	1,113	910	609
Fuels and lubricants, processed, motor spirit	222	283	135	407	–87	124
Fuels and lubricants, processed, other	924	1,699	1,579	3,691	656	1,992
Capital goods (except transport equipment), and parts and accessories thereof	7,698	13,769	2,313	9,812	–5,385	–3,957
Capital goods, parts and accessories	5,115	9,189	3,382	6,069	–1,732	–3,120
Transport equipment, passenger motor cars	2,620	3,458	2,872	4,220	252	762
Transport equipment, industrial	2,895	3,065	2,465	3,149	–430	84
Transport equipment, non-industrial	37	97	187	243	150	146
Transport equipment, parts and accessories	4,336	8,181	6,645	13,033	2,309	4,852
Consumer goods not elsewhere specified, durable	1,165	2,912	4,257	9863	3,092	6,951
Consumer goods not elsewhere specified, semi-durable	1,626	5,097	3,258	6,183	1,632	1,086
Consumer goods not elsewhere specified, non-durable	3,399	7,185	2,115	8,137	–1,284	952
Goods not elsewhere specified	47	33	56	58	9	25
Total	53,925	10,4522	47,723	11,0441	–6,202	5,919

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

Earlier we highlighted the growth in Poland's intra-EU imports and exports (see comment for Table 1). Now, analyzing the data in Table 10, we can conclude that such is the case for almost all major groups of goods (except in the case of "goods not elsewhere classified" in imports, and "fuels and lubricants, primary" in exports). In Poland's imports and exports, both at the beginning and the end of the studied period, "industrial supplies not elsewhere specified, processed" dominate—see Tables 10 and 12. However, despite the large increase in the value of the imports and exports of these goods (by more than €16 billion and €17 billion respectively), their shares in Poland's intra-EU imports and exports decreased (by 1.3 p.p. in imports, and by about 7 p.p. in exports). Poland's deficit in the trade of these products also decreased (by almost €780 billion), although it remained the highest among all the studied major groups of goods (standing at almost €6.7 billion in 2013).

"Capital goods (except transport equipment), and parts and accessories thereof" and "capital goods, parts and accessories" rank second and third in Poland's imports respectively. This shows that Poland plays a major role in international production chains.

In exports, "transport equipment, parts and accessories" and "durable consumer goods" were number two and three respectively. These two groups also show the highest surpluses of exports over imports. Products with a relatively high level of technological advancement occupy an important place in the Polish economy, and consequently in exports. This is due to the adoption by Polish companies of EU standards and the inflow of foreign direct investment, especially in the automotive industry.

Table 11

The value of Poland's extra-EU imports and exports and the trade balance in 2004 and 2013 by major groups of goods, in millions of euros

Group of goods	Imports		Exports		Trade balance	
	2004	2013	2004	2013	2004	2013
Food and beverages, primary, mainly for industry	110	200	82	275	−28	76
Food and beverages, primary, mainly for household consumption	273	298	202	989	−71	691
Food and beverages, processed, mainly for industry	98	244	163	471	65	227
Food and beverages, processed, mainly for household consumption	381	820	860	2,879	478	2,059
Industrial supplies not elsewhere specified, primary	1,057	1,707	190	703	−867	−1,004
Industrial supplies not elsewhere specified, processed	3,616	9,270	3,741	9,439	125	169
Fuels and lubricants, primary	4,454	13,974	54	98	−4,401	−13,876
Fuels and lubricants, processed, motor spirit	0	0	0	266	0	266
Fuels and lubricants, processed, other	751	1,147	331	1,352	−420	205
Capital goods (except transport equipment), and parts and accessories thereof	1,898	5,255	990	4,901	−908	−353
Capital goods, parts and accessories	1,413	3,931	959	3,060	−453	−871
Transport equipment, passenger motor cars	244	425	595	927	351	503
Transport equipment, industrial	1,319	3,237	1,272	4,421	−48	1,184
Transport equipment, non-industrial	51	39	25	112	−27	73
Transport equipment, parts and accessories	590	2,080	727	3,881	138	1,801
Consumer goods not elsewhere specified, durable	307	995	816	2,417	509	1,422
Consumer goods not elsewhere specified, semi-durable	899	1,998	517	1,550	−382	−448
Consumer goods not elsewhere specified, non-durable	693	1,183	1,038	3,764	346	2,580
Goods not elsewhere specified	30	91	46	162	17	71
Total	**18,184**	**49,915**	**12,609**	**41,693**	**−5,575**	**−8,222**

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

"Industrial supplies not elsewhere specified, processed" occupy an important place in both Poland's intra- and extra-EU trade. These goods led the way in Poland's exports in both 2004 and in 2013 and were in second place in imports, behind "unprocessed fuels and lubricants" (the latter dominate in imports, while being marginal in exports, which explains why they show record deficits in Poland's trade balance at the beginning and end of the studied period). In both analyzed years, "capital goods (except transport equipment), and parts and accessories" were the runner-up in exports and third in imports. Poland has a deficit in the trade of these goods, however this deficit decreases over time (the same trend is observed in intra-EU trade), which again proves that Poland is part of international production networks and that its position in this area is improving.

"Transport equipment, parts and accessories" and "durable consumer goods," are important in Poland's intra-EU exports, but are also gaining importance in extra-EU trade, even though they are not among the leaders. Transport equipment exports increased more than fivefold during the studied period, while the trade surplus in the case of these goods increased by 13 times (in 2013, it was the third-largest among the trade surpluses). When it comes to durable consumer goods, the changes are less spectacular. Their imports increased more than three fold, while exports and the trade surplus less than doubled. However, in both analyzed years, they exhibit a much higher, though declining, share in Poland's extra-EU exports than in imports (their net exports were 6.8 p.p. in 2004 and 6.1 p.p. in 2013—see Table 13).

A separate analysis is required, in our view, for four groups of products related to agriculture and the food industry ("food and beverages, primary, mainly for industry"; "food and beverages, primary, mainly for household consumption"; "food and beverages, processed, mainly for industry"; and "food and beverages, processed, mainly for household consumption"). In the two groups intended for household consumption, the surplus of Poland's intra-EU exports over imports increased significantly (in the case of food and beverages for industry, small deficits were recorded in 2013).

In turn, in extra-EU trade (Table 13), in the trade of the four analyzed product groups, surpluses were recorded in 2013. The surplus in the trade of processed food and beverages for household consumption was very high (the second-largest among all the major groups of goods analyzed). Moreover, in intra-EU exports, the shares of three groups of goods related to agriculture and the food industry are growing (with a simultaneous decrease in the shares of these groups of goods in imports). Particularly promising is an increase by 0.8 p.p. in the share, in Poland's intra-EU exports, of unprocessed goods intended for household consumption, accompanied by a decreased share of this group of goods in intra-EU imports by 0.9 p.p.

Table 12

The shares of major groups of goods in Poland's intra-EU imports and exports in 2004 and 2013, in %; changes in net exports in percentage points

Group of goods	Imports		Exports		Net exports		Change	
	2004	2013	2004	2013	2004	2013	Imports	Exports
Food and beverages, primary, mainly for industry	0.6	0.4	0.7	0.7	0.0	0.3	–0.2	0.0
Food and beverages, primary, mainly for household consumption	1.5	0.6	1.6	2.4	0.1	1.8	–0.9	0.8
Food and beverages, processed, mainly for industry	0.5	0.5	1.3	1.1	0.8	0.6	–0.1	–0.2
Food and beverages, processed, mainly for household consumption	2.1	1.6	6.8	6.9	4.7	5.3	–0.5	0.1
Industrial supplies not elsewhere specified, primary	5.8	3.4	1.5	1.7	–4.3	–1.7	–2.4	0.2
Industrial supplies not elsewhere specified, processed	19.9	18.6	29.7	22.6	9.8	4.1	–1.3	–7.0
Fuels and lubricants, primary	24.5	28.0	0.4	0.2	–24.1	–27.8	3.5	–0.2
Fuels and lubricants, processed, motor spirit	0.0	0.0	0.0	0.6	0.0	0.6	0.0	0.6
Fuels and lubricants, processed, other	4.1	2.3	2.6	3.2	–1.5	0.9	–1.8	0.6
Capital goods (except transport equipment), and parts and accessories thereof	10.4	10.5	7.9	11.8	–2.6	1.2	0.1	3.9
Capital goods, parts and accessories	7.8	7.9	7.6	7.3	–0.2	–0.5	0.1	–0.3
Transport equipment, passenger motor cars	1.3	0.9	4.7	2.2	3.4	1.4	–0.5	–2.5
Transport equipment, industrial	7.3	6.5	10.1	10.6	2.8	4.1	–0.8	0.5
Transport equipment, non-industrial	0.3	0.1	0.2	0.3	–0.1	0.2	–0.2	0.1
Transport equipment, parts and accessories	3.2	4.2	5.8	9.3	2.5	5.1	0.9	3.5
Consumer goods not elsewhere specified, durable	1.7	2.0	6.5	5.8	4.8	3.8	0.3	–0.7
Consumer goods not elsewhere specified, semi-durable	4.9	4.0	4.1	3.7	–0.8	–0.3	–0.9	–0.4
Consumer goods not elsewhere specified, non-durable	3.8	2.4	8.2	9.0	4.4	6.7	–1.4	0.8
Goods not elsewhere specified	0.2	0.2	0.4	0.4	0.2	0.2	0.0	0.0

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

Table 13

The shares of major groups of goods in Poland's extra-EU imports and exports in 2004 and 2013, in %; changes in net exports in percentage points

Group of goods	Imports		Exports		Net exports		Change	
	2004	2013	2004	2013	2004	2013	Import	Exports
Food and beverages, primary, mainly for industry	0.3	0.9	0.5	0.8	0.2	–0.2	0.6	0.2
Food and beverages, primary, mainly for household consumption	1.1	2.3	1.6	1.6	0.4	–0.7	1.2	0.0
Food and beverages, processed, mainly for industry	0.8	1.1	0.5	0.7	–0.3	–0.4	0.3	0.3
Food and beverages, processed, mainly for household consumption	2.3	4.9	4.8	8.1	2.5	3.2	2.6	3.3
Industrial supplies not elsewhere specified, primary	1.5	2.0	2.0	2.0	0.5	–0.1	0.5	0.0
Industrial supplies not elsewhere specified, processed	37.7	35.0	27.0	27.1	–10.7	–7.9	–2.7	0.1
Fuels and lubricants, primary	0.4	0.5	2.3	1.0	2.0	0.5	0.1	–1.3
Fuels and lubricants, processed, motor spirit	0.4	0.3	0.3	0.4	–0.1	0.1	–0.1	0.1
Fuels and lubricants, processed, other	1.7	1.6	3.3	3.3	1.6	1.7	–0.1	0.0
Capital goods (except transport equipment), and parts and accessories thereof	14.3	13.2	4.8	8.9	–9.4	–4.3	–1.1	4.0
Capital goods, parts and accessories	9.5	8.8	7.1	5.5	–2.4	–3.3	–0.7	–1.6
Transport equipment, passenger motor cars	4.9	3.3	6.0	3.8	1.2	0.5	–1.5	–2.2
Transport equipment, industrial	5.4	2.9	5.2	2.9	–0.2	–0.1	–2.4	–2.3
Transport equipment, non-industrial	0.1	0.1	0.4	0.2	0.3	0.1	0.0	–0.2
Transport equipment, parts and accessories	8.0	7.8	13.9	11.8	5.9	4.0	–0.2	–2.1
Consumer goods not elsewhere specified, durable	2.2	2.8	8.9	8.9	6.8	6.1	0.6	0.0
Consumer goods not elsewhere specified, semi-durable	3.0	4.9	6.8	5.6	3.8	0.7	1.9	–1.2
Consumer goods not elsewhere specified, non-durable	6.3	6.9	4.4	7.4	–1.9	0.5	0.6	2.9
Goods not elsewhere specified	0.1	0.0	0.1	0.1	0.0	0.0	–0.1	–0.1

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

Trade with non-EU countries shows growing shares of all major groups of goods related to agriculture and the food industry, with the exception of unprocessed goods for household consumption, whose share in both analyzed years did not change. This time there is only an improvement in the position of Polish processed goods intended mainly for household consumption (increasing net exports and a larger increase in the share in exports than in imports).

Table 14

Revealed comparative advantage indices in Poland's intra-EU imports and exports in 2004 and 2013

	Imports		Exports	
	2004	2013	2004	2013
Food and beverages, primary, mainly for industry	0.6	0.3	2.3	1.3
Food and beverages, primary, mainly for household consumption	0.8	0.3	3.6	3.9
Food and beverages, processed, mainly for industry	1.1	0.8	2.7	2.0
Food and beverages, processed, mainly for household consumption	1.0	0.8	1.8	1.7
Industrial supplies not elsewhere specified, primary	1.5	0.9	0.6	0.7
Industrial supplies not elsewhere specified, processed	1.0	1.0	1.2	0.9
Fuels and lubricants, primary	1.6	1.3	0.7	0.5
Fuels and lubricants, processed, motor spirit	0.0	0.0	0.0	0.4
Fuels and lubricants, processed, other	1.4	0.4	1.4	0.8
Capital goods (except transport equipment), and parts and accessories thereof	0.7	0.8	0.4	0.7
Capital goods, parts and accessories	0.8	1.2	0.6	0.8
Transport equipment, passenger motor cars	0.5	0.5	0.8	0.3
Transport equipment, industrial	2.0	3.9	2.1	2.4
Transport equipment, non-industrial	0.4	0.3	0.4	0.9
Transport equipment, parts and accessories	0.7	0.8	0.9	1.3
Consumer goods not elsewhere specified, durable	0.5	0.7	2.1	2.1
Consumer goods not elsewhere specified, semi-durable	0.6	0.6	1.1	1.1
Consumer goods not elsewhere specified, non-durable	0.9	0.6	1.2	1.2
Goods not elsewhere specified	0.2	0.3	0.3	0.5

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

Below we compare the structures of Poland's intra-EU imports and exports with the structures of intra-EU imports and exports of all the member states. We calculate revealed comparative advantage indices as the ratios of the shares in imports/exports of a given group of goods in Poland's trade with EU countries and the shares of this group of goods in total intra-EU exports/imports (Table 14). Then we calculate similar ratios for Poland's extra-EU trade in the EU as a whole (Table 15). In this way we define Poland's relative position in the exports of individual groups of goods compared with other EU exporters. An RCA index equal to 1 means that Polish goods have exactly the same position (in exports and imports) as goods from all EU member states taken together. An RCA index greater than 1 means that a given group of goods has a greater share in Poland's exports than the shares of all EU members combined. This shows that Poland has a comparative advantage over its EU partners: in intra-EU

exports (Table 14) and extra-EU exports (Table 15) respectively. On the other hand, an RCA index lower than 1 indicates a relatively smaller share of a given group of goods in Poland's exports in relation to the shares in exports of the EU as a whole and is treated as a comparative disadvantage.

The indices for imports add up to a different picture. They tend to show a comparative disadvantage. The greater these indices, the greater the relative share of a given group of goods in Poland's imports compared with the EU average. An index close 0 to indicates a small share of a given group of goods in Poland's imports, compared with its share in the imports of the EU as a whole, and shows no comparative disadvantage.

Table 15

Revealed comparative advantage indices in Poland's extra-EU imports and exports in 2004 and 2013

	Imports		Exports	
	2004	2013	2004	2013
Food and beverages, primary, mainly for industry	0.6	1.1	0.9	0.9
Food and beverages, primary, mainly for household consumption	1.0	1.5	1.6	1.4
Food and beverages, processed, mainly for industry	1.4	1.3	0.9	0.9
Food and beverages, processed, mainly for household consumption	0.4	0.8	0.9	1.3
Industrial supplies not elsewhere specified, primary	0.7	0.8	1.0	0.9
Industrial supplies not elsewhere specified, processed	1.4	1.2	1.0	1.0
Fuels and lubricants, primary	0.2	0.1	1.3	0.3
Fuels and lubricants, processed, motor spirit	1.3	0.5	0.8	0.7
Fuels and lubricants, processed, other	0.7	0.3	1.4	0.7
Capital goods (except transport equipment), and parts and accessories thereof	1.2	1.2	0.4	0.8
Capital goods, parts and accessories	1.1	1.2	0.8	0.8
Transport equipment, passenger motor cars	0.6	0.6	0.8	0.7
Transport equipment, industrial	1.6	1.2	1.4	1.1
Transport equipment, non-industrial	0.2	0.4	0.9	0.8
Transport equipment, parts and accessories	1.0	1.0	1.8	1.6
Consumer goods not elsewhere specified, durable	0.8	0.9	3.0	3.0
Consumer goods not elsewhere specified, semi-durable	0.6	1.1	1.4	1.1
Consumer goods not elsewhere specified, non-durable	0.9	1.0	0.6	1.1
Goods not elsewhere specified	0.3	0.1	0.3	0.2

Source: Own calculations based on Eurostat database (accessed March 28, 2014).

Goods with the highest shares in Poland's intra-EU exports—"industrial supplies not elsewhere specified, processed" (22.6%—see Table 12) and "capital goods (except transport equipment), and parts and accessories thereof" (11.8%)—did not show

a comparative advantage in 2013 compared with other EU exporters (with indices of 0.9 and 0.7 respectively). These are diverse manufacturing industry products. The success of Poland's intra-EU exports in the case of these goods attests to considerable intra-industry trade in them within the EU. Also indicative of intra-industry trade is a lack of Poland's revealed comparative disadvantages in the imports of "capital goods (except transport equipment), and parts and accessories thereof." The index for imports is less than 1, testifying to Poland's low dependence on such imports. The opposite is true of "capital goods, parts and accessories," which are important to Poland's imports and in trade where Poland has comparative disadvantages (an index for imports of 1.2 in 2013). This makes them perfectly suitable for Polish imports.

"Transport equipment, parts and accessories" and durable consumer goods, which also figure prominently in Poland's exports, are characterized by a large (and growing in the case of transport equipment, parts and accessories) comparative advantage over other EU member states, which justifies the position of these goods in Poland's exports.

Poland has considerable advantages in the exports of four major groups of goods related to agriculture and the food industry. These advantages have been in place throughout the period of Poland's EU membership, but they increased over this time only in the case of "food and beverages, primary, mainly for household consumption" (3.9 in 2013). These goods also have a lasting, though smaller and decreasing, comparative advantage (1.4 in 2013) in Poland's trade with non-EU countries. It seems that Poland is not taking full advantage of the potential these agriculture-related categories offer, because they are not among leading sectors in Poland's exports (their share in intra-EU exports in 2013 was 2.4%, while in extra-EU exports in both analyzed years it was 1.6%). In general, other groups of goods related to agriculture and the food industry have a sizable though declining role, especially in intra-EU trade. These four groups together provide 11.1% of Poland's intra-EU exports, which does not reflect the comparative advantages that Poland has in their production. The reason is probably the EU's Common Agricultural Policy and the related production limits.

The commodity pattern of Poland's trade shows that Poland makes good use of its comparative advantage in the production of "transport equipment, parts and accessories" and durable consumer goods. These are important items in Poland's exports, in both intra-EU and extra-EU terms. On the other hand, Poland has comparative disadvantages in "capital goods, parts and accessories," which is an important item in Poland's imports. Furthermore, Poland is not using efficiently its comparative advantages in the export of goods from groups related to agriculture and the food industry. The four groups of goods from agriculture and the food industry account for just over 10% of Poland's intra-EU exports. The primary cause may be limitations resulting from the Common Agricultural Policy. Meanwhile, two groups of goods that have neither comparative advantages nor disadvantages on the EU market make up about one—third of Poland's intra-EU exports. This, in our opinion, signals intense intra-industry trade in these goods with EU partners.

Concluding remarks

Our analysis shows that Poland's membership of the European Union has had a positive impact on Poland's foreign trade. Its value, particularly in the case of trade with other EU member states, has increased significantly, and its structure has improved.

The international competitive position of Polish goods is improving. Poland's export potential is growing, especially in trade with neighboring countries that joined the EU together with Poland in 2004 (the Czech Republic and the Baltic states). Poland's export position on the UK market is also improving strongly, which, in our opinion shows the big role that labor migration has played in bilateral trade between Poland and Britain. With the exception of France, Poland is doing worse when it comes to goods winning markets of the most developed EU countries, in particular eurozone members. In particular, Poland is losing its position on the German market, which is the traditional buyer of Polish goods. This means, however, that Poland's trade is becoming less concentrated and that Poland is less dependent on Germany as its economic partner.

Analysis of the commodity structure of Poland's trade shows that Poland makes good use of its comparative advantages in the production of transport equipment, parts and accessories and in the production of durable consumer goods. These are important items among Poland's intra- and extra-EU exports. On the other hand, Poland has comparative disadvantages in the trade of capital goods, parts and accessories, which are an important item of Poland's imports. At the same time, Poland is not fully exploiting its advantages in the export of goods from agriculture and the food industry. This may be due to limitations resulting from the Common Agricultural Policy. Two groups of goods that have neither comparative advantages nor disadvantages on the EU market make up about one third of Poland's intra-EU exports. This, in our opinion, testifies to relatively intense intra-industry trade in these goods with EU partners.

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2.2. The Impact of Poland's Accession to the European Union on the Country's Foreign Investment Attractiveness

Tomasz M. Napiórkowski[6]

Foreign direct investment (FDI) and competitiveness are interconnected by spillovers that accompany inward FDI enjoyed by the host economy, the key spillovers in this case being the transfer of technology and know-how. For this reason attracting FDI has been included in Poland's policy agenda. Poland's membership in the European Union (EU) is often mentioned as one of many determinants of inward FDI. This subchapter is aimed at providing evidence supporting this hypothesis.

The aim of this research is to examine whether EU membership had an impact on and can be considered a determinant of inward FDI into selected Central European countries (CECs). Furthermore, if such is the case, does it enable an increase in competitiveness as a result of inward FDI?

The resulting main hypothesis states that the EU membership of selected Central European countries, including Poland, has had a positive and statistically significant impact on inward foreign direct investment into those host economies. The set of explored countries includes Bulgaria, the Czech Republic, Hungary, Poland, Romania, Slovakia, and Slovenia.

This research is laid out as follows: first, the dynamics of the stocks and flows of inward and outward foreign direct investment activity in the world, the European Union and in the selected economies (as an aggregate and individually) is presented and analyzed; second, an econometric approach is taken to confirm these hypotheses with a static model based on panel data, the parameters of which are estimated with the use of the Ordinary Least Squares method.

The data is presented in U.S. dollars and not in euro, because there is no single source of data on FDI denoted in euro for the required time frame, i.e. years prior to and after EU accession.

FDI in Poland, Central European countries, EU27 and the world compared

This section explores the long-term perceived attractiveness of the examined parties (i.e., analysis of foreign direct investment stocks) as well as the more recent, short-term attractiveness (i.e., foreign direct investment flows).[7]

Inward and outward foreign direct investment stock—the long-term perspective

Inward foreign direct investment stock in the world increased during the examined period from $7,511,311 million (2000) to $22,812,680 million (2012). The two biggest negative shocks in this time period were two recessions: the dotcom recession and the housing/derivatives recession. Both had a significant impact on the stock of invested capital, but as the former only slowed growth, the latter actually caused a decline in the series from $18,038,044 million (2007) to $15,586,249 million (2008). This decline was erased the following year. Inward foreign direct investments in the European Union were also growing ($2,350,014 million in 2000, $7,805,297 million in 2012), but at a much slower pace with the two recessions having a similar impact on this series as the series described above. Central European economies were, as an aggregate, more attractive for investors than the European Union as these transitioning economies had a significant combined growth rate of inward FDI—from $98,260.05 million to $665,985.9 million in 2012. This growth was not suppressed by the dotcom recession, and the 2007 recession had only a minor negative impact on the series; in fact, a bigger decline was seen in 2011 than in 2008. The biggest growth of the inward FDI stock in CEC was recorded from 2005 to 2007, when hosts like Poland had begun enjoying the benefits of their EU accession in 2004, while states that were to join in 2007 were already enjoying the "expectation" benefits.

As far as the inward FDI stock into each of the Central European countries is concerned (Figure 1), the seven economies can be divided into two groups: the leaders (Poland – $34,227.17 million in 2000 to $230,603.6 million in 2012, the Czech Republic – $21,643.66 million to $136,442.4 million, and Hungary – $22,869.89 million to $103,556.5 million) and the followers (Slovenia – $2,892.73 million to $15,526.01 million, Bulgaria – $2,703.69 million to $49,870.63 million, and Slovakia – $6,969.92 million to $55,815.92 million), with Romania ($6,952.99 million to $74,170.76 million) on the borderline between the groups. This prompts four observations:
1. Poland has diverged from the group the most.

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[7] The reason for separately analyzing the inward and outward activity of FDI is that different measuring agencies use varying methods of accounting for FDI; hence, opposite to what is expected, outward and inward FDI activities in the world are not equal.

2. Hungary and the Czech Republic were neck and neck until 2006 after which the appetite of foreign investors to invest in Hungary decreased and the series leveled out.
3. With the exception of Poland and Hungary, both of which experienced declines in 2008, the remaining members of the group either saw no negative effects or only saw a slowdown in the growth rates of inward foreign direct investment.
4. The trends themselves generally increased just prior to (e.g., Poland 2003–2004) and just after each economy joined the European Union.

Figure 1

Inward foreign direct investment stock (IFDIS) to selected Central European economies
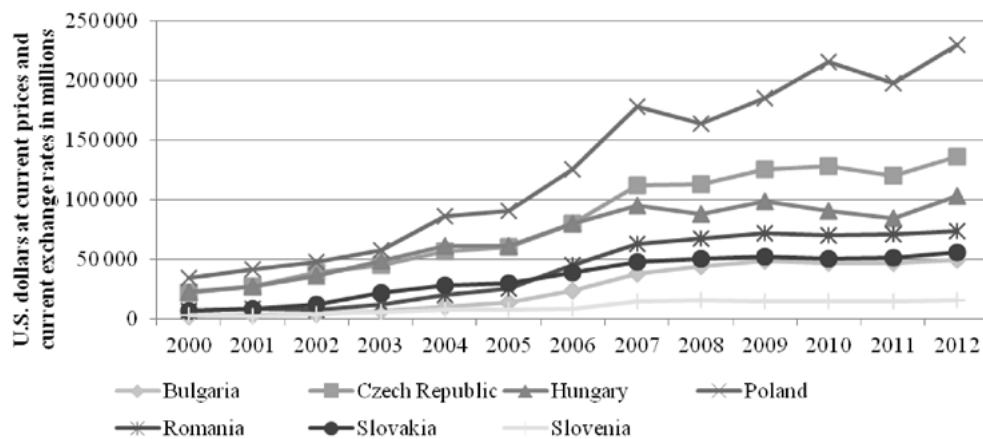
Source: Author's own graph based on data from UNCTAD.4

Outward foreign direct investment has also been increasing globally, growing from $8,025,834 million in 2000 to $23,592,739 million in 2012. The impact of the two recessions was the same as in the case of inward FDI. These similarities also extend to the inward/outward foreign direct investments in/out of the European Union ($3,508,626 million in 2000 to $9,836,857 million in 2012). None of the recessions had any effect on the outward investments of Central European economies, which skyrocketed after 2004, reaching $122,935.5 million in 2012 ($4,561.9 million in 2000). The series experienced its biggest growth after most of the group joined the EU in 2004.

How foreign investment has changed over time in Central European economies is best presented when looking at each economy separately (Figure 2). Until 2003, when Hungary started separating from the group, outward investments from these economies were, by today's investment standards, irrelevant. As with inward FDI, some key observations can be made:

1. Despite Hungary ($1,279.85 million in 2000, $34,741.2 million in 2012) being the first mover, it is Poland ($1,018 million, $57,525.2 million) that is the leading foreign investor in the group.

2. Of the leading investors (in descending order, Poland, Hungary, and the Czech Republic), only the Czech Republic's investments abroad declined during the latter part of the examined period.
3. Only two economies stood out as leaders in investments abroad (Poland and Hungary), while the Czech Republic is closer to Slovenia than to Hungary.
4. Outward foreign direct investment from Slovenia is declining, while the opposite is true for Slovakia.
5. Unlike in the case of inward activity, there was no anticipatory outward FDI (stock) activity in the researched economies until about a year after most of its members have joined the European Union.

Figure 2

Outward foreign direct investment stock (OFDIS) from selected Central European economies
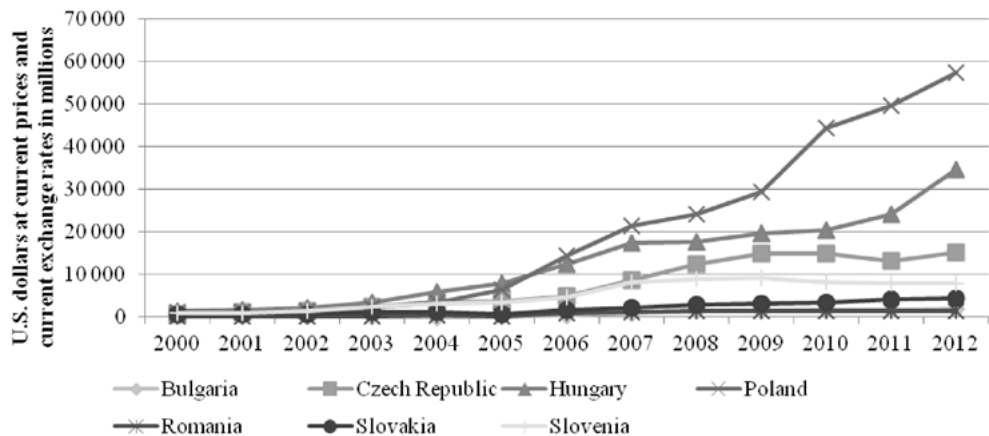
Source: Author's own graph based on data from UNCTAD.

The above analysis can be extended to include a comparison of inward FDI stock in per capita terms. In this case, Poland, with $890, was in third place in 2000, ahead of Bulgaria ($331) and Romania ($310), and behind Hungary ($2,240) and the Czech Republic ($2,111). Despite the growth of FDI per capita in Poland in the analyzed timeframe ($2,272 in 2004 and $5,984 in 2012), the position of the Polish economy, relative to the other analyzed countries, worsened after Bulgaria surpassed it in 2007. By 2012, Bulgaria had mustered $6,826 vs. Poland's $5,984.[8]

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[8] FDI expressed in per capita terms is not an ideal indicator of the general attractiveness of an economy to foreign investors. This is because, unlike in the case of GDP, there is no direct relationship between changes in population and FDI (with the possible exception of market-seeking FDI). This can be illustrated with the example of Estonia and China, where FDI per capita in 2012 was $14,000 and $610 respectively. This suggests that Estonia enjoys greater foreign investor interest than China. However, looking at the FDI stock in both economies as an indicator of attractiveness—$18,826 million and $832,882 million

The key conclusion from this section is that the economies in Central Europe are growing in their attractiveness both as a group and individually, and faster than the European Union as a whole. In terms of EU membership, inward foreign direct investment picked up before 2004 (when the biggest players entered the bloc) while outward foreign direct investment activity saw its greatest growth after the date of joining (in accordance with the findings of, e.g., Carstensen and Toubal, 2003, p. 2).[9]

Inward and outward foreign direct investment flows: the short-term perspective

Foreign direct investment flows have been much more volatile over the examined period, as can be expected given the methodology behind the measure. For the world, inward flows (Figure 3) had three maxima ($1,413,169 million in 2000, $2,002,695 million in 2007 and $1,651,511 million in 2011), which in themselves show the parabolic general shape of the series. Flows coming from the European Union follow a similar path with relative maxima of $701,825.7 million (2000), $859,117.8 million (2007) and $441,556.6 million (2011), showing a much flatter, less responsive pattern. CECs as a group mimic the volatility of the world more than does the European Union, reaching a maximum investment of $65,797.3 million in 2007, with the biggest growth recorded from 2004 to 2007. As suggested earlier, all three series were more responsive to economic shocks such as the dotcom and 2007 crises, and the positive recoveries following these.

Figure 3

Inward foreign direct investment flows (IFDIF) to CECs (right-hand axis) the EU27 and the world (both left-hand axis)
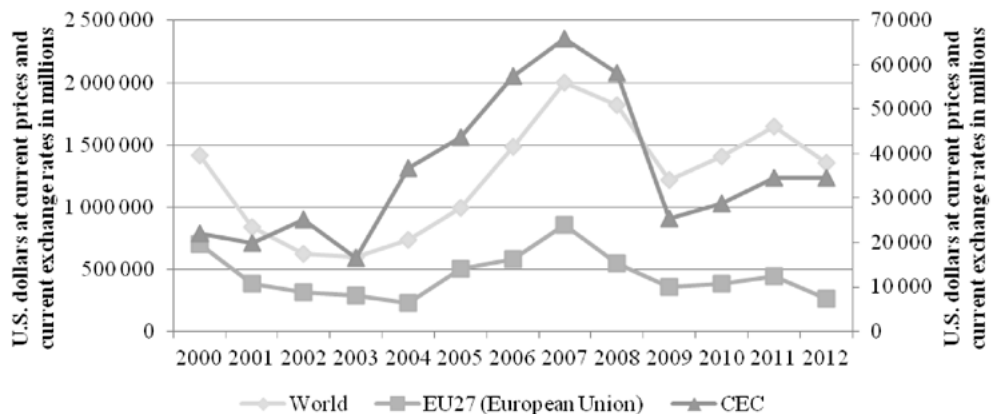
Source: Author's own graph based on data from UNCTAD.

respectively—the conclusion will be different. As a result, it is advisable to use more than one indicator of FDI attractiveness to get a clearer picture of the situation.

[9] This suggests that, parallel to this work, a study should be conducted in order to examine the impact of EU membership on outward foreign direct investment activity in the CEC group.

The volatility of foreign direct investment flows is even more apparent when look-ing at flows directed at each of the economies separately (Figure 4). All flows were harmed by both recessions, with most of the series reaching their maxima right before the recession—excluding recoveries seen in the Czech Republic and Hungary, which rank these countries ahead of Poland. As can be observed on the referenced graph, inward flows are more evenly distributed among the economies than the foreign direct investment stock. Looking at average values, Poland is the leader ($11,853.95 million per year), followed by the Czech Republic ($6,321.1 million per year) and Hungary ($4,638.9 million). Analyzing the data for all seven CECs, we see that FDI inflows are more evenly distributed among these host economies than FDI stock.

Figure 4

Inward foreign direct investment flows (IFDIF) to selected Central European economies

Source: Author's own graph based on data from UNCTAD.

Looking at the share of inward foreign direct investment directed at each of the hosts as a percentage of the sum (Table 16), Poland generally takes the top spot by attracting between 42.70% and 34.98% of total investment flows to CECs. The situation is very different in the last year of the analysis, in which Hungary (39.01%) is followed by the Czech Republic (30.68%) and the very distant Poland (9.72%). Slovenia is found at the other side of the spectrum throughout the period.

Just like in the case of stock, as in the case of flows of foreign direct investment there are similarities in terms of inward and outward investments – outflows for the world (Figure 5) reach three maxima ($1,240,316 million in 2000, $2,272,049 mil-lion in 2007 and $1,678,035 in 2011) as does the series for the European Union ($809,237.9 million, $1,257,890 million and $536,499.1 million respectively). Until around 2005, the two series appear to move parallel to each other, after which the

latter series grows at a slower pace. In terms of CECs, the series does not really come into play until after the dotcom crisis around 2002 ($262,060.9 million). It then sky-rockets to $16,321.9 million (2006) during its highest growth period (2004–2007), after which the series is impacted by the 2007 crisis, which (as mentioned above) took its toll on the world and the European Union series significantly. After 2007, outflows of capital from the analyzed economies decreased. However, just two years later, FDI outflows began to rise again.

Table 16
Share of inward foreign direct investment flows (IFDIF) by selected economies from Central Europe as a percentage of total IFDIF to CECs for selected years

	2000	2004	2007	2012
Bulgaria	4.6%	9.2%	18.8%	5.5%
Czech Republic	22.5%	13.5%	15.9%	30.7%
Hungary	12.5%	11.6%	6.0%	39.0%
Poland	**42.7%**	**34.9%**	**35.8%**	**9.7%**
Romania	4.8%	17.5%	15.1%	6.5%
Slovakia	12.3%	10.9%	6.1%	8.2%
Slovenia	0.6%	2.2%	2.3%	0.4%

Source: Author's own table based on data from UNCTAD.

Figure 5
Outward foreign direct investment flows (OFDIF) from CECs (right-hand axis), the EU27 and the world (both left-hand axis)
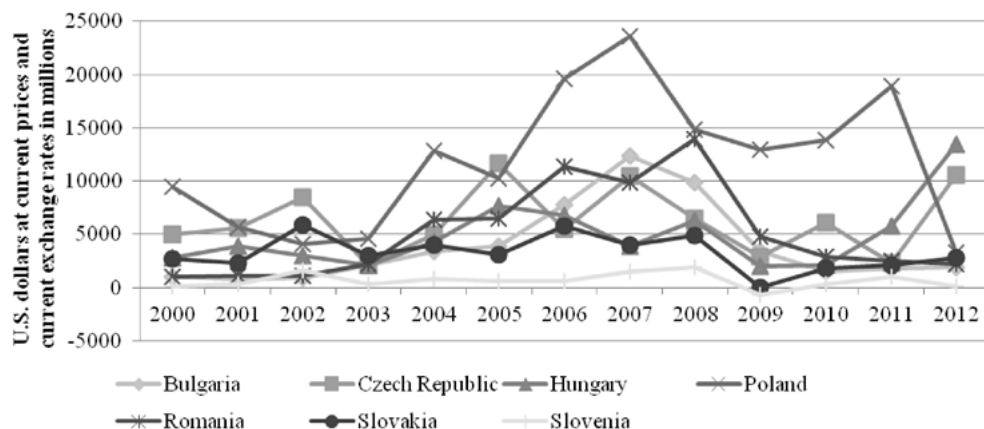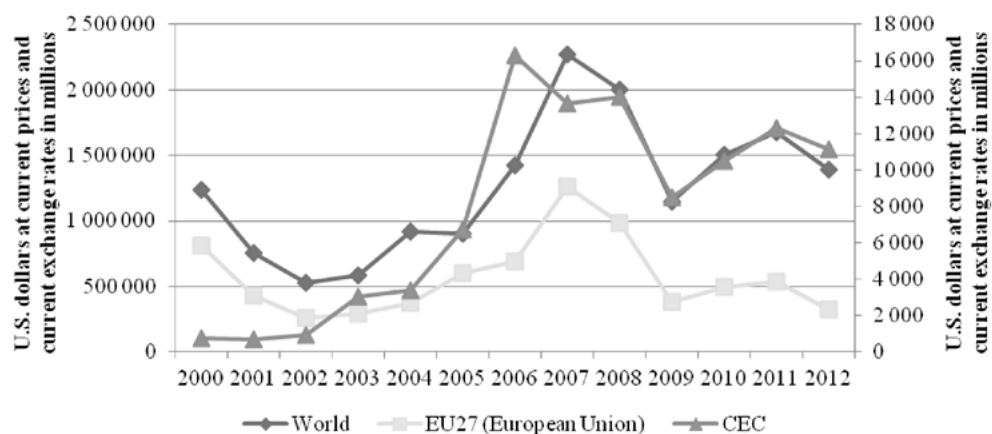

Source: Author's own graph based on data from UNCTAD.

When it comes to outward flows by each of the CECs (Figure 6), Hungary was the first of the examined economies to break out (2003) and was quickly followed by Poland (2004) and the Czech Republic (2006). When looking at all of the series, Hungary appears to have been damaged the most by the fallout of the most recent recession (the flows declined from 2006 to 2010), but it is also the country that shows the most impressive recovery. The opposite is true for Poland, which incurred a negative shock around 2007, followed by a slight recovery and then a staggering fall starting in 2011.

Figure 6

Outward foreign direct investment flows (OFDIF) from selected Central European economies
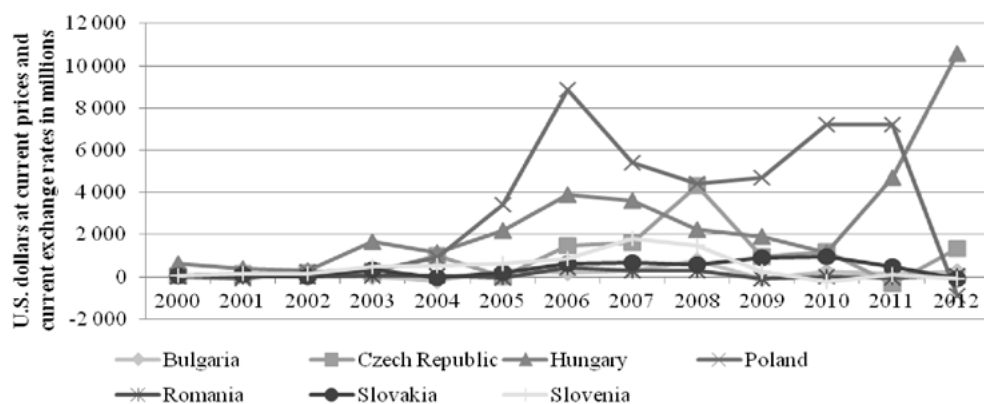
Source: Author's own graph based on data from UNCTAD.

In terms of the share of investment coming out of each of the centrally located European economies (Table 17), with the exception of 2007, Hungary is the most significant leader, accounting for up to 95.06% of total foreign direct investments coming from the region. Poland takes a distant second spot, while Slovakia and Slovenia close the spectrum at the negative end.

Table 17

Share of outward foreign direct investment flows (OFDIF) by selected economies from Central Europe as a percentage of total OFDIF by CECs for selected years

	2000	2004	2007	2012
Bulgaria	0.4%	–6.0%	2.1%	2.0%
Czech Republic	5.5%	29.7%	11.8%	12.0%
Hungary	79.9%	32.7%	26.5%	95.1%
Poland	**2.2%**	**26.3%**	**39.5%**	**–8.0%**
Romania	–1.7%	2.0%	2.0%	0.4%
Slovakia	5.2%	–0.8%	4.9%	–0.7%
Slovenia	8.3%	16.0%	13.2%	–0.8%

Source: Author's own table based on data from UNCTAD.

As in the case of the foreign direct investment stock, the tempo enjoyed by the economies of interest is significantly closer to that enjoyed by the world rather than that seen in the European Union. When looking at the flows, the role of Hungary has been described as the key in the region, especially as a foreign investor from the point of view of FDI flows.

Lastly, there are two points to make. First, as seen earlier, inward activity begins prior to 2004 and outward activity begins after 2004. Second, the decline in FDI flows is a result of investors shifting into capital in transit (NBP, 2014, p. 1), which also resulted in shifts in the geographical and economic allocation of investments (this issue is also discussed in the *World Investment Report 2013*, UNCTAD, 2013, pp. 15–17). National Bank of Poland studies shows that if the 2012 value were corrected for the capital in transit, the FDI inflow to Poland would turn out to be only 30% lower than in the previous year (NBP, 2014, p. 2).

Focusing specifically on Poland, from the long-term perspective (i.e., FDI stock), it is the biggest investor (Figure 1) and the biggest recipient (Figure 2) among all the CECs, with both series significantly diverging from those for other Central European economies. Poland's dominant position does carry over to the short-term perspective (i.e., FDI flows) where Poland is the biggest recipient (Table 16) and one of the biggest sources (Table 17) of FDI flows (with the exception of 2012).

Foreign direct investment in Central European countries by indexes

This part of the research will look at two indexes: 1) the Bilateral FDI Index, to show the intensity of bilateral foreign direct investments of CECs, and 2) UNCTAD's FDI Attraction Index (to show another measure of hosts' ability and success in attracting foreign direct investment over a rolling three-year period, UNCTAD, 2012, p. 30).

The first index is based on the Intra-Industry Trade Index (discussed by Misala, 2011, p. 167, Equation 1). The value of the index ranges from 0 to 1; the higher the value, the higher the intensity of bilateral foreign direct investments (between, e.g., Poland and the European Union or Poland and the world).

Equation 1
Bilateral FDI Index formula

$$BFDII_{ij,t} = \frac{\left(OFDI_{ij,t} + IFDI_{ij,t}\right) - \left|\left(OFDI_{ij,t} - IFDI_{ij,t}\right)\right|}{\left(OFDI_{ij,t} + IFDI_{ij,t}\right)}$$

Where:
$BFDII_{ij,t}$ – bilateral FDI index between economies i and j in year t,
$OFDI_{ij,t}$ – outward stock of FDI from economy i to economy j in year t,
$IFDI_{ij,t}$ – inward stock of FDI from economy j to economy i in year t.
Source: Author's own formula.

The second index looks at "the average of a country's rankings in FDI inflows" (UNCTAD, 2012, p. 30); the higher the value of the index, the higher the country's ability to attract foreign investors with the incorporation of the size of its economy. The index itself is the "average of country's rankings in FDI inflows and in FDI inflows as a share of GDP" (UNCTAD, 2012, p. 30). The index can also be calculated based on the FDI stock, which provides a more long-term perspective (UNCTAD, 2012, p. 30).

The European Union as a collective has a high degree of bilateral investment (Table 18), and Slovenia is the only CEC country that reaches levels near the EU average, being the dominant economy in terms of the Bilateral FDI Index. In 2012, Slovenia was ahead of Hungary and Poland, both of which show the highest levels of bilateral foreign direct investments. The values for the index have been growing since the economies' accession to the EU; this reflects the trends for CECs' outward FDI activity, as discussed earlier.

Table 18

Bilateral FDI Index with the world for CECs individually and as a collective, and for the European Union for selected years

	2000	2004	2007	2012
Bulgaria	0.0484	0.0173	0.0420	0.0722
Czech Republic	0.0659	0.1232	0.1415	0.2002
Hungary	0.1060	0.1781	0.3071	0.5024
Poland	**0.0578**	**0.0744**	**0.2135**	**0.3993**
Romania	0.0384	0.0262	0.0386	0.0375
Slovakia	0.1475	0.0741	0.0836	0.1465
Slovenia	0.4195	0.5700	0.7169	0.6685
CECs	0.0887	0.1216	0.1951	0.3117
EU27	0.8022	0.9269	0.9266	0.8848

Source: Author's own table based on own calculations using data from UNCTAD.

In ranking countries according to their ability to attract FDI (Table 19), as measured with the UNCTAD Attraction Index, Poland's position underwent some changes. It worsened until 2003 (46th), after which Poland's ranking improved, and in 2006 Poland was 23rd. After 2007, Poland's ability to attract FDI deteriorated again. In 2011, the country ranked 40th. Notably, Poland's deteriorating attractiveness is not an exception when looking at the entire CEC group, and in 2011 it was Poland that was at the top spot in UNCTAD's ranking among all the analyzed economies.

Table 19

Researched economies ranked according to UNCTAD's FDI Attraction Index

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Bulgaria	33	30	33	21	12	6	5	4	4	4	12	45
Czech Republic	10	9	7	9	15	13	20	24	54	72	80	65
Hungary	15	14	18	22	32	19	22	45	56	90	81	82
Poland	**29**	**32**	**37**	**46**	**30**	**30**	**23**	**30**	**37**	**39**	**56**	**40**
Romania	54	70	68	57	18	10	6	13	15	26	36	88
Slovakia	43	25	11	8	8	26	18	42	41	93	118	144
Slovenia	136	133	61	69	67	126	125	125	122	142	152	167

Source: UNCTAD.

An interesting observation that can serve as a conclusion to this section is that Slovenia (despite its relatively low FDI activity in absolute terms) is looking very good when it comes to bilateral FDI, but it is Slovenia's attractiveness to foreign investors that has deteriorated the most in the researched timeframe, as shown by UNCTAD's FDI Attraction Index.

EU accession as a determinant of foreign direct investment in Poland and other Central European Countries

EU membership has been approached by Bevan and Estrin (2000) as a reduction in a member's country risk, which is an indication of economic, institutional, environmental and political stability (Bevan and Estrin, 2000, p. 9; Buch, Kokta and Piazolo, 2001, p. 1). Sometimes even the prospect of membership is enough to stimulate investments directed at that economy as investors seek to get a head start, as proven for Spain and Portugal by Buch, Kokta and Piazolo, 2001, p. 21). In addition to sharing this view, another benefit of EU membership is highlighted by Carstensen and Toubal, who underline that when a home economy makes an investment in a host economy that is a member of the European Union, it also gains access to EU markets (Carstensen and Toubal, 2003, p. 3). Authors also point out that EU membership can be seen as an indication of, and a proxy for, the transition process of CECs (Carstensen and Toubal, 2003, p. 2; Buch, Kokta and Piazolo, 2001, pp. 7–8).

The list of possible determinants of foreign direct investment in very general. Many economic concepts are used, such as the size/potential of the host market, and the same concept can be represented by many variables—for example, GDP – Bevan and Estrin, 2000, p. 13; GDP per capita—Walsh and Yu, 2010, p. 7; and the sum of the host's and home's GDPs– Xun and Awokuse, 2005, p. 11 (the issue of oversaturation has been covered by Blonigen and Piger, 2011).

Still, it is possible to extrapolate three staple economic concepts that appear in all models where foreign direct investment is the dependent variable, i.e. $FDI = f(X_1,..., X_n)$

and the topic of the research are the determinants of this phenomenon. These concepts are: 1) market size/potential, 2) trade and its costs and 3) cost of the resource (which almost always is the cost of labor). Following this theme, the author makes a subjective choice (given the abundance of possible determinants) to use gross domestic product (*GDP*), openness to trade (exports plus imports as a percentage of the host's GDP, [(*X+M*)/*GDP*]*100, Kerr, Peter, 2001, p. 5) and the unit labor cost (*ULC*) to represent the three staple concepts of what attracts foreign direct investment.

The best way of entering the EU membership of the host economy into the model is presented (and used in this research) by Buch, Kokta and Piazolo (2001, p. 9), who use a simple dummy variable with a value of 1 to denote a member of the European Union (also used by Buch, Kleinert and Toubal, 2003, p. 19).

In addition, because of the importance of the financial system highlighted by many researchers (e.g., Buch, Kokta and Piazolo, 2001, pp. 9–10), a decision was made to include money and quasi money (*M2*, a measure used by Buch, Kokta and Piazolo, 2001, in per GDP terms) to represent its development.

Data and correlation analysis

Because the data on inward FDI in Poland constitute too short of a timeframe, and due to a lack of complementary data on the determinants of inward FDI (e.g., unit labor costs), it was not possible to construct a valid time-series model for this economy. As a result, it was decided to construct a panel data base for the countries that have a similar geographical location and entered the European Union in 2004 and 2007, and to build the model for those economies as a collective. The countries selected for this part of the research are the Czech Republic, Hungary, Poland, Slovakia, and Slovenia. Due to the fact that inclusion of countries such as Bulgaria or Romania would create a significantly unbalanced dataset (i.e., there was no data on key macroeconomic factors such as unit labor costs), despite meeting the geographical and accession requirement listed above, these countries have been excluded from this part of the research.

Data has been collected on the following variables:

- Inward foreign direct investment stock in the host economies in U.S. dollars at current prices and current exchange rates in millions from UNCTAD,
- Gross domestic product of the host economies in constant 2005 dollars from the World Bank,
- Exports of goods and services out of the host economies in constant 2005 dollars from the World Bank,
- Imports of goods and services into the host economies in constant 2005 dollars from the World Bank,
- Unit labor cost in the host economies expressed as an index where 2010 = 100 from the OECD,
- Money and quasi money (M2) in the host economy as a percentage of the respective host's gross domestic product from the World Bank.

The independent variable of interest in this study, i.e. the host's EU membership, has been introduced into the model as a dummy variable, which takes the value of 1 for the year in which the economy joined the European Union and afterwards, and the value of 0 for years prior to joining.

Data on some macroeconomic concepts had to be complemented by the author.[10] For Hungary, Slovakia, and Slovenia the referenced source did not have the data on international trade for 2011 and 2012 and for Slovakia there was a lack of data on money and quasi money for 2009–2012. To resolve this issue, the author fit a linear trend[11] to the data in order to forecast the missing values based on the fitted trend equation for each of the seven series.

- For exports from Hungary, the trend has the R-squared value of 0.9629
- For the imports to Hungary, the trend has the R-squared value of 0.9627
- For exports from Slovakia, the trend has the R-squared value of 0.9367
- For the imports to Slovakia, the trend has the R-squared value of 0.9309
- For exports from Slovenia, the trend has the R-squared value of 0.9165
- For the imports to Slovenia, the trend has the R-squared value of 0.8972
- For money and quasi money for Slovakia, the trend has the R-squared value of 0.4358[12]

The collected data was used to construct the following six variables:
1. The dependent variable: Stock of inward foreign direct investments, IFDIS
2. Independent variables:
   a. Gross domestic product, GDP,
   b. Openness of the host economy to trade as expressed by the sum of its exports and imports as a percentage of its gross domestic product, $[(X+M)/GDP]*100$,
   c. Unit labor cost, ULC (OECD Index 2010 = 100),
   d. Membership in the European Union, EU,
   e. Money and quasi money, M2.[13]

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[10] In some cases, data in constant 2005 dollars were unavailable in the World Bank's database. Using data in current prices would be a mistake given that inflation in each host economy was different. This would make the calculations even more difficult as it would require another complete set of data (coming from one source) on inflation for each analyzed economy. Because supplementing the existing dataset with data from other source(s) is impossible due to possible differences in the methodology used to arrive at constant 2005 dollars, it was decided to use the existing data to estimate the missing data points. Of course, another alternative was to accept an unbalanced panel dataset, but this would have been a much worse solution, especially in light of the fact that the number of estimated values is at most six out of 90 (i.e., 6.67%).

[11] Admittedly, the R-squared value was higher for the fit of the exponential trend, but the estimated values for 2011 and 2012 were sometimes more than four times greater than the value for 2010; hence, these results were rejected.

[12] Despite attempts to fit non-linear trends to the data, the value of R-squared changed insignificantly; hence, it was decided to stay with the linear trend.

[13] This variable was derived by first multiplying the original data by GDP and then by dividing it by 100, i.e., reversing the procedure of expressing M2 as a percentage of GDP.

Based on previous studies on the subject of determinants of foreign direct investment, it is hypothesized that the coefficient of the gross domestic product, openness to trade, membership in the European Union and money and quasi money variables will be positive while the coefficient of the unit labor cost variable will be negative (Table 20).

Table 20

Summary of variable coefficient's null and alternative hypotheses statements

Independent Variable's Coefficient	Null Hypothesis	Alternative Hypothesis
β_{ODP}	$\beta_{ODP} \leq 0$	$\beta_{ODP} > 0$
$\beta_{[(X+M)/ODP]*100}$	$\beta_{[(X+M)/ODP]*100} \leq 0$	$\beta_{[(X+M)/ODP]*100} > 0$
β_{ULC}	$\beta_{ULC} \geq 0$	$\beta_{ULC} < 0$
β_{EU}	$\beta_{EU} \leq 0$	$\beta_{EU} > 0$
β_{M2}	$\beta_{M2} \leq 0$	$\beta_{M2} > 0$

Source: Author's own table.

Because the used variables are non-stationary, a co-integration analysis was employed in order to determine if the data can be used in its original form. If this is the case, this will mean that common trends cancel out and that there is a long-term equilibrium between the used variables (Banerjee, Carrion-i-Silvestre, 2006, p. 1). To test for co-integration, Pedroni (1999, Table 21) statistics with the null hypothesis of no co-integration were used and calculated with the EViews 8 software package. The within-dimension statistics are divided, as two of them (Panel v-Statistic and panel rho-Statistic) do not allow for the rejection of the null hypothesis, while the other two (Panel PP-Statistic and Panel ADF-Statistic) suggest that, at a 5% level of significance, the null hypothesis can be rejected. In terms of between-dimension statistics, two of them (Group PP-Statistic and Group ADF-Statistic) are for the rejection of the null hypothesis, while Group rho-Statistic points to the contrary.

The initial step taken in the econometric analysis is the examination of Pearson linear correlation coefficients (r) and their respective null hypotheses (H0: $r = 0$) at a 5% level of significance. Despite the fact that a correlation coefficient between two variables has been found statistically significant, it does not justify a statement of causation between the two variables. Keeping this restriction in mind, the analysis of the calculated coefficients of correlation will take place via the lens of the previously stated hypothesis statements in regards to the cause-and-effect relationship between inward foreign direct investments and selected independent variables.

First, the analysis is conducted on the data as an aggregate (i.e., without separating the data by countries).

Table 21

Results of Pedroni tests for co-integration with the null hypothesis of no co-integration

Pedroni's co-integration test				
Variables: IFDIS PKB [(X+M)/PKB]*100 ULC EU M2				
	Statistic	Prob.	Weighted statistic	Prob.
Panel v-Statistic	–0.879	0.810	–0.940	0.827
Panel rho-Statistic	1.082	0.860	1.597	0.945
Panel PP-Statistic	–11.997	0.000	–6.601	0.000
Panel ADF-Statistic	–4.212	0.000	–3.693	0.000
	Statistic	Prob.		
Group rho-Statistic	2.605	0.995		
Group PP-Statistic	–8.870	0.000		
Group ADF-Statistic	–4.579	0.000		

Source: Author's own table based on results obtained with EViews software.

Table 22

Pearson correlation coefficients for data without by-country separation

		IFDIS	GDP	X	M	ULC	EU	M2
GDP	Pearson Correlation	0.753	1.000	0.583	0.849	0.343	0.207	0.953
	Sig. (2-tailed)	0.000		0.000	0.000	0.001	0.050	0.000
X	Pearson Correlation	0.741	0.583	1.000	0.813	0.547	0.474	0.666
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000	0.000
M	Pearson Correlation	0.942	0.849	0.813	1.000	0.634	0.526	0.916
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000	0.000
ULC	Pearson Correlation	0.614	0.343	0.547	0.634	1.000	0.753	0.461
	Sig. (2-tailed)	0.000	0.001	0.000	0.000		0.000	0.000
EU	Pearson Correlation	0.608	0.207	0.474	0.526	0.753	1.000	0.332
	Sig. (2-tailed)	0.000	0.050	0.000	0.000	0.000		0.001
M2	Pearson Correlation	0.878	0.953	0.666	0.916	0.461	0.332	1.000
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	0.001	

Source: Author's table of results obtained with SPSS software.

All of the used independent variables are significantly correlated with the dependent variable from the statistical point of view (i.e., p-value < 0.05). Almost all of the calculated coefficients have the expected sign, the exception being the positive sign of the coefficient for the pair of ULC and IFDIS; based on the set hypotheses, the expected sign was negative. The reason for the positive sign of the coefficient of correlation can be the fact that the unit labor cost is measured as an index that is almost constantly increasing throughout the studied period, reaching 100 in 2010; hence, in the examined period, the value for inward foreign direct investment and the unit

labor cost were both increasing.[14] Again, there is no call for alarm as this is just a test for correlation and not a cause-and-effect relationship. Of note are the high correlation coefficients between GDP and international trade variables. This problem goes away after the openness of the economy to international trade is expressed as a sum of exports and imports relative to the host's GDP. Admittedly, this transformation yields the correlation coefficient between the dependent variable and the newly formed independent variable statistically insignificant, p-value = 0.183, but due to its solid base in research publications on the topic and the nature of the correlation as a phenomenon, this issue does not play a significant role in this study.

Another troubling coefficient of correlation is the one between GDP and money and quasi money. This is due to the fact that a) these two macro variables go in tandem, as in the case of the international trade variables and b) the initial M2 variable was transformed using GDP, which may have also contributed to the issue. Unfortunately, there is no other data (i.e., M1) that is available for all of the explored economies from one source, so a decision was made to stay with the current measurement of M2.

When the correlation coefficients are calculated by separating the data by countries (Table 23), the results closely follow those obtained for the aggregate database. That is, all correlation coefficients (with the exception of the X and IFDIS pair for Hungary) are found to be statistically significant at a 1% level of significance and their signs are as hypothesized, again with the exception of the unit labor cost.

Table 23
Pearson correlation coefficients for data with by-country separation

		Czech Republic	Hungary	**Poland**	Slovakia	Slovenia
		IFDIS				
GDP	Pearson Correlation	0.982	0.924	**0.982**	0.988	0.934
	Sig. (2-tailed)	0.000	0.000	**0.000**	0.000	0.000
X	Pearson Correlation	0.976	0.526	**0.982**	0.979	0.942
	Sig. (2-tailed)	0.000	0.025	**0.000**	0.000	0.000
M	Pearson Correlation	0.970	0.948	**0.972**	0.966	0.944
	Sig. (2-tailed)	0.000	0.000	**0.000**	0.000	0.000
ULC	Pearson Correlation	0.861	0.944	**0.750**	0.936	0.925
	Sig. (2-tailed)	0.000	0.000	**0.000**	0.000	0.000
EU	Pearson Correlation	0.883	0.921	**0.879**	0.919	0.882
	Sig. (2-tailed)	0.000	0.000	**0.000**	0.000	0.000
M2	Pearson Correlation	0.951	0.977	**0.973**	0.952	0.963
	Sig. (2-tailed)	0.000	0.000	**0.000**	0.000	0.000

Source: Author's table of results obtained with SPSS software.

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[14] For the researched period and the researched economies, it was impossible to find a different variable to represent ULC that would come from one source as a requirement for unified methodology.

Model estimation

The model, as mentioned earlier, is built on a set for five countries for years from 1995 to 2012, i.e. 90 observations per variable for each of the six variables—one dependent and five independent, yielding a balanced dataset. Because the model is static rather than dynamic (i.e., it does not have a lagged dependent variable as one of its independent variables, which is dictated by the fact that the FDI stock is more static than FDI flows, as has been presented earlier), it can be estimated with the use of the Ordinary Least Squares method (Leitão, 2010) as it does not lead to the issues listed by Carstensen and Toubal (2003, pp. 7–12). Research (e.g., Woodridge, 2010) suggests using cross-section and time effects (random or fixed, used for example by Razin, Rubinstein and Sadka, 2004, p. 17) in order to correct for, i.e. capture, the data pertaining to a particular cross-section (in this case, a host country) and to a particular point in time (in this case, a particular year). Unfortunately, because of the use of a dummy variable that is time-dependent (EU membership), it is impossible to use time fixed/random effects as they create the problem of a near singular matrix; that is, they are perfectly correlated with the used dummy variable causing the problem of multicolinearity. In order to decide whether the used cross-section effects should be fixed or random, a model with fixed effects has been estimated and then the effects were tested with the Redundant Fixed Effects Test with a null hypothesis of the effects being redundant. As the results of the test show (Table 24), the null hypothesis can be rejected; therefore, statistically confirming the correctness of applied cross-section fixed effects. For the coefficient covariance method, the White cross-section method was applied in order to achieve estimators robust to cross-section correlation and heteroskadesticity.

Table 24
Redundant Fixed Effects Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	11.412	(4,80)	0.000
Cross-section Chi-square	40.632	4	0.000

Source: Author's own table based on results obtained with EViews software.

The presented procedure was carried out on the following structural equation (Equation 2):

Equation 2
Structural equation of the model to be estimated

$$IFDIS_{i,t} = \beta_0 + \beta_1 PKB_{i,t} + \beta_2 [(\frac{X+M}{PKB}) * 100]_{i,t} + \beta_3 ULC_{i,t} + \beta_4 UE_{i,t} + \beta_5 M2_{i,t} + \delta_i + \varepsilon_{i,t}$$

Where:
$IFDIS_{i,t}$ – Stock of inward foreign direct investment in the host economy i in year t, i.e., the dependent variable
β_0 – Constant term
β_a – Coefficient of the ath dependent variable, $a = 1, 2,..., 5$
$GDP_{i,t}$ – Gross domestic product in the host economy i in year t
$[[(X+M)/GDP]*100]_{i,t}$ – Openness to trade of the host economy i in year t
$ULC_{i,t}$ – Unit labor cost in the host economy i in year t
$EU_{i,t}$ – Dummy variable for host i's membership in the European Union in year t
δ_t – Cross section fixed effect
$\varepsilon_{i,t}$ – Error term
Source: Author's own equation.

After estimating the model within the EViews software package, the results presented in Table 25 were obtained.

Table 25
Model's estimation results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	–87886.8	13471.98	–6.524	0.000
GDP	7.31E–07	2.04E–07	3.593	0.001
[(X+M)/GDP]*100	562.816	99.0416	5.683	0.000
ULC	–679.746	171.1046	–3.973	0.000
EU	9985.738	3650.444	2.735	0.008
M2	5.12E–07	2.33E–07	2.199	0.031
R-squared	0.965537	F-statistic	249.0351	
Adjusted R-squared	0.96166	Prob(F-statistic)	0.000	

Source: Author's own table based on results obtained with EViews software.

Starting with the model statistics, based on the Prob.(F-statistic) being equal to 0.000, it can be said that the model as a whole is statistically valid and it is a better explanation of the changes in the dependent variable than using mean values. As for the extent of variation in the dependent variable that is explained by the model (R-squared = 0.965), 96.55% of the variation in inward foreign direct investment

into the group of host economies is explained by the applied model. Therefore it is possible to say that the model is a good fit to the data. The Jarque-Bera test was used to establish that the residuals have a normal distribution, i.e. the null hypothesis of normal distribution could not have been rejected with the probability associated with the Jarque-Bera statistic being equal to 0.11. The validity of the model is also aided by the fact that the fitted data points are very close—at times spot-on—to the actual data (Figure 7).

Figure 7
Actual and fitted data (left-hand side axis), and residuals (right-hand side axis)
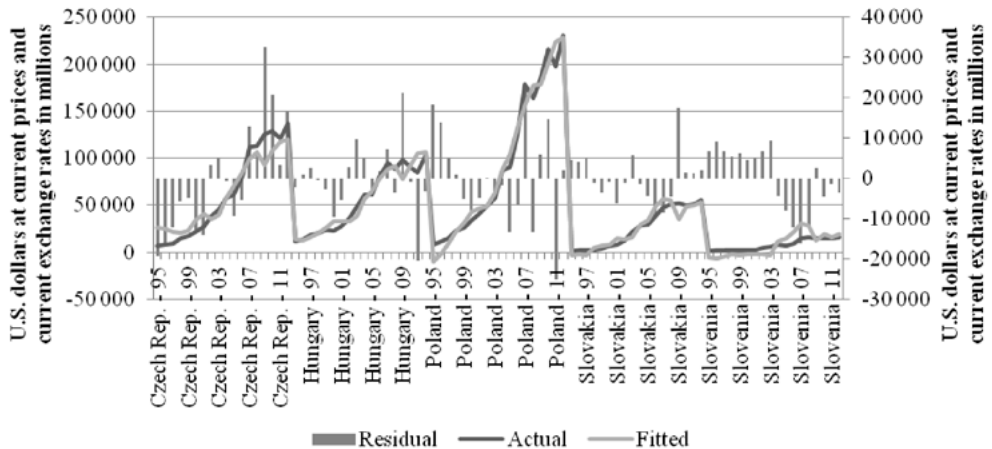
Source: Author's own graph based on results obtained with EViews software.

All the coefficients of the used explanatory variables were found to have the hypothesized signs and to be statistically significant on the very restrictive 1% level of significance (admittedly, the coefficient for M2 was found to be statistically significant at 5% with *p*-value = 0.0308). The values of the coefficients can be interpreted, *ceteris paribus*, as follows:

- An increase in the hosts' gross domestic product by $1 in constant 2005 dollars resulted in an increase in inward foreign direct investment by a mere $0.73.
- An increase in hosts' openness to trade, as expressed by the sum of exports and imports as a percentage of hosts' gross domestic product by one unit, resulted in an increase in inward foreign direct investment by $562.82 million,
- An increase in the unit labor cost index in the host country by one unit resulted in a decrease in inward foreign direct investment by $679.746 million,
- A change from the host country not being a member (EU = 0) to being a member (EU = 1) resulted in an increase in inward foreign direct investment by $9,985.738 million,

- An increase in the hosts' M2 by $1 million constant 2005 dollars resulted in an increase in inward foreign direct investment by a mere $0.51.

    The above analysis suggests the following conclusions that can be useful for economic policies dealing with increasing the attractiveness of an economy for foreign investors. First, the host's openness to trade is a positive factor in attracting FDI, at least up to the point when FDI and foreign trade become substitutes for each other. Second, hosts cannot permit an increase in their labor costs without shifting their economic structure toward the production of more technology-intensive goods. The obvious goal is to increase the host's GDP, which directly and indirectly impacts inward FDI.

Summary and conclusions

    Analyzing the trends in foreign direct investment from the long- and short-term perspectives (i.e., FDI stock and FDI flows), it is apparent that the attractiveness of the European Union to foreign investors increased in the 2000–2012 period, but not as fast as that of Central European countries, whose investment appeal grew more in line with global trends. Countries from this region are not only becoming recipients of more foreign direct investment. They are also becoming foreign investors themselves, with the same three economies leading the charge.

    In terms of the impact EU membership has had on foreign direct investment in Central Europe, it can be observed that a) inward investments increased upon the host's EU entry or just prior to it, while b) the outward activity has been found to take place after accession.

    A static econometric model constructed on the basis of panel data with the Ordinary Least Squares as the parameter estimation method was used to show that becoming a member of the European Union (introduced into the model as a dummy variable) had a positive impact on inward foreign direct investments in the researched countries.

    The data analyzed in this study have shown that, in reference to attractiveness to foreign investors, the positive impact on a new member is twofold:

- Pre-accession: the potential member is seen as reaching a specific level not only in terms of economic development, but also—which is probably more important—in terms of economic, legislative and political stability,
- After accession: the new member is able to consume and build on the benefits of its membership (e.g., low-cost access to other members' markets).

    Therefore, it is possible to say that the hypothesis that the EU membership of selected Central European countries has had a positive and statistically significant impact on inward foreign direct investment into those host economies, has been confirmed. Furthermore, based on data analysis, this hypothesis can be extended to include the period just prior to the CECs' accession to the European Union.

    Lastly, it is noteworthy that the significance of Poland as an investor and as a recipient of FDI in the CEC group is further highlighted by the fact that all the observations for the aggregate are generally in line with what can be observed for the

series in Poland. This means that Poland's membership in the European Union has had a positive impact on the country's attractiveness to foreign investors.

The results of this analysis for the researched economies from 1995 to 2012 should be interpreted with caution. One limitation is that there was no single source of data for all of the economies in all of the analyzed years, creating a need to estimate the missing data. Also, as in other studies on this topic, the choice of explanatory variables was a subjective decision of the researcher. These limitations may have an impact on the results, which should be taken into consideration when they are interpreted.

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2.3. Balance of Payments, Official Reserve Assets and External Debt: State of Play and Changes since Poland's EU Entry in 2004

Bogdan Radomski

In international competitiveness studies, foreign trade and the openness of an economy are treated as important determinants of a country's status in terms of its ability to compete. In the case of Poland, exports and foreign direct investment are factors strengthening the international competitive position of the Polish economy, although they do not play a key role in the country's competitiveness ratings.

The Swiss-based International Institute for Management Development (IMD) ranked Poland 26th in terms of the role of foreign trade in the country's international competitiveness and 56th in terms of foreign investment (IMD, 2013, p. 228).

A country's economic transactions with the rest of the world are recorded in a periodically drawn-up balance of payments. The balance of payments shows the results of this turnover in the form of the current account and the capital account. This offers an insight into how the country's current-account deficit is financed or how a potential current-account surplus is redistributed. The influence of the current-account surplus or deficit on a country's international competitive position is not clearly defined. The IMD's multiple-factor international competitiveness league table gives high scores to countries with current-account deficits as well as those with surpluses. Poland has steadily improved its position in the IMD standings[15] over the past several years (Table 26).

Table 26

Poland's balance of payments in 2004–2013—the current account, in millions of euros

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Current account	–10,736	–5,856	–10,425,	–19,245	–23,799	–12,152	–18,129,	–18,519	–14,191	–4,984
Balance on goods	–4,826	–2,508	–5,829	–13,827	–20,928	–5,427	–8,893	–10,059	–5,175	2,309
Balance on services	28	585	582	3,441	3,475	3,427	2,334	4,048	4,642	5,249
Balance on income	–6,775	–5,490	–7,728	–11,928	–8,685	–11,828	–,14,415	–16,869	–17,662	–16,377
Balance on current transfers	837	1,557	2,550	3,069	2,339	1,676	2,845	4,361	4,004,	3,835

Source: National Bank of Poland – www.nbp.pl, *Bilans Płatniczy Polski.*

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[15] For example, Poland was ranked 44th in 2009, followed by 32nd place in 2010, 2011 and 2012.

After the fall of communism and the start of Poland's transition to a market economy in the early 1990s, its current account showed a surplus only until 1995, but from 1996 onward, these surpluses were insufficient and the current account showed a deficit.

Poland's imports used to be higher than exports, but this trend changed in 2013. The country's outgoing payments—including transfers of profits and transfers of financial liabilities—are greater than incoming payments from similar sources. Service exports and private transfers from abroad outweigh outgoing payments from these sources.

The prices of imported goods are shaped by several factors including the exchange rate (Table 27). A strong national currency promotes imports while discouraging exports. With low inflation at home, consumers and producers may be less eager to buy domestically produced goods.

Table 27

NBP exchange rates in zlotys

Year	Euro	U.S. dollar
2005	4.02	3.23
2008	3.51	2.41
2009	4.32	3.11
2011	4.11	2.96
2012	4.18	3.25
2013	4.19	3.16

Source: GUS, (2013), p. 43.

Table 28

The terms-of-trade index in Poland's foreign trade, 2005–2013

Year	Terms of trade
2005	100.1
2008	97.9
2009	104.4
2011	98.8
2012	97.8
2013	102.7

Source: GUS, 2013, p. 41.

If we take the level of export and import prices in 2005 as 100, the terms-of-trade index in 2005–2013 stood at 1.10.[16] the index fluctuated in 2005–2013 (Table 27).

The relatively stable exchange rate is due to a constant surplus in the supply of capital from abroad and EU funds. This surplus supply of foreign currency strengthens the domestic currency because the Polish financial market is credible and the public finance deficit is moderate. This guarantees stable rates of return on invested capital, which strengthens the supply and stabilizes the exchange rate. This in a sense means coming full circle because the same factors create this credibility and strengthen it at the same time.

A key macroeconomic cause of the deficit is a shortage of domestic savings and the necessity of financing the gap from external sources (Orłowski, 1999, pp. 19–34). Foreign funds can come from a variety of sources: foreign direct investment, portfolio investment, grants, and subsidies. Funds from foreign investment and grants and subsidies are the least risky form of raising funds abroad. In both of these cases, they pose a minimal threat to the financial stability of the country. On the other hand, portfolio investment, which means investment in domestic securities and futures transactions, involves high risk.

The portion of the capital market formed by foreign portfolio investors is particularly vulnerable to speculative attacks and a "domino effect," both of which pose a risk to the country's financial system. Although the country's floating exchange rate system and quite substantial foreign exchange reserves are a protective shield for the Polish economy, the best guarantee for stabilization would be entering the eurozone.

The financial account of Poland's balance of payments (Table 29) confirms that the current-account deficit has been financed from external funds. This is explained in greater detail by an analysis of Poland's international investment position from 2004 to 2013 (Table 30).

The international investment position of a country, in this case Poland, is determined by the foreign assets and liabilities of domestic entities at the end of each year. The difference between the assets and liabilities determines the country's net international investment position. A positive difference (assets minus liabilities) means that the country is a net creditor, while a negative difference means that the country is a net debtor to the rest of the world. Since the beginning of its transition to a market economy, Poland has been a net debtor (Table 31). In 2011, its net international investment position was negative and accounted for –59.2% of the GDP; in 2010 the indicator was –66%. Other Central European countries had similar indicators of net international investment position relative to GDP in 2011. For example, in the Czech Republic the indicator was –0.7%, and Romania reported –60.5%.

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[16] Own calculations based on GUS data for IMD competitiveness reports, 2005–2013.

Table 29

Poland's balance of payments in 2004–2013—the financial and capital accounts, in millions of euros

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
1.Capital account – balance	954	786	1,666	3,418	4,068	5080	6,453	7,254	8,550	9,011
2. Financial account – balance	6,629	12,151	10,586	27,621	25,924	24,597	30,936	23,091	17,549	2,182
3.Balancing transactions	3,838	–627	204	–2,414	–8,621	–7,111	–7,767	–7,132	–3,171	–5,452
4. Current account minus financial account	685	6,454	2,031	9,380	2,428	10,414	11,493	4,694	8,737	757
5. Official reserve assets	–685	–6,454	–2,031	–9,380	–2,428	–10,414	–11,493	–4,694	–8,737	–757

Source: National Bank of Poland data – www.nbp.pl, *Bilans Płatniczy Polski.*

Table 30

Poland's balance of payments in 2004–2013—the country's international investment position, in millions of euros

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
TOTAL ASSETS	58,475	77,842	89,610	106,642	97,159	108,349	139,628	153,232	166,687	158,725
1. Polish direct investment abroad	2,457	5,330	10,933	14,492	17,104	20,334	33,264	40,890	43,495	39,926
2. Polish portfolio investment abroad	4,920	7,420	10,515	14,943	7,516	9,764	11,085	8,280	10,031	11,712
3. Other investment	23,910	28,700	30,910	31,643	26,721	22,349	22,130	23,860	25,942	25,861
4. Financial derivatives	222	421	419	872	1,679	681	3,158	4,880	4,642	4,082
5. Official reserve assets	26,966	35,971	36,833	44,692	44,139	55,221	69,991	75,722	82,577	77,144
TOTAL LIABILITIES	152,768	185,926	215,990	270,699	269,397	300,884	373,657	374,804	426,482	429,229
1. Foreign direct investment in Poland	63,601	76,785	95,554	121,280	116,634	128,494	161,396	157,153	178,258	183,048
2. Foreign portfolio investment in Poland	41,517	60,313	64,411	71,287	55,249	70,839	95,732	97,435	128,848	126,072
3. Other foreign investment	47,345	48,386	55,555	77,051	94,334	100,591	111,756	114,662	114,023	115,691
4. Financial derivatives	305	442	470	1,081	3,180	960	4,773	5,554	5,353	4,418
Net international investment position	–94,293	–108,084	–126,380	–164,057	–172,238	–192,535	–234,029	–221,572	–259,795	–270,504

Source: National Bank of Poland data – www.nbp.pl, *Międzynarodowa pozycja inwestycyjna Polski w 2013.*

As shown by the data in Table 30, starting from 2004 Poland's liabilities increased significantly in foreign portfolio investment and other foreign investment. Foreign portfolio investment increased due to a strong rise in the sales of government debt securities, and "other foreign investment" increased due to government loans incurred. In other words, the government sector and non-banking institutions have become major debtors in Poland in recent years. This debt is subject to the heavy influence of various types of turbulence generated by financial markets, which poses a risk to the country's competitive position.

Table 31

The breakdown of Poland's foreign debt in 2004–2013 in millions of euros

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total debt of which:	95,264	112,267	128,968	158,624	173,736	194,396	237,359	250,138	277,300	278,888
non-government and non-banking sector	41,981	48,233	58,694	73,352	81,872	87,508	98,407	105,292	110,293	110,455
Long-term debt	77,055	89,404	102,713	117,246	126,943	145,821	179,545	194,534	223,877	218,901
Short-term debt	18,209	22,863	26,255	41,378	46,793	48,575	57,814	55,604	53,423	59,987

Source: National Bank of Poland data – www.nbp.pl, *Bilans Płatniczy Polski*.

Poland's foreign debt is long-term in nature and rising. The short-term debt has remained practically the same for three years (Table 31). The data also show that the government sector and non-banking sector strongly contribute to the growth of Poland's foreign debt.

Table 32

Poland's foreign exchange reserves in 2009–2013—as of December, in millions of euros

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total reserves of which:	26,966	35,971	36,833	44,692	44,139	55,221	69,991	75,722	82,577	77,144
– currency reserve	25,339	34,218	35,034	42,644	42,840	50,929	64,612	69,403	76,067	72,153
– monetary gold	1,062	1,434	1,598	1,881	2,032	2,534	3,493	4,031	4,174	2,887
– IMF reserve	514	253	133	99	190	299	375	898	1,023	916
– SDR	51	66	68	68	77	1,459	1,511	1,390	1,313	1,188

Source: National Bank of Poland data – www.nbp.pl, *Bilans płatniczy Polski*.

Poland's foreign exchange reserves are steadily increasing. A pronounced increase was noted in currency reserve assets. In 2013, according to data from December of that

year, the overall reserves totaled €77.144 billion. This amount consisted of €72.153 billion in foreign currency, €2.887 billion worth of monetary gold, €1.188 billion worth of Special Drawing Rights (SDR), and a €916 million IMF reserve. Overall, Poland's foreign exchange reserves were 6.6% lower in 2013 than in 2012. Monetary gold reserves fell dramatically: they were 31% lower than in 2012. Currency reserves decreased by 5.2%, SDRs dropped by 9.6%, and the IMF reserve shrank by 10.5% (Table 32).

In conclusion, Poland's balance of payments shows a chronic current-account deficit accompanied by a constant capital-account surplus. The current-account deficit is due to a shortage of domestic savings for investment needs, combined with the supply of foreign capital, which has a strengthening effect on the Polish currency. This produces impulses for monetary policy, in particular for setting interest rates and foreign exchange sterilization operations. The state of foreign exchange reserves does not raise concern, because it is chiefly the government sector—and not the banking sector—that is becoming indebted and the debt is being incurred for long-term periods on the debt securities market rather than on the direct investment market. As the history of financial turbulence shows, the direct investment market is the most unstable. A guarantee of security is the country's continued economic growth, so the risk is manageable for now.

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PART II

DETERMINANTS OF POLAND'S COMPETITIVENESS

Chapter 3
Assets and Their Productivity

This chapter provides an analysis of tangible factors shaping the competitiveness of the Polish economy, such as human resources and physical capital (including infrastructure). We also look at technological factors reflected in the functioning of the national innovation system. Next, we examine changes in total factor productivity. This analysis shows to what extent economic growth and the related shifts in Poland's competitive position result from changes in tangible factor inputs (capital and labor) and to what extent they stem from changes in the level of technology.

3.1. Changes in Human Resources 2004–2013: Poland and the EU

Mateusz Mokrogulski

This subchapter seeks to evaluate trends in the development of human resources in Poland as one of the factors behind economic competitiveness during the first 10 years of Poland's membership in the European Union—from 2004 to 2013. The analysis covers the main factors determining the state of human resources in the economy, including demographic trends, changes in employment and unemployment, wages, and changes in labor productivity. Particular emphasis has been placed on demographic issues, especially in terms of low fertility rates and family policy tools.

Demography

In terms of population, Poland is the sixth-largest economy in the European Union. In 2004, just after joining the bloc, Poland's population accounted for 8.3% of the EU25 population, while the total population of all the new member countries

accounted for 16.1% of the EU25 population. This means that Poland accounted for more than half of the population growth related to the accession of the 10 new member states. Currently, the Polish population represents 7.6% of the EU28 total (the percentage reduction results mainly from the subsequent two rounds of EU enlargement, including Romania and Bulgaria in 2007 and Croatia in mid-2013). Despite Poland's significant demographic potential, demographic processes in the country have been largely negative since the beginning of its EU membership, and the observed temporary improvements were short-lived.

Poland still has one of the lowest fertility rates in the EU. In 2012, Poland's fertility rate was 1.30, roughly the same as in 2011. Other EU countries with low fertility rates include Portugal (1.28), Spain (1.32), and Greece, Hungary, and Slovakia (each with 1.34). In Poland, the fertility rate reached its highest value of 1.40 in 2009 and has declined ever since. Given that a simple replacement of generations takes place with a fertility rate of 2.1, the results are alarming and pose the risk of a continual decline in Poland's population in the coming years. Demographic problems are now affecting countries throughout the European Union, with the average fertility rate in the bloc at 1.58. France and Ireland are the only two EU countries with a rate above 2 (both with 2.1 in 2012).

Another demographic problem is a large number of Poles living outside the country. Poland's EU entry created opportunities for citizens to work in other member states, but this process was gradual. Britain, Ireland, and Sweden were the first EU countries to open their labor markets to Poles in 2004, and Finland, Greece, Spain, and Portugal followed suit two years later. From the end of July 2006, Poles could take jobs in Italy, and from May 1, 2007 in the Netherlands. Luxembourg opened its labor markets in November 2007, France in July 2008, Belgium and Denmark in May 2009, and Austria and Germany in May 2011. From 2004 to 2012, the number of Poles residing temporarily abroad more than doubled, from 1 million to 2.13 million. Significant changes came especially during the first three years after accession. Poles began to seek employment primarily in the UK, where there were about 637,000 Polish residents at the end of 2012. Many Poles are also living in Germany (500,000) and Ireland (118,000).

The question is why the fertility rate in Poland was so low. It turns out that Poles living abroad have far more children on average than their compatriots back home, according to data from the UK Office for National Statistics. Polish women living in the UK have a fertility rate of 2.13 and account for 3% of all newborn babies in the UK. The significant difference between the patterns of fertility displayed by Polish women living in Poland and the UK is frequently attributed to the lack of an adequate family policy in Poland. But is this claim justified? Until 2005 family policy tools were applied on a small scale in Poland. One of these was tax allowances for single parents. Owing to this solution taxpayers could deduct an additional tax credit for the child and, if they had sufficiently high income, they could reduce their taxable income. Critics argued this approach discriminated against married people, who, in order to reduce the tax burden, could get a fictional divorce. In fact, this policy was widely viewed as an anti-family policy. In 2006, a one-off child birth allowance

of ZL1,000 was introduced. As of 2007 taxpayers raising children, regardless of their marital status, could deduct an additional credit equal to twice the general tax credit (in 2007 it was 2 × ZL572.54 a year for each child). Now the rules for child allowances have been tightened. In 2013, single parents raising one child were entitled to a tax deduction of ZL1,112.04 (i.e. 2 × ZL556.02), but only if their annual income did not exceed ZL56,000. In the case of spouses filing jointly, the maximum amount of income entitling them to the tax relief is twice as high and stands at ZL112,000. For those bringing up two children, the rules of using the allowance did not change. But for people bringing up three children, the allowance for the third child was increased by 50%, and for those bringing up four children and more, the relief for the fourth and each subsequent child was increased by 100%. Recent changes in tax breaks for children do not change the fact that there is a family policy in place in Poland. However, demographic trends are still negative.

Figure 1

Natural increase, net migration (left axis) and total fertility rate (the number of newly born children to a woman—right axis) in Poland, 1990–2013
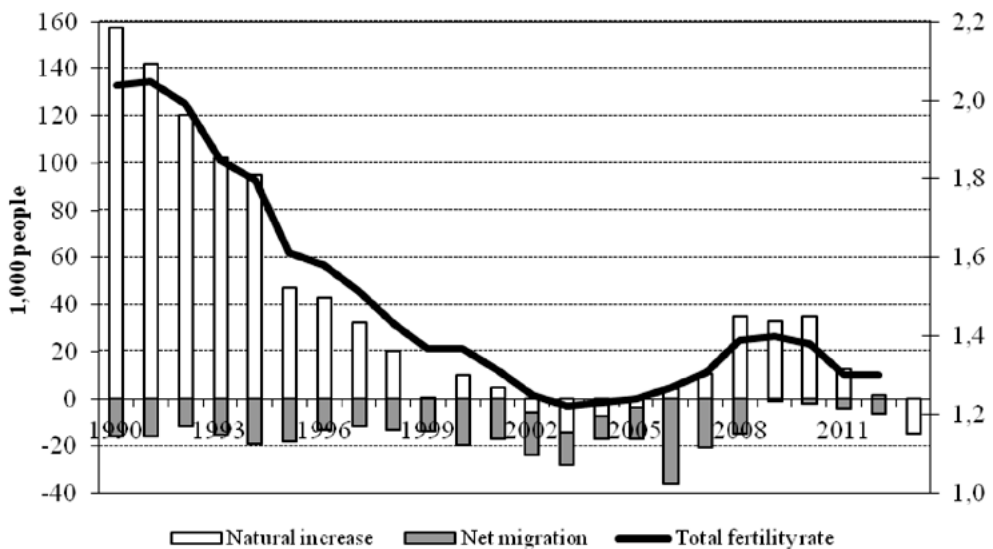
Source: GUS.

There are probably other factors behind the low fertility rate in Poland. One of them may be the financial situation of households in the broad sense. A closer look at family policy tools used in other European[1] countries (Table 1) makes it possible to assess the quality of those used in Poland.

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[1] Due to the fact that information on family policy tools is collected by the OECD, Table 1 contains data for selected OECD countries. Among EU28 countries, only Bulgaria, Romania, Croatia, Cyprus,

Table 1

Family policy tools in selected European countries in 2012

Country	Family policy tools in 2012 (yearly scale)
Austria	Family allowance of €1,264.80 for 1st child, €1,418.40 for 2nd child, €1,684.80 for 3rd child, and €1,864.80 for 4th and each additional child. Certain additives are allowed along with the age of the child. The children's tax credit amounts to €700.80 for each child, plus a family allowance of €132 or €220 per child. Additional tax relief is granted to families in which only one of the spouses is employed.
Belgium	The following income is tax exempt: €1,440 (1 child), €3,720 (total for 2 children), €8,330 (total for 3 children), €13,480 (total for 4 children), and €5,150 for each additional child. When income is lower than the amount of the relief, the family gets a refund. In addition, family allowances depend on the age of the child and range from €1,000 to €1,500 for the first child and from €3,000 to €3,700 for the third child.
Czech Republic	Payable tax credit of CZK 13,404 (€533) for each child. In addition, non-taxable family allowances are paid as follows: CZK 6,000 (€239) to CZK 8,400 (€334) per child (depending on the age of the child) for the poorest families.
Denmark	Transfers for each child ranging from DKK 10,632 (€1,428) to DKK 17,064 (€2,292) depending on the age of the child.
France	The family quotient (*quotient familial* in French) in which the income of family members is added up and then divided by the number of family "units;" the parents have a weight of 1, the first and second child has a weight of 0.5, and each additional child a weight of 1. The calculated tax is multiplied by the number of family members with weights. Income of up to €5,963 is exempt from tax. In addition, family allowances are also available.
Germany	Tax credit of €2,208 for the 1st and 2nd child, €2,280 for the 3rd child, and €2,580 for each additional child.
Hungary	The family tax allowance is HUF 750,000 (€2,594) per child for families with one or two children or HUF 2,475 million (€8,560) per child for families with at least 3 children (available after the 91st day of pregnancy). In addition, there are transfers for dependent children ranging from HUF 146,400 (€506) to HUF 310,800 (€1,075) for each child.
Ireland	Tax credit of €810 for families where one spouse works at home to look after children or incapacitated persons. Transfers for dependent children are €1,680 for the 1st and 2nd child and €1,776 for each additional child. There are also additional allowances for families with the lowest income.
Italy	Tax credit depends on the family income and the number of children. In addition, families with at least three children receive a tax credit of €200 per child.
Norway	Transfers for dependent children in the amount of NOK 11,640 (€1,557) per child.
Slovakia	Tax credit of €249.24 per child allowed if the annual income is at least six times the average monthly salary. Otherwise the tax credit is equal to €1,963.20. If the tax due is less than the amount of relief, the family gets a refund. Generous benefits granted to families with low income.
Spain	Income exempt of €1,836 for the 1st child, €2,040 for the 2nd child, €3,672 for the 3rd child, and €4,182 for the 4th child. An additional allowance of €2,244 per child under three years of age.

Malta, Lithuania and Latvia are not OECD members. At the same time, the analysis of the tax wedge includes four European countries that are not EU28 members, namely Norway, Switzerland, Iceland and Turkey.

Country	Family policy tools in 2012 (yearly scale)
Sweden	Transfers are tax exempt and independent of the parents' income. The transfers for each child are as follows: SEK 12,000 (€1,448) for the 1st child, SEK 14,400 (€1,654) for the 2nd child, SEK 18,048 (€2,073) for the 3rd child, SEK 24,720 (€2,840) for the 4th child, and SEK 27,600 (€3,171) for the 5th and each subsequent child.
Switzerland	Tax deduction of CHF 6,500 (€5,393) for each child and a tax credit of CHF 251 (€208) for each child. In addition, employers pay a benefit of approximately CHF 3,000 (€2,489) for each child of the employee.
UK	A child benefit of £1,058.50 (€1,305) per year for one child and £698.70 (€862) for the 2nd and each subsequent child. Additional relief granted to families with low income.

Note: The conversion from national currencies to the euro is based on the average 2012 annual exchange rates published by the National Bank of Poland, taking into account cross rates for the Polish zloty.

Source: Own calculation based on *Taxing Wages 2012*, OECD.

The multitude of tools used in the member states (allowances, tax credits, tax relief) causes difficulties in comparative analysis. An additional problem arises from the difference in wages and prices between EU countries. Therefore, for the purpose of this study, we will use indicators that will measure the relative intensity of family policy tools. The analysis uses the notion of a "tax wedge," which represents the difference between gross earnings increased by contributions paid by the employer (total labor costs) and the net salary, i.e. the amount received by the employee. The value of the tax wedge is given in relative terms, i.e. in relation to the total labor cost incurred by the employer. Among the available statistics of the tax wedge in the OECD databases, the following groups were selected:

a) a single person, no children, average earnings,
b) a married couple with two children, one spouse with average earnings, the other not employed,
c) a married couple with two children, one spouse with average earnings, the other spouse with two-thirds of average earnings.

The next step is to determine how the tax wedge is reduced when the taxpayer is bringing up children (an increase in net wages in relative terms is one of the effects of family policy tools). Therefore two indicators are calculated. The first one represents the difference between the tax wedge in case b) and a), and the second is the difference between the tax wedge in case c) and a). The higher the value of each indicator, the more significant the family policy tools used in the country. The values of both indicators are shown in Figure 2.

Figure 2

The intensity of family policy tools (in % of labor costs) in selected OECD countries for two selected types of families
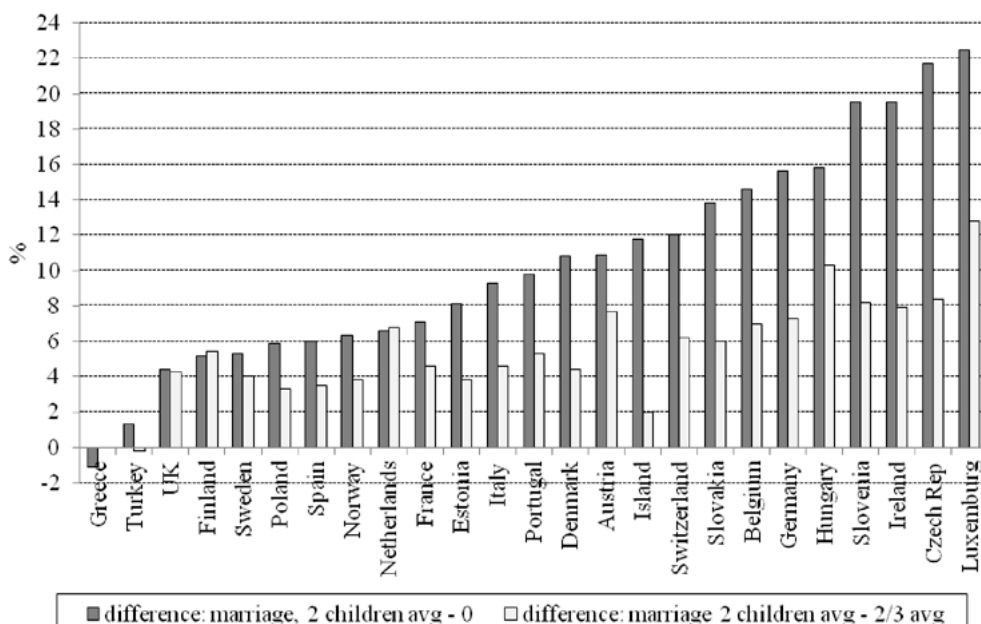
Source: Own calculations based on OECD data.

The data in Figure 2 show that Poland is among countries with the least developed family policy tools. Therefore, despite the changes in this area in Poland since 2006, this policy is not carried out on a large scale. Although the policy entails specific costs for the government, in the long term it represents an investment in the new generation. The current demographic trends make it very desirable. The financial and economic crisis in Europe has not resulted in cuts in family allowances (except in Ireland). In the majority of the countries, a slight increase in spending on family policy was observed. Despite the debt crisis, European countries have been generous in offering incentives for citizens to have children.

The calculations presented here refer only to the income side of households. They do not include expenses incurred by parents in connection with bringing up children. Expenditures are strongly influenced by the VAT rate, which is at the standard level of 23% in Poland in the case of children's products. The latest tax increase took place in early 2012, when the preferential 8% rate tax on children's shoes and baby clothes was increased. Also, the analysis does not consider workers' rights related to parenthood, such as maternity leave. In Poland, the leave entitlement for mothers after childbirth has been extended to one year and covers all children born in 2013 or later. The annual leave is now 20 weeks of basic maternity leave, six weeks of additional

maternity leave and 26 weeks of parental leave. In the case of the annual leave, the allowance has been reduced to 80% of the salary (from the previous level of 100% for the basic maternity leave of 20 weeks).

Low fertility means a gradual loss of the population, which causes society to age with time. This increases the proportion of retirement age persons per working-age person which requires reform of the existing pension system in order to ensure its long-term sustainability. In 2004, people aged 60–65 and over accounted for 15.3% of the Polish population, and those aged 0–17 years accounted for 21.2%. This means that there were 575 non-working-age persons (334 pre-working age and 241 post-working age persons) for every 1,000 working-age persons (i.e. 18–59/64). Over the years, the structure has undergone a gradual deterioration and in 2013 people aged 60–65 and over accounted for 18.2% of the population, the same as in the case of those aged 0–17 years. For every 1,000 people of working age there where 572 non-working age individuals, nearly the same as at the time of Poland's accession to the European Union. However, this last group included 286 pre-working people and 286 retirement-age persons. The share of older people has therefore clearly increased at the expense of children. In the years ahead, the population aging process will continue, posing a problem for both Poland and many other economies.

Labor market

When Poland was entering the European Union, the situation on the Polish labor market was difficult, even dramatic. The unemployment rate hovered around 20%, and employment was steadily falling. This was primarily due to an economic slowdown in 2002 and 2003, as labor market trends are usually delayed by several months before showing fluctuations in the real product economy. Also of significance was the fact that the process of systemic transformation in Poland was still in progress, reflected in developments including an artificial increase in labor productivity caused by reduced employment among the least productive workers. In this way people who were previously "disguisedly unemployed" (that is, at least partly employed) officially joined the unemployed ranks.

The period after Poland's EU accession can be divided into three phases in terms of labor market trends: rising, declining and stagnant. Each of these periods was conditioned by trends in the global economy. The first phase resulted from the economic recovery and was characterized by a significant increase in employment, a marked decline in the unemployment rate, and a rise in both nominal and real salaries. Although the increase in wages was partly due to a shrinking supply of labor caused by emigration, an increase in demand for labor was also evident. In 2006–2008, real wages in the economy increased by 16.2%, which represented an average annual growth of 5.1%. The increase in the corporate sector was greater than in the public sector, at 18.1% (5.7% annually) vs. 15.4% (4.9% annually).

A further increase in net salaries was noted as a result of reductions in disability premiums paid by employees,[2] from 6.5% to 3.5% in July 2007, and subsequently from 3.5% to 1.5% in 2008. At the end of April 2004, just before Poland joined the EU, the unemployment rate stood at 19.9% but by the end of the year it had fallen to 19.0%. At the end of 2007, the rate reached 11.2% and in October 2008 it fell to a historical low of 8.8%. Employment in the enterprise sector increased by a record 4.6% in 2007 on average. This trend continued until the global financial and economic crisis began in the third quarter of 2008. The Polish economy improved significantly and was doing increasingly better than other EU economies. The Polish labor market expanded faster than its counterparts in other member states on average. On accession to the EU Poland had the highest unemployment rate among the new entrants, at 19.1% on average in 2004, according to Eurostat data. Slovakia was next, with 18.4%. Overall, unemployment in the new member states was significantly higher than in the EU15 countries (at the time, Spain, Greece, and Germany had unemployment rates exceeding 10%). Although Poland has never matched leading EU economies in terms of labor market trends, in 2008 the unemployment rate in Poland was exactly at the EU27 average of 7.1%. Afterwards the rate began to rise in the aftermath of the financial and economic crisis. However, in Poland the deterioration was less visible than in the EU as a whole.

Figure 3

Increase/decrease of real wages and employment in the enterprise sector (corresponding month of previous year = 100) and the registered unemployment rate in Poland
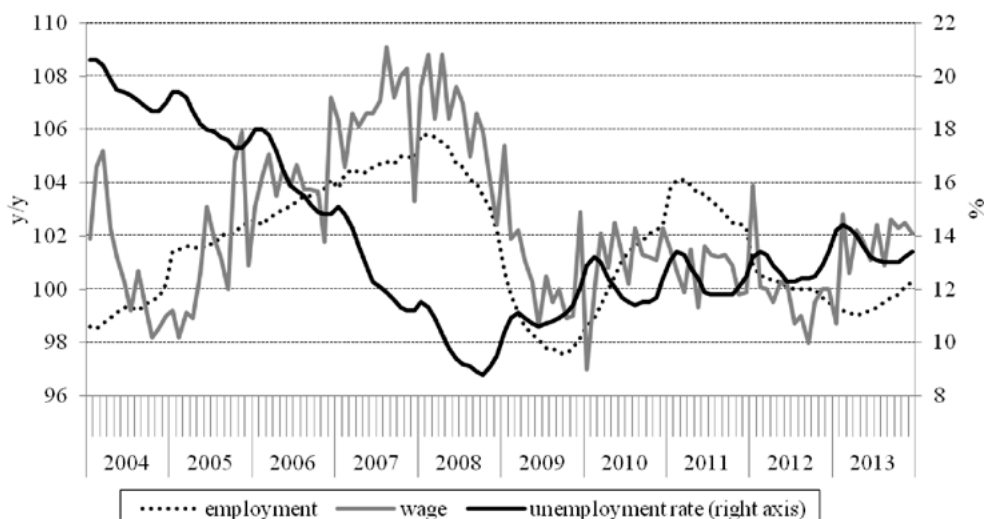
Source: GUS.

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[2] Beginning in 2008 disability premiums paid by employers were reduced from 6.5% to 4.5%, only to return 6.5% at the beginning of February 2012. Although the value of premiums paid by employers does affect labor costs, it remains neutral for both gross and net wages.

The second phase was a period of a rapid decline in economic activity, accompanied by a drop in employment and an increase in unemployment, with slower wage growth than in the previous phase. However, wages continued to rise in real terms. Interestingly, as the Polish labor market relatively quickly reacted to the crisis, the negative trends spread much faster than the positive trends in the first phase. Poland's labor market rapidly deteriorated in the fourth quarter of 2008 in a trend that lasted until the first half of 2010. The registered unemployment rate increased from 9.5% at the end of 2008 to 12.1% at the end of 2009 and to 12.4% in 2010. Demand for labor across the economy was uneven. Real wage growth decelerated substantially, to 2.0% in 2009 and 1.4% in 2010. In addition, in 2009 employment in the enterprise sector fell by an average of 1.5%. Beginning in 2008, wages grew faster in the public sector than in the corporate sector. While in the initial phase of the crisis, higher wage growth in the public sector can contribute to the stabilization of consumer demand, a continuation of this trend may suggest the presence of rigidities in the labor market in Poland. These actually occurred in the next phase.

The third phase, which began in the first half of 2010, was a period of stability in employment and unemployment. These indicators were subject to relatively small fluctuations. At the end of 2013 the unemployment rate logged at 13.4%, equaling that at the end of 2012 and overshooting the 12.5% registered at the end of 2011. From the end of 2010 to the end of 2013, employment in the manufacturing sector increased by 2.1%, growing at an average annual rate of 0.7%. This phase saw relatively slow real wage growth in the national economy, at 1.4% in 2011, 0.1% in 2012 and 2.5% in 2013. In 2012, wages in the enterprise sector fell by 0.2% in real terms. The marked increase in real wage growth in 2013 was partly due to an unexpected drop in inflation, to which nominal wages had no time to adjust, due to their rigidity. During the third phase, the labor market also became less flexible, which was reflected in an increase in long-term unemployment as well as by the jobless rate among 15–24-year-olds. At the end of 2012, long-term unemployment stood at 4.1%, up from 3.0% at the end of 2010 and 2.4% in late 2008. The jobless rate among 15–24-year-olds increased to 27.3% at the end of 2013, from 23.6% at the end of 2010 and 17.1% at the end of 2008, highlighting a growing problem among first-time job seekers.

The increasing number of long-term unemployed may eventually lead to their social exclusion. In the fourth quarter of 2013, the average job search lasted longer than a year and was about two months longer than in 2010. The progressing rigidity of the labor market was one of the reasons for an increase in emigration after the first phase of the financial and economic crisis.

The overall employment rate (in the 15–64 age group) increased from 51.7% to 59.7% from 2004 to 2012. At the beginning of the analyzed period, Poland had the lowest rate among EU states. At the end of 2012, employment rates in nine countries were lower than in Poland, with the EU27 average at 64.2%. During this period there was a significant increase in the employment rate in the 55–64 age group, from 26.2% to 38.7%, which helped the Polish economy advance from last to sixth position from

the end in the EU27 ranks (with an average of 48.9%). Recent data go hand in hand with the rise in the average age of professional deactivation, which in the analyzed period increased from less than 58 years to nearly 62 years. The observed trends are the result of the following changes:

- part of the population was stripped of their right to state pensions (transition);
- lack of extended privileges in the form of early retirement for women born after 1953 and men born after 1948;
- activation of older people on the labor market by the 50+ program.[3]

In the coming years, there will be a further improvement in the activity of the people aged over 55, which will be induced artificially by raising the retirement age. Changes will be particularly evident in the employment rates for women.

Education, labor costs and labor productivity

Polish society is relatively well educated in comparison with other European countries in terms of the percentage of people with at least a secondary education among those aged 25–64. This ratio stood at 90.0% in 2013, compared with 83.6% in 2004 and 74.9% on average in member states. However, in the case of higher education, Poland is below the EU average (25.5%, compared with 28.3% in 2013). Yet this is still a noticeable increase compared with 2004, when the indicator logged at 15.6%. Similarly, a relatively small percentage of people in Poland participate in various courses and training programs; the indicator stands at 4.4% vs. 10.7% in the EU27 on average in 2013. The high level of education has a positive effect on wages, as confirmed by statistics. However, lifelong learning is as important as education. Focusing on self-development and raising professional qualifications helps avoid unemployment during an economic downturn and reduces the risk of unemployment among people approaching retirement age.

The relatively good education of Poles is accompanied by low nominal labor costs per hour of work. For Poland this ratio is comparable to those in Hungary, Slovakia and Estonia, higher than in Lithuania, Latvia, Romania, and Bulgaria, but still one-third the figure in the UK and one-fourth the labor costs in Germany. Therefore the cost advantage of Poland, along with the entire Central and Eastern Europe region, seems evident. The question is whether, in the longer term, this will be a sufficient incentive for foreign companies to create new jobs in Poland. In addition, it may turn out that the persistence of relatively low wages compared with the EU average will continue to encourage educated people to leave the country in search of employment. Incentives are needed for young people to remain in the country where their work will create significant value added. Financial stability is an important factor when making a decision to start a family and have children.

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[3] The full name of the program is "Solidarity across generations. Measures aiming at increasing the economic activity of people over 50."

Table 2
Nominal labor costs in euro per hour in selected European Union countries

Country	2005	2006	2007	2008	2009	2010	2011	2012
Poland	5.2	5.7	6.4	7.6	6.6	7.2	7.3	7.4
Czech Republic	6.3	7.0	7.7	9.2	9.1	9.8	10.5	10.6
Slovakia	5.9	6.4	6.9	7.3	7.6	7.7	8.0	8.3
Hungary	6.3	6.4	7.3	7.8	7.1	7.0	7.3	7.5
Lithuania	3.5	4.1	5.0	5.9	5.6	5.4	5.5	5.8
Latvia	3.0	3.7	4.8	5.9	5.8	5.5	5.7	6.0
Estonia	4.9	5.7	6.8	7.8	7.7	7.6	7.9	8.4
Slovenia	11.7	12.2	12.8	13.9	14.4	14.6	14.9	14.9
Germany	26.8	27.1	27.3	27.9	28.6	28.8	29.6	30.5
France	n.a.	n.a.	n.a.	31.2	31.6	32.5	33.6	34.2
Ireland	25.2	26.4	27.6	28.9	29.3	28.9	28.7	29.1
UK	21.3	22.4	23.3	20.9	18.8	20.0	20.1	21.6
Luxembourg	28.3	29.2	30.0	31.0	32.2	32.9	33.9	34.6
Romania	2.4	3.0	3.8	4.2	4.0	4.1	4.2	4.4
Bulgaria	1.6	1.7	2.0	2.6	2.9	3.1	3.3	3.6

Source: Eurostat.

When entering the European Union, Poland had one of the lowest labor productivity rates (expressed as GDP per person employed, in PPS); only the Baltic states[4] were lower. Labor productivity in Poland[5] began to increase slowly but steadily beginning in 2007 and the country's position has improved in comparison with the EU27 average. However, this does not change the fact that Poland is still among countries where labor productivity is low. In 2012, only Latvia, Estonia, Bulgaria, Romania, and Hungary had lower labor productivity rates (Table 3). Now that the Polish economy is recovering noticeably, a slow increase in labor productivity in Poland can be expected, along with a continuing process of catching up with Western Europe. It is also important that the potential inflationary pressures will not lead into an excessive increase in real wages, which can happen as a result of strongly adaptive inflation expectations. Such a scenario would result in employers focusing on reducing labor costs rather than creating new jobs.

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[4] As well as Bulgaria and Romania, which became EU members in 2007.
[5] Data on labor productivity in 2013 were not yet available at this writing.

Table 3
**Labor productivity expressed in GDP (in PPS) per person employed: Poland
in comparison with selected EU countries (EU27 = 100 for each year)**

Country	2003	2004	2005[a]	2006	2007	2008	2009	2010	2011	2012
Poland	60.3	61.8	61.7	61.1	62.2	62.3	65.4	70.1	72.1	73.5
Czech Republic	71.1	72.9	73.0	73.9	76.2	74.0	75.8	74.4	74.7	73.8
Slovakia	63.6	65.7	68.7	71.6	76.3	79.7	79.9	82.5	81.7	81.9
Hungary	65.9	67.0	67.6	67.7	66.5	70.6	72.3	71.8	72.7	71.1
Lithuania	52.5	53.8	54.9	56.7	59.5	61.9	57.9	68.3	72.4	73.9
Latvia	44.1	45.8	47.8	48.8	53.9	55.1	57.2	60.8	63.9	66.1
Estonia	54.9	57.7	60.7	62.3	66.6	65.6	66.0	69.0	69.8	69.9
Slovenia	78.8	81.5	83.1	83.2	83.1	83.6	80.0	79.6	81.2	80.8
Germany	107.8	107.5	108.5	108.6	108.2	107.8	104.1	106.9	108.3	106.9
France	116.1	115.3	116.3	115.2	115.5	115.2	117.2	116.9	116.9	116.1
Ireland	137.4	136.6	135.4	135.4	136.3	126.9	132.8	138.0	141.3	141.6
UK	114.0	115.4	114.9	114.3	111.7	108.8	106.9	102.6	100.4	99.7
Luxembourg	167.9	170.4	170.0	179.2	179.7	168.2	159.3	164.4	165.6	162.4
Romania	31.3	34.6	36.1	39.7	43.3	49.1	49.4	49.8	50.5	51.0
Bulgaria	34.7	34.7	35.8	36.4	37.4	39.7	39.7	41.0	43.0	44.2
United States	147.2	148.6	149.8	145.4	144.2	142.2	144.7	146.6	n.a.	n.a.

Source: Eurostat.

Unit labor costs increased temporarily after Poland joined the European Union and have shown a slight downward trend since 2008. Unit labor costs are now about 6% lower than in 2002, the reference year for this analysis. On the other hand, a look at selected sectors of the economy reveals a number of divergent processes. Above all, there is a substantial surplus in unit labor costs in trade, a service sector that is insignificantly exposed to the international exchange of goods. Unit labor costs showed a clear upward trend from 2007 onward, achieving their maximum value in the fourth quarter of 2008, at 140% of the 2002 average. In 2009, there was a significant correction in the index, and from 2010 it was positioned at a relatively stable level equal to an average of 112% of the value from the reference period. In industry and the construction sector, unit labor costs remained significantly lower than in 2002 on average (81% and 79% of the reference value respectively). It is expected that the stagnation today on the labor market will continue to have a disinflationary effect. However, price developments in Poland are highly dependent on trends on global markets where uncertainty persists about commodity prices. In addition, the exchange rate of the Polish zloty against the base market currencies remains a risk, especially to the euro and the U.S. dollar. Nevertheless, the stabilization in overall unit labor costs is a positive signal for the Polish economy.

Figure 4

Growth of seasonally adjusted unit labor costs in Poland (2002 = 100)
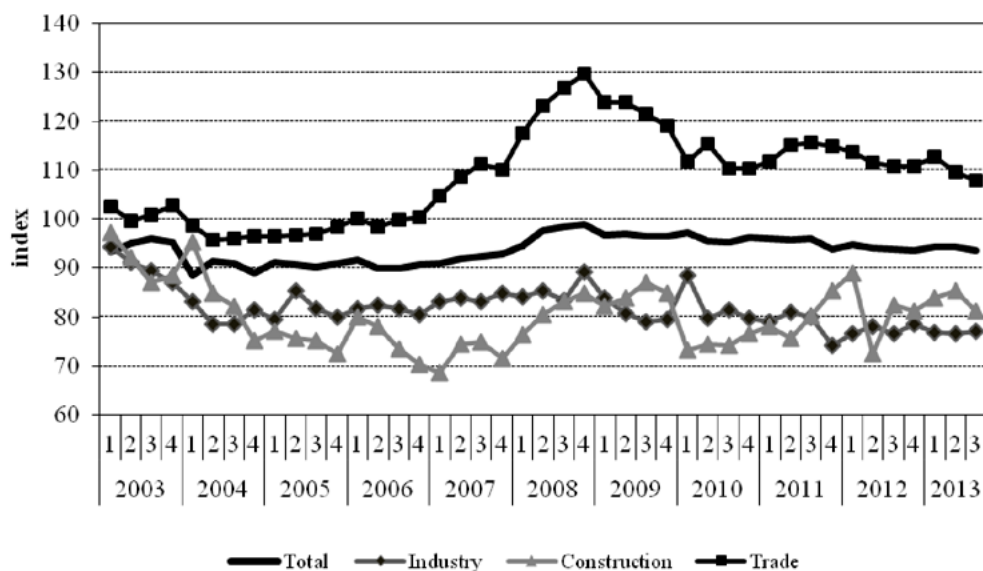
Source: Own calculations based on GUS data.

Conclusions

The first 10 years of Poland's membership in the European Union did not bring an improvement in demographic trends. Instead, the country's EU entry intensified labor force migration, with the opening of internal EU borders and the uncertain situation on the domestic labor market. At the same time, Poland began to use family policy tools on a small scale, but they have yet to produce a higher fertility rate. Despite an increase in real wages at a time of strong economic growth, Poland still has a noticeable competitive advantage over Western European countries in terms of labor costs. But a major challenge for economic policy is to create incentives for young and educated people to stay in the country and live their family and professional life here.

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3.2. Physical Capital and Infrastructure

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Investment and infrastructure are important determinants of the competitiveness of economies. In this subsection, their role in shaping the competitiveness of the Polish economy is analyzed, taking into account the changes that have occurred since Poland joined the European Union in 2004.

Investment

An in-depth look at investment outlays in Poland during its first 10 years of European Union membership, from 2004 to 2013, reveals two different periods in terms of the value and growth of this part of aggregate demand. From 2004 to 2008, the value of investment outlays grew consistently, with double-digit growth in 2006 and 2007. That made it possible to reach a level of investment equal to values from before the deep drop during the 2001–2003 period. This positive change in investment in Poland was definitely a result of Poland's EU accession and a general improvement in the Polish economy. In 2009 the value of investment outlays in the Polish economy began decreasing, except in 2011 when—together with GDP growth—investment increased by 8.4%. In the last five years the growth and value of investment outlays have shown negative trends due to the influence of adverse effects of the global economic crisis. Nevertheless, as in the case of GDP growth, the adverse influence on Poland was relatively moderate, at least compared with the rest of the EU. The value of investment outlays decreased no more than 1.7% in year-on-year terms, with a 17.6% increase in 2007.

Growing investment has increased the competitiveness of the Polish economy on the one hand. On the other, Polish enterprises performed better on the European market and increased their investment outlays and thus their capacity to meet growing demand. Because of a specific feedback mechanism described in the Keynesian

model, investment outlays influence the economy far more dramatically than private consumption or government spending and are responsible for the part of aggregate demand most dependent on the business climate. So, investment has stimulated both the demand and supply sides of the Polish economy. Both 2004 and 2005 marked a significant improvement in the Polish economy (with cumulative growth at around 9%, compared with just 5.3% during the 2002–2003 period). This automatically changed previous, negative trends in the value of investment and economic growth in Poland. In 2006 and 2007 the country's GDP growth rate was higher than 6%, with double-digit dynamics in investment. In 2008, the Polish economy expanded by 5.1% and the value of investment outlays grew by around 10%. The following year marked a negative change in both GDP growth (1.6%) and the value of investment (a decrease by 1%). In 2010, the Polish economy grew by 3.9%, not enough to increase the value of investment outlays, but the rate at which this part of aggregate demand decreased was lower than in the previous year (0.4%). In 2011, Poland's economic growth picked up again (to 4.5%) and investment increased by around 8% because of the feedback mechanism described above. The following year marked another deceleration in GDP growth (to 1.9%) and the value of investment outlays dropped by 1.7%, as expected.

The future path of investment growth in Poland is considered later in this chapter. Still, it is widely expected that the value of investment outlays will increase as a result of faster GDP growth (most probably 2.5%-3%). That could mean that the feedback mechanism observed in the 2008–2012 period would be at work again.

Figure 5
Investment growth in Poland, 2004–2013
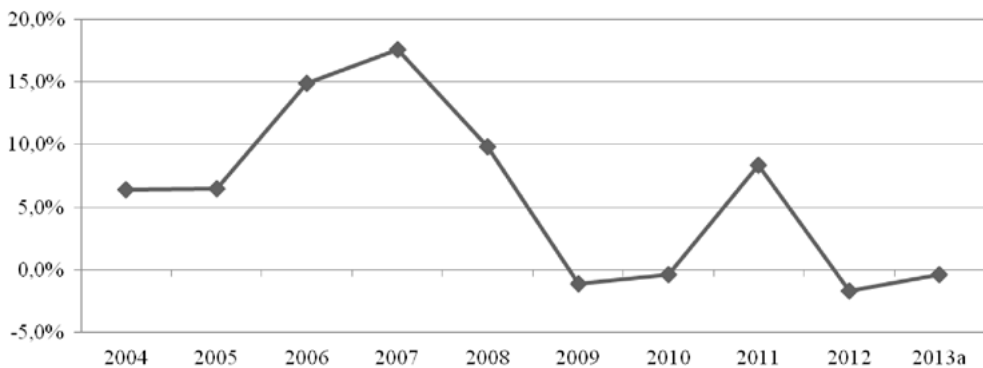
ᵃ preliminary data

Source: Author's own calculations based on Central Statistical Office data.

Contrary to optimistic expectations voiced last year by the government and some independent economists, 2013 most likely did not mark a positive change in investment in Poland, albeit the rate at which the value of investment outlays decreased dropped significantly compared with the previous year. This change in the rate at which the value of investment outlays decreased should be treated as a positive trend, despite the fact

that 2013 was another consecutive year of negative dynamics in this part of aggregate demand and the total amount of investment outlays was substantially lower than during the 2007–2011 period. The 2013 investment ratio (relation of investment outlays to the GDP in current prices) was 18.4%, compared with 19.1% in 2012 and 20.3% in 2011.

The significant deceleration in investment outlays and gross fixed capital formation in the Polish economy in 2012 occurred despite slower GDP growth than in the previous year (1.6% in 2013, compared with 1.9% in 2012, according to preliminary data by the Central Statistical Office). This means that the link between this part of aggregate demand and the overall economic situation was not only different than in previous years, but also different than the relationship described by the Keynesian model. Yet, insofar as the data describing the Polish economy during the 2008–2012 period proved such a feedback mechanism, in 2013 the relationship between GDP growth and the value and growth of investment outlays was shaped in a totally different way.

The prime factor driving the decreasing negative growth of the investment pattern in 2013 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. Data by the Ministry of Regional Development show that the total expenditure of businesses, institutions and individuals benefiting from EU funds in Poland in 2013 came to ZL255.2 billion and increased by ZL65.2 billion (in the part directly financed by the EU, the increase was ZL45.4 billion), compared with ZL68.6 billion in 2012 (ZL48.4 billion directly financed by the EU). In 2013, businesses, institutions and individuals benefiting from EU funds again spent more than 30% of all structural and cohesion funds allocated to Poland under the EU's 2007–2013 budget.

Another factor behind the deceleration in investment was the relatively moderate course of the financial crisis in Poland, at least compared with the rest of the EU. From 2008 to 2013 the Polish economy expanded by almost 20%, while the average cumulative growth in the EU as a whole was close to zero. 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. In addition, 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. However, as time passed, banks became accustomed to the poorer climate and started to lend money to enterprises planning investment projects, which led to a positive growth rate for investment in 2011. In 2012–2013, the value of investment outlays dropped again (by 2%). Notably, the non-financial sector recorded substantial financial results, which enabled it to finance investment projects with its own funds.

The key factor that led to continued negative trends in investment, alongside slower GDP growth, was a significant drop in the foreign direct investment (FDI). Preliminary data by the Polish central bank (NBP) show that FDI in Poland not only decreased but its value was negative (–$2.9 billion) in 2013. The NBP said this was chiefly due to a single decision to close down a special-purpose entity established previously in

Poland. As a result of that decision, Poland lost almost $3 billion in FDI. Such decisions made by foreign owners of such special-purpose entities have a major influence on Polish statistics, but regardless of that, last year marked a significant change in the FDI inflow to Poland. From 2004 to 2011 foreign direct investment in Poland reached $10-24 billion annually. In 2012 it was only $4.8 billion and this decrease was accompanied by an increased outflow of foreign capital, amounting to $4 billion. In 2013, the FDI inflow was negative for the first time since the NBP began publishing its own statistics. The most important question is whether this change is only temporary or whether the negative trend will continue in the longer term. That could mean that Poland is losing its selling points. Admittedly, according to a ranking list of the best destinations for direct investment compiled by A.T. Kearney, Poland moved from 23rd to 19th place in 2013, but this did not lead to financial decisions. Besides, Poland had been ranked higher in previous years: fifth in 2005 and sixth in 2010.

A comparison of changes in investment outlays in Poland with those of the Czech Republic, Slovakia, and Hungary—Poland's main competitors in the region for foreign capital—shows that, although the level and growth of capital formation in all the Central and Eastern European countries that have joined the EU is mainly determined by external factors, there are significant differences between them (Figure 6).[6] More precisely, the value and growth of investment outlays in the Czech Republic, Slovakia, and Hungary are changing in the same way, and this increasingly visible convergence trend is different than the pattern influencing investment in Poland.

Figure 6

A comparison of investment growth in Poland, the Czech Republic, Hungary, and Slovakia, 2008–2013
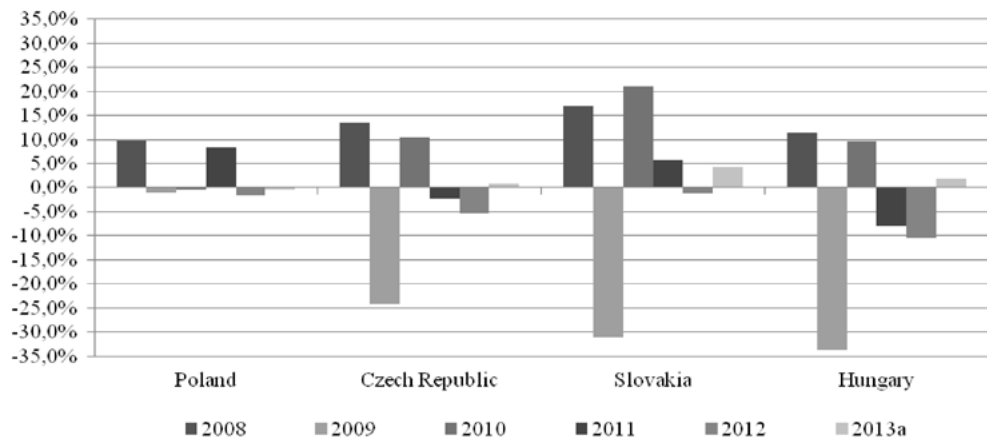
[a] preliminary data

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

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[6] The data on investment outlays in the Czech Republic, Hungary, and Slovakia in 2008–2013 come from the Eurostat website: http://epp.eurostat.cec.eu.int.

In 2013, investment in the Czech Republic was projected to increase by around 0.8%, which—as in the case of all of the analyzed countries—marked a positive change following a prolonged negative trend. Nevertheless, the Czech economy has been unable to return to its 2008 investment level. After a nearly 24% drop in 2009 and another cumulative drop of 7.5% in 2011 and 2012, the Czech economy cannot reach a stable growth rate in this part of aggregate demand.

Until 2013 data on investment outlays and their growth showed that, in the analyzed group of countries, the Slovak pattern was been the closest to that of Poland, although the 4.4% growth in investment in Slovakia could mean a future change in this pattern. Alongside Poland, Slovakia managed to maintain positive investment growth in 2010 and 2011. Slovakia's 2011 growth rate was lower than Poland's, but in 2010 and 2013 the value of investment outlays in Slovakia increased, whereas investment in Poland declined. While the Slovak investment growth path was similar to that of Poland until 2009, 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. The amplitude of variations in the value of investment in Slovakia is the highest in the group. Regardless of whether the rate rises or falls, in Slovakia the figure is always the highest.

Hungary, like the Czech Republic and Slovakia, also recorded a positive growth rate for investment in 2013 (1.9%). Thus Poland was the only country in the group that failed to change its unfavorable investment climate last year.

The future path of investment growth: tentative estimates

Considering the acceleration in GDP growth and in investment outlays in 2013, combined with some optimistic data published in February 2014, investment in Poland is likely to increase strongly in 2014, after a moderate decline in 2012 and 2013.

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 rapid 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 2003, the same trend was noted for GDP. A peculiar situation emerged during the 2009–2010 and 2012–2013 periods when, together with the decreased investment outlays and reduced employment, the GDP growth rate remained positive, chiefly due 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 indicates that the fast growth of fixed capital investment in the Polish economy leads to faster TFP growth in both 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 alternate with periods of negative growth in investment and labor outlays and

high TFP dynamics, which keeps the GDP growth rate above zero. 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 this mechanism, 2013 marked a substantial change from previous trends. Slower GDP growth was accompanied by a still negative but substantially slower rate at which the value of investment outlays changed. A turning point in this specific Polish business cycle was in the first quarter of 2013, when the GDP growth rate was 0.5%, mainly due to net exports. In subsequent quarters, positive trends on the demand side were increasingly visible. In the third and fourth quarters domestic demand positively influenced GDP growth, and the value of investment outlays increased 0.6% and 1.3% respectively. Data released by the Central Statistical Office in January this year showed a further acceleration in GDP growth. Considering positive forecasts, including a European Commission projection for 2.5% GDP growth in Poland in 2014, it is likely that investment in Poland will increase by around 5%. Of course, the higher the GDP growth rate (a March forecast by the NBP suggested the Polish economy would grow 3% in 2014), the higher investment outlays can be expected.

While analyzing the probability of the positive scenario, one more factor should be taken into consideration. In the absence of serious inflationary pressure, the central bank will probably keep interest rates at their previous low level until the end of the third quarter of 2014. This would help increase the amount of credit available to the corporate sector. A low cost of money, coupled with credit expansion, may lead to easier access to funds for enterprises. This should boost the overall level of investment in the country, especially in the second and third quarters of 2014.

With all these favorable data and forecasts for the Polish economy, it is highly unlikely that investment in Poland will decline further in 2014. The worst-case scenario is moderate growth of 2–3%, while the optimistic scenario is growth of around 7%.

In analyzing the probability of a negative scenario, three key factors should be considered. First, the negative scenario is more likely because the inflow of financial transfers from the EU budget began to decrease in the second half of 2013. Most of the growth in investment outlays over the past three years or so has been generated by the public sector, chiefly via EU funds. This positive climate will likely turn negative in 2014. Most of the funds allocated to the enterprise sector have already been spent and their beneficiaries have been reimbursed for their expenditures or are waiting for such reimbursement, so they will not continue with their investment projects. This means that prospective investment has already been made and it is very unlikely that investment supported by EU financing activity will be kept at the same level. New investment projects in the coming 12–15 months will likely be financed by companies' own resources or bank credit, and the cost of money from this source is much more expensive than EU funds.

A medium-term strategy introduced by the Polish government for the public finance sector calls for lowering the deficit below 3% of the GDP and thus bringing down the public debt level. Consequently, 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 Programme. As a result, the high ratio of absorption in the public sector will decrease significantly together with the value of Polish investment.

Second, in the longer term, the structure of investment in Poland could limit GDP growth to 2%-3.5%, leaving Poland in the "middle income trap." Because of the specific feedback mechanism described above, investment is most dependent on the business climate, so with this moderate GDP growth, investment outlays would increase relatively slowly, which would have a negative influence on the economy. So far the Polish economy, with its emerging "model of capitalism" and institutions supporting the development of the market, has managed to grow without any significant investment in innovative projects. But over time, 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 declining. In such a case, this specific business cycle in which periods of fast growth in investment outlays and employment (and consequently rapid GDP growth) alternate with periods of moderate growth (during which TFP is the only factor of GDP growth) could end soon. Moreover, the "model of capitalism" based on imitation (instead innovation) and low costs, which has functioned relatively well in Poland so far, could end quickly with production reallocated to countries with cheaper labor. What the Polish economy really needs 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 new (or at least reformed) institutions that will ensure an appropriate level of factors of production, and thus enable sufficient investment in innovation. These institutions (such as universities, investment funds, venture capital, business angels) have to be financed—at least in part and in the first few years—from public sources, including EU funds.

Third, the negative scenario is more likely because of the sharp decrease in the value of FDI in Poland in 2012 and 2013. The long-term evaluation of Poland as a destination for foreign direct investment is generally moderate. The positive appraisement of Poland's investment appeal offered in the previous edition of the report—in terms of the possibility of maintaining the positive trend in FDI—proved to be too optimistic. This was due to sagging GDP growth, combined with the continued existence of administrative barriers, underdeveloped transport infrastructure, and an incomprehensible system of public financial support for direct investment as well as an increasingly outdated model of the Polish economy. That model relied on cheap labor as the main

factor designed to draw investors, which negatively influenced the attractiveness of the Polish economy as a potential investment destination, not only compared with Asian countries but also other Central and Eastern European countries. Nevertheless, in the short and medium term, the Polish economy will stay relatively competitive for foreign direct investment, due to lower labor costs in both euro and dollar terms, even taking into account the moderate increase in labor costs due to higher average taxation. Poland should be an especially interesting destination for an additional transfer of capital in the next three to five years, especially for those international companies that have already invested in this country and could transfer a part or all of their production processes from Western Europe. But this strategy could be stopped in its tracks by growing unit labor costs. In such a case, many multinational companies could be tempted to move their production processes to countries with cheaper labor (such as Turkey and Central and Southeast Asian nations).

As in the previous edition of the report, all these estimates have been made with the assumption that Poland's economic and political environment will develop according to a baseline scenario in which no unexpected positive or negative trends will emerge either in Europe or worldwide during 2014. 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 commodity prices stimulated by continued tension in political relations between the EU and the United States, on the one hand, and Russia, on the other, in the wake of the Ukrainian crisis. The same would happen if the negative consequences of the financial crisis in Greece, Portugal and Spain spilled over the rest of the eurozone, lowering the GDP growth rate in this group. The deteriorating political situation across Poland's border could negatively influence the business plans of American companies and households and in such a situation all European countries (particularly Germany) would be hurt and investment outlays in Poland would drop significantly. This year started with a series of crises on emerging markets (Turkey, South Africa, Russia) that not only destabilized currencies in emerging economies (including the Polish zloty), but also called into question the hypothesis that the global crisis is finally over.

If, however, the political and economic situation in Ukraine and Russia improves and there is a relatively swift positive change in the business climate throughout 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.

Infrastructure

Since the early 1990s, infrastructure has been the subject of research as one of the additional factors of production, in most cases classified alongside physical resources and labor. It is often defined as a factor supporting other factors of production.

Research reports usually distinguish three main effects of infrastructure on the real economy:

- (public) infrastructure, exploited complementarily, constitutes a direct expenditure in the production process. Therefore, the impact of infrastructure can be defined as the effect of complementary expenditure. In this particular case, infrastructure constitutes an additional, complementary factor of production.
- (public and private) infrastructure facilitates innovation processes (by modernizing manufacturing processes); as a result, it indirectly impacts on production, productivity and competitiveness.
- (public and private) infrastructure can impact on the productivity of other factors of production. Infrastructure may be substitutive or complementary in relation to other factors and thus can affect factor productivity, which can be specified as an effect of factor "distortion" (Mackiewicz-Łyziak, 2010).

Infrastructure is of key importance for competitiveness since it affects productivity in the economy. This effect (or impact) may vary depending on whether a given sector produces for export or not. The greater the importance of infrastructure in the production and export process, the greater its impact on international competitiveness as well.

As in previous years, the accelerated process of investment in infrastructure continued in Poland in 2013. This was chiefly due to financial support from the EU's Cohesion Fund and structural funds (under the EU budget for 2007–2013). The main area of investment was transport infrastructure (roads and railways). In total, projects co-financed from the EU budget resulted in the construction of 10,948 km of roads, including 1,355 km of motorways and expressways. The government also built or modernized 1,653 km of railway lines; purchased or modernized 2,127 units of municipal transportation fleet; built 408 wastewater treatment plants; and built 46,012 km of a broadband internet network.

Road infrastructure

In 2013, 350 km of new supra-regional roads were put into operation, including 120 km of motorways, 181 km of expressways and around 48 km of main (national) roads. This accounts for less than half the figure from 2012 when a record 294 km of new motorways and 330 km of new expressways were launched. In addition, 246 road stretches with a total length of 677 km were renovated in 2013. As a result, at the end of 2013, Poland's network of dual carriageways was expected to total 2,759 km,

including 1,491 km of motorways and 1268 km of expressways. By the end of 2014, around 500 km of new road is expected to be put to use, according to the General Directorate for National Roads and Motorways in Poland (GDDKiA)—see Table 4.

Table 4
Length of motorways and expressways in 2004 vs. 2014 in Poland (km)

	2004	2014
Motorways	405	1,491
Expressways	226	1,268
Total	631	2,759

Source: GDDKiA.

The improved quantity and quality of roads is largely due to Poland's EU membership, especially the bloc's 2007–2013 budget, of which Poland is the biggest beneficiary. From 2007 to 2013, a total of 2,871 km of new roads were constructed in Poland, including 1,695 km of motorways and expressways. In addition, 5,739 km of road were renovated or modernized.

Figure 7
Total length of motorways and expressways in Poland in 2004–2013 (km)
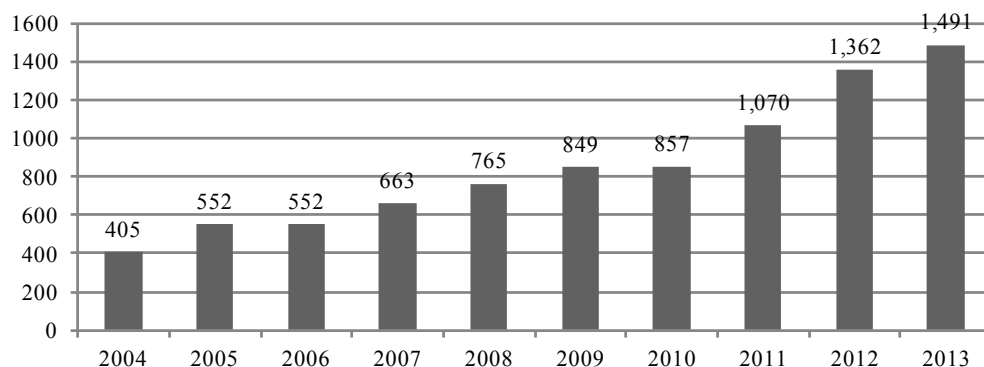
Source: GDDKiA (2014).

With these expenditures, the density ratio of the motorway network per 100 km^2 in Poland has increased by more than 100%, while the length of expressways and motorways in Poland has more than doubled. The growth rate in terms of the number of kilometers of motorways in Poland in 2007–2012 is 106% (GDDKiA, 2013).

Railway infrastructure

Poland has a relatively dense network of railway lines. However, the length of the network has decreased steadily since 1989. In 2013, the length of the railway network totaled 19,191 km in terms of railway lines (i.e. 37,076 km of tracks), including 27,768 km of mainline tracks and primary basic tracks at railway stations and 9,308 km of railway station tracks (PKP PLK, 2014).

A positive factor that makes Poland stand out in the European Union is a high degree of electrification, which brings about measurable energy savings and ecological benefits. However, this does not change the fact that the railway infrastructure (including tracks and traction equipment, train stations, signaling devices, technical instrumentation and railway crossings) is to a large extent obsolete and does not meet the standards for a high-speed train ride. The advantage of the national rail network is the existence of broad gauge connection hubs with Russia and CIS countries. They ensure fast and reliable transportation of goods to Eastern European markets.[7]

Tracks in "good condition" account for 43% of the total length of the railway network. Tracks in "satisfactory condition" account for 30%, those in "unsatisfactory condition" for 23%, and those in "poor condition" for 4%.

The most significant strategic change benefiting the development of the railway network has been the government's decision to change investment priorities in transport. With this decision, more funds than in the past have been allocated to the railways at the expense of road infrastructure. Furthermore, changes in rail system investment in 2012–1013 have contributed to an increased efficiency with which EU funds are being absorbed and spent. In the first half of 2012, 40% of ongoing projects were critically endangered. In order to increase the effectiveness of EU funds, the European Commission authorized the implementation of "revitalization" projects—not just modernization, as it was described previously (PKP PLK, 2014).

As a result, PKP PLK has become the biggest beneficiary of EU funds in Poland. This should be seen as a good sign for the future of railways in Poland. PKP PLK's investment expenditure in 2008–2011 was around ZL14 billion, while in 2012–2015 it is expected to reach ZL31 billion. In 2014, modernization projects on railway lines with a total length of 3,000 km are scheduled to be carried out.

The rolling stock is also being modernized. PKP Intercity has bought 40 new electric multiple units (EMU), 20 Pendolino trains, and 10 double-deck cars. It has also modernized 218 cars and purchased 45 new standard cars and 10 diesel engines, in addition to modernizing 20 engines. This investment means a significant improvement in the quality of railway equipment and shorter travel time. It should contribute

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[7] The broad-gauge network is 400 km long. The trail begins in Sławków in Poland's southern Upper Silesia region, where the country's largest loading ramp is located, and continues to the eastern town of Hrubieszów on the European Union's border with Ukraine.

to an increased number of passengers. According to PKP, the new Pendolino trains will carry 3.4 million passengers in 2015, followed by 4.3 million in 2016, and 4.9 million in 2019, with average seat occupancy of 65%.

The outlook for further investment in the coming years is positive, chiefly due to EU co-financing. Under the Infrastructure and the Environment Operational Programme alone, Poland will receive €27.5 billion for road and railway infrastructure, an amount similar to that allocated under the previous budget (2007–2013). Railways will claim a significantly larger portion of the funds. In 2008–2011, expenditure on railways in Poland was around ZL14 billion, while in the 2012–2015 period it is expected to reach around ZL31 billion (PKP PLK).

Airport infrastructure

Poland's accession to the European Union and the opening of the Polish aviation market has brought about a rapid growth of the air services market. This process has been further stimulated by a growing number of Poles living and working in other EU member states that have opened their labor markets to Polish workers since 2004. The appearance of low-cost air carriers (Ryanair and Wizzair) contributed to an increased use of air transport instead of bus transport. As a result, the number of checked-in passengers increased from 8.8 million in 2004 to 25.2 million in 2013 (according to preliminary data). This is a 310% increase in passenger traffic in the first 10 years since accession (ULC 2008; 2013).

With the increasing popularity of air transport, Poland's airfield and airport infrastructure has been modernized, expanded and developed. Today in Poland, there are 13 airports that handle passengers. Another three (in Gdynia, Radom and Szymany) are under construction or are operated seasonally. The Euro 2012 European football championships in Poland and Ukraine were an important stimulus to improve the quality of passenger service. Four airports in Euro 2012 host cities earmarked a combined ZL1.7 billion for investment projects.

As a result, the air traffic infrastructure in Poland is very well developed. The airports meet all European standards, reflecting the size of the country and the demand for air services.

Inland waterways and seaports

Although Poland is a country of lowlands, its inland waterways are poorly developed. The total length of the country's waterways was 3,660 km in 2013, and this figure has not changed for years. Of this, 91% of the total length (3,347 km) was actually in use. Only 206 km (5.5%) are river waterways with international significance. Inland waterways handle around 0.25% of the total volume of shipping, a figure that has been decreasing over the years (GUS, 2013).

In general, only two rivers in Poland are of economic value for transport, the Oder and the Vistula. The busiest waterway is the Oder Waterway (along with Gliwicki and Kędzierzyński Canals). However, for most of the navigation period, it is not possible to navigate between the upper and lower sections of the Oder River. The Vistula River is most often used in its upper section and in the lower section stretching from Płock to the Włocławek barrage and on downstream, from Tczew to the mouth of the Gulf of Gdańsk. Ports constitute an integral part of the inland waterway infrastructure. In recent years, rather scarce resources have been allocated to its development and extension, as a result of which Poland's inland waterways have undergone further deterioration.

There are four key seaports of international significance in Poland—Gdańsk, Gdynia, Szczecin and Świnoujście—along with 57 minor ports and marinas; 18 of these are sea border crossings as well. The most important regional ports include Police, Kołobrzeg, Darłowo, and Elbląg (MIR).

In 2013, all Polish seaports recorded an increase in the transshipment of goods. The Port of Gdańsk, for the first time in history, crossed the 30 million ton mark. The Port of Gdynia closed 2013 with nearly 18 million tons, a 11.7% increase over 2012. The ports of Szczecin and Świnoujście handled 22.7 million tons of goods, a 7% increase over 2012.

Power and energy infrastructure

Thanks to improved energy efficiency in manufacturing, primary energy consumption in Poland has gradually decreased since the launch of political and economic reforms in 1989. The process of reducing energy consumption has been accompanied by a gradual decommissioning of the most worn manufacturing equipment and transmission installations. For many years, this process had ensured that the infrastructure was kept in relatively good shape.

Without new investment, these basic reserves were soon depleted, and today the main problem of the energy infrastructure in Poland is due to a high level of depreciation of manufacturing equipment. The average age of the distribution network infrastructure ranges from 27 to 35 years, and in the case of the transmission network it is even higher. Around 70% of the power plants and power grids are depreciated: 15% of the power units are more than 50 years old and 40% are over 40 years old. The average energy efficiency of generation units in Poland is around 35%, while the efficiency of new units is around 45%.[8]

Due to a strong role of solid fuels in primary energy consumption, Poland still has a high, unfavorable ratio of emissions to energy use. The emission rate is about a third

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[8] Moreover, in early 2016, Directive 2001/80 on the limitation of emissions of certain pollutants into the air from large combustion plants (LCP) and Directive 2001/81 on national emission limits for SO2 and NOx will enter into force. This means that the environmental performance of some of the equipment used in Poland will be below acceptable levels and the units will have to be decommissioned.

higher than the EU27 average and also higher than the average for Central European countries. The only positive feature is a low level of emissions per capita, similar to that in other EU countries on average. This is due to significantly lower total energy consumption per capita than more developed countries.

In terms of electrical power engineering, the demand for electrical power in Poland has grown gradually. In 2014, work started on two new power units—with a total capacity of 1,800 MW—at the Opole II power plant, in what marks the biggest investment project in Poland's electrical power industry since 1989. Power unit no. 5 is scheduled to be completed after 54 months, and power unit No. 6 after 62 months. The project was postponed several times due to doubts over its profitability. However, the government's firm position led to its launch.

The Polish power grid company, Polskie Sieci Elektroenergetyczne (PSE), is expected to invest heavily in the development of transmission and distribution networks. By 2025, ZL23 billion will have been allocated for this purpose, of which around ZL9 billion will be spent in 2014–2018.

The beginning of 2014 brought significant progress in efforts to build Poland's first nuclear power plant. On Jan. 28, 2014, the government approved the Polish Nuclear Energy Program, which specifies the schedule for building two nuclear power plants and for developing regulatory and organizational infrastructure for this long-term project. It is estimated that the project will take at least 15 years to move from the decision to the actual launch of the power plant. In order to create a nuclear power industry in Poland, it is essential to build almost the entire infrastructure that this industry needs to operate and develop (including legal, organizational, institutional and R&D infrastructure as well as a personnel training system) (Ministry of Economy, 2014).

However, in December 2014, another flagship energy infrastructure project is scheduled to be completed, an LNG terminal in Świnoujście. Once it is operational, Poland will be able to import gas from alternative geographical regions and become more independent from Russian supplies.

This is even more important in the light of forecasts for growing demand for natural gas in Poland. Gas consumption is estimated to increase by 12.2% by 2020, and by 32.5% (to 20.2 billion m³) by 2030. Such profound and drastic fluctuations in demand require an expansion and modernization of gas infrastructure. After years of stagnation and underinvestment, the Polish gas transmission network is in need of comprehensive modernization, especially as 62% of the gas transmission network is over 26 years old. Gas transmission facilities that are less than five years old account for a mere 3% of the network. The costs of replacing the oldest sections of the gas transmission network will be ZL14 billion by 2025 (Gaz-System).

In 2014, the government is expected to come up with a new long-term energy policy until 2050 to replace its old policy, which spans the period until 2030. Most probably, the new policy will provide for the growing importance of natural gas from the country's own sources (including non-conventional ones) as well as from imports, accompanied by a decreased role of hard coal and lignite.

Conclusions

Poland's first 10 years in the European Union coincided with a period of dynamic infrastructure development. To a large extent, this was made possible by the proper use of EU structural funds and the Cohesion Fund; Poland's total allocation from these two sources was a generous €67.3 billion. Poland has become the biggest beneficiary of EU structural aid, which helped build 10,948 km of road, including 1,355 km of motorways and expressways in the country during the 10-year period. Poland also built or modernized 1,653 km of railway lines. With these projects, the country has managed to reduce its development gap with other EU member states.

Airport infrastructure has also undergone intensive development. Today Poland has a network of modern airports in major cities and regional airports that meet the demand for air transport services in the country.

However, Poland failed to stop the process of energy and power infrastructure depreciation in 2004–2014. Most investment plans have not been implemented, mainly due to shifts in the legal environment, regulatory provisions, and environmental conditions. It was not until the beginning of 2014 that a decision was made to build new large power units (Opole II) and go ahead with the Polish nuclear power program.

The EU's new budget for 2014–2020 is fairly generous for Poland, offering prospects for further improvement in infrastructure. The government's decision to change investment priorities in favor of public transport (railways and rolling stock)—accompanied by decreased support for the development of airports—deserves positive ratings. With domestic financing supported by EU funds, the coming years should see further convergence by Poland to more developed EU member states in terms of infrastructure. However, the importance of infrastructure for Poland's competitiveness is bound to decrease because the country has reached a level of development that requires it to look for more sophisticated sources of competitive advantages.

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3.3. Innovation System Restructuring in Poland in the Context of EU Membership

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EU11 countries restructured their innovation systems gradually, with some delay compared with the speed of economic transition in this region. The results of innovation system restructuring in EU11 countries, in combination with convergence processes, can be analyzed by comparing changes in the Summary Innovation Index (SII) with changes in real GDP per capita. This is illustrated in Figure 8, where the convergence (divergence) of real GDP per capita relative to the EU28 average (in p.p.) during the 2004–2013 period is marked on the horizontal axis, while the vertical axis shows the change in the Summary Innovation Index (SII) in relation to the EU28 average for the same period.

The convergence of GDP per capita was observed in all of the EU11 economies (excluding Slovenia) and was accompanied by slower changes in the innovativeness of these economies as expressed with the SII. However, the rate at which the SII changed in 2004–2013 in most EU11 countries was faster than the EU28 average. This trend was also present in Poland, while Slovakia and Hungary were the only EU11 economies that saw a convergence in terms of the SII in relation to the EU28 average. In the case of Slovenia, the process of catching up to the EU average in terms of innovation was accompanied by a divergence in terms of real GDP per capita (Figure 8). As far as Poland is concerned, in the 2004–2013 period, the country failed to complement the growth of real GDP per capita by catching up with the EU average—let alone EU innovation leaders—in terms of innovativeness. What are the causes of this negative trend? This question can be answered on the basis of a comparative analysis of the indicators incorporated in the SII. This analysis will show areas where the restructuring of the national innovation system was not completed. Table 5 gives an overview of the development of science and innovation in Poland compared with the other EU11 economies.

Figure 8

Changes in the Summary Innovation Index (SII) and changes in real GDP per capita (in PPS) in relation to the EU28 average levels, 2004–2013 (EU28=100; percentage points)
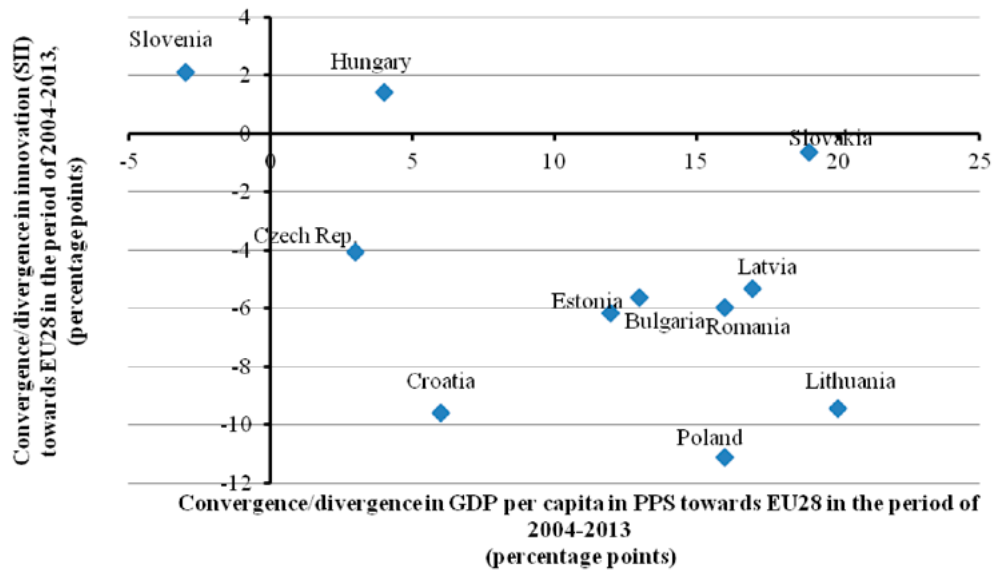
Source: Authors' elaboration based on Eurostat data and on *Innovation Union Scoreboard 2013*, European Commission, 2013.

The main indicator describing R&D from the input side is R&D intensity, understood as the ratio of R&D expenditures to GDP, and its changes over time. In the first decade of the 21st century in Poland, this relationship was well below the EU average. For example, in 2012 the figures were 0.90% vs. 2.06%. On the positive side, the Polish indicator grew twice as fast (1.6%) as the rate in the EU as a whole (0.8%). In 2012, only two EU11 economies, Slovenia and Estonia, had a higher level of R&D expenditure than the EU average. In 2000–2011, R&D expenditure growth in these two economies was in the double digits. In terms of the intensity of R&D expenditure in the EU11 group, the Czech Republic and Hungary stand out, with 1.88% and 1.30% respectively in 2012. R&D expenditure in other EU11 economies did not break the 1% of GDP threshold. The low level of R&D expenditure in Poland is also reflected by the *per capita* value: in 2012, R&D expenditure per capita in Poland, at €73.6, was one-seventh of the EU average of €516.2 (GUS, 2013, p. 54).

One of the problems in Poland is the structure of R&D expenditure inherited from a centrally planned economy, with the government sector in the dominant position. Only four EU11 economies—Estonia, Hungary, Slovenia, and Lithuania—were able to significantly restructure their R&D expenditures toward a growing role for the non-government sector (Figure 9).

Table 5

Overview of research and innovation performance: Poland and other EU11 countries compared

	R&D intensity index, 2012		Population aged 25–64 years having completed at least upper secondary education		HRST with tertiary education in science, mathematics and computing		Excellence in S&T index, 2010		Index of economic impact of innovation 2010–2011	Knowledge-intensity of economy 2010	
	value	growth rate (2000–2011) (%)	% of total in 2012	change since 2004 in p.p.	as a % of active population in 2012	change since 2004 in p.p.	value	growth rate (2005–2010) (%)		value	growth rate (2000–2011) (%)
Bulgaria	0.64	1.06	81.0	2.4	5.1	1.5	24.65	3.40	0.23	29.45	3.65
Czech Republic	1.88	4.23	92.5	5.7	9.3	2.0	29.90	4.58	0.50	39.58	2.91
Estonia	2.18	13.31	89.8	1.4	6.7	1.4	25.85	11.70	0.45	46.48	2.94
Latvia	0.66	4.15	89.1	4.1	5.1	–3.0	11.49	–0.15	0.25	34.38	3.96
Lithuania	0.90	4.13	93.4	0.4	6.5	0.0	13.92	2.62	0.22	35.28	5.04
Hungary	1.30	4.64	82.1	2.3	7.0	2.3	31.88	2.03	0.53	50.23	1.87
Poland	0.90	1.60	89.6	3.9	9.7	8.7	20.47	4.45	0.21	31.78	1.65
Romania	0.42	2.53	75.9	2.7	8.7	–7.3	17.84	7.81	0.38	28.35	5.86
Slovenia	2.80	12.47	85.0	3.5	5.1	–0.7	27.47	3.99	0.52	45.90	4.25
Slovakia	0.82	0.41	91.7	2.1	7.2	0.8	17.73	3.85	0.48	31.64	0.07
Croatia	0.75	–2.72	79.3	0.2	6.6	1.5	12.25	2.31	0.35	n.a	n.a
EU28 average[a]	2.06	0.80	74.2	2.1	8.7	–0.1	47.86	3.09	0.61	48.75	0.93

[a] if data were not available for EU28, average values for EU27 are given.

Source: Methodology and data derived from: European Commission (2013a), p. 5; data also taken from the Eurostat database.

In Poland, there was no significant change in the role of the business sector in R&D expenditures in 2004–2012; it was responsible for around 30% of total expenditure. However, the role of foreign funds in terms of R&D expenditure increased from 5.2% in 2004 to 13.3% in 2012. This was chiefly due to an inflow of EU funds; their contribution increased in the first few years of Poland's membership, reaching 5.6% in 2006. In 2007–2009, the role of EU funds fell to 3.6%, only to spring back to 10.9% in 2012. Even though the number of beneficiaries using EU funds for R&D has increased continuously, these entities account for a falling percentage of all research entities, at 14.2% in 2012, down from a high of 23% in 2006 (GUS, 2013, p. 66). This may mean that EU funds intended for R&D are increasingly reaching beneficiaries that are the most active in applying for foreign funds.

Figure 9

Gross domestic expenditure on R&D (GERD) by source of funds in Poland and other EU11 countries: 2004 and 2012 compared
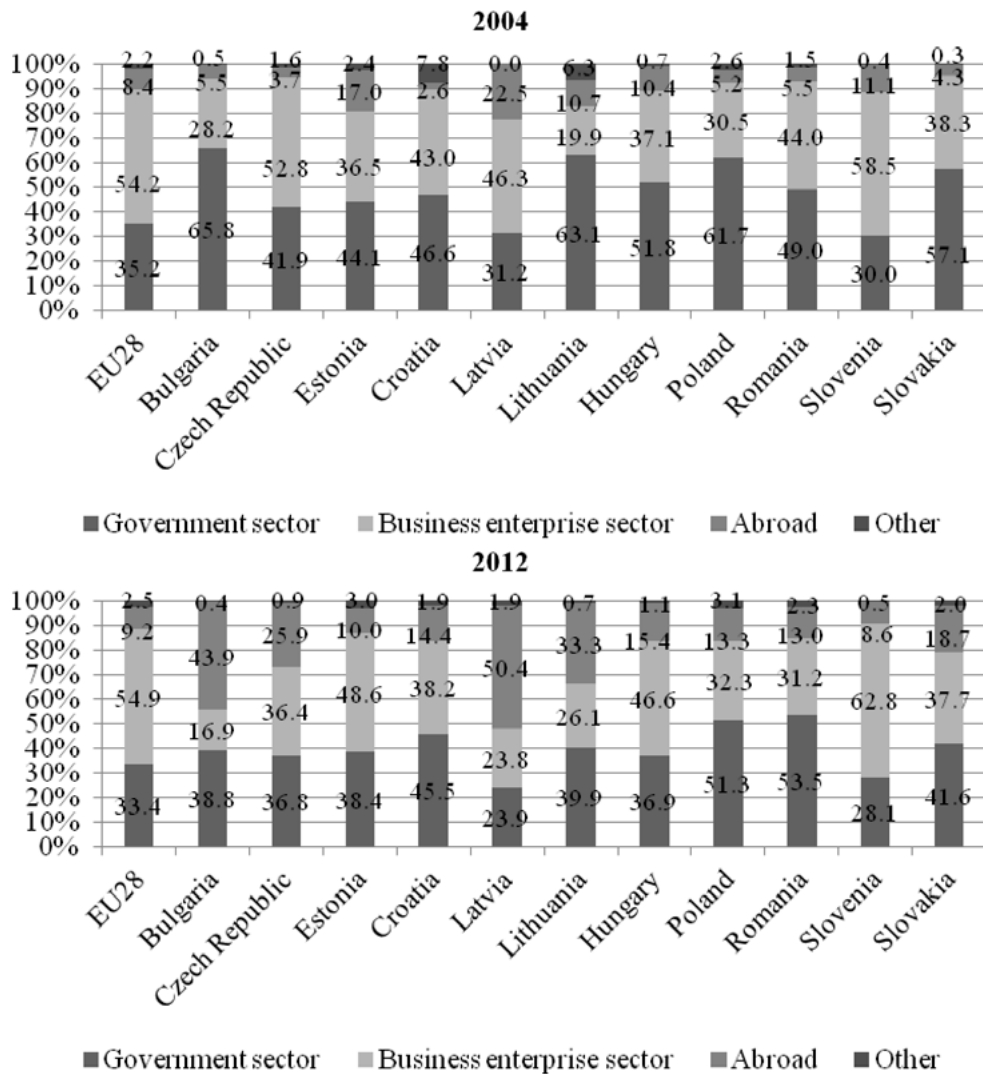
Source: Own elaboration based on Eurostat data.

In summary, Poland, like most other EU11 countries, saw some restructuring in its innovation system in terms of R&D financing in 2004–2012, but this was mainly based on an increased role of foreign funds, including EU funds. The business sector still is not the key player in financing research in the EU11. However, four of these economies stand out from this pattern: Estonia, Hungary, Lithuania, and Slovenia.

In these countries, the role of the business sector as a source of R&D financing increased. But only in Slovenia did the role of businesses in financing R&D surpass 50% and overshoot the EU average (Figure 9).

Human capital is a key factor for the proper functioning of a national innovation system. This is a strong point for Poland and most other EU11 countries, compared with the EU average, especially as human capital indicators in most of these countries grew at a faster rate than the EU average. Poland was the fifth economy among EU11 countries in terms of the percentage of the population aged 25–64 with more than a secondary education (89.6% in 2012), but was third (behind the Czech Republic and Latvia) with regard to the average growth of this indicator in 2004–2012. A similar trend was noted in another human capital indicator in EU11 countries in 2004–2012: the percentage of employees with a university degree in mathematics and computer science in the total working population. In Poland, the Czech Republic and Romania, this indicator was above the EU average. In 2012, it amounted to 9.7% in Poland, while the EU average was 8.7% (Table 5).

To sum up this assessment of restructuring in EU11 innovation systems in terms of human capital, it is necessary to note the relatively strong position of most EU11 countries, Poland in particular, and the positive changes in this position from 2004 to 2012.

In order to access how changes in the financing of R&D and in human capital affect the positions of Poland and other EU11 economies in science and technology, the Excellence in S&T index will be analyzed. This index comprises four separate indicators that describe scientific publications, references to these works, grants in per capita terms, and R&D expenditure.[9]

For all of the members of the EU11 group, the values of this index are significantly lower than the EU average (47.86 in 2010). However, three subgroups can be identified within the analyzed group.

The first subgroup consists of Hungary, the Czech Republic, Slovenia, and Estonia. The best performer in the group, Hungary, had an Excellence in S&T index of 31.88 in 2010. However, its index grew at a slower rate than the EU average in 2005–2010 (2.03% vs. 3.09%). The Czech Republic, Slovenia, and Estonia had relatively high indices in 2010 (above 25.0). These grew at a faster rate than the EU average in 2005–2010, with Estonia recording the fastest growth, at 11.7%.

Poland, as with Bulgaria, Romania, and Slovakia, recorded a moderate Excellence in S&T index in relation to other EU11 economies. In 2010, Poland's index was

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[9] The Excellence in S&T index consists of four separate variables: 1) the share of most-quoted scientific publications in the general number of publications where at least one author is a resident of the said country, 2) the number of reputable universities and public R&D units in the said country per 1 million inhabitants, 3) the number of patents awarded in the international PCT procedure per 1 million inhabitants of the said country, and 4) the general value of European grants (ECR) awarded to the said country based on R&D expenditures of its public sector and higher education units. The details of the methodology are described in: European Commission (2013), p. 321.

20.47, similar to that in Bulgaria, but higher than in Romania (17.84) and Slovakia (17.73). Significantly, the indices in all four economies grew at a faster rate than the EU average in 2004–2010.

The third and the weakest group of the EU11 economies in terms of the Excellence in S&T index is made up of Lithuania, Croatia, and Latvia. The value of the index for these economies ranged from 11.49 (Latvia) to 13.92 (Lithuania), and its growth in 2005–2010 was slower than the EU average, with negative growth in Latvia (Table 6).

Overall, Poland is outperformed by Hungary, the Czech Republic, Slovenia, Estonia, and Bulgaria in terms of Excellence in S&T in the EU11 group. Estonia stands out positively in terms of the rate at which this index grew in the studied period: its index grew almost three times as fast as the EU average. As it turns out, there is little correlation between the growth of R&D expenditure in 2000–2011 and the growth of the Excellence in S&T index. The Pearson correlation index is 0.508 (Table 6), which means that an increase in the intensity of R&D only partially translates into a rise in the Excellence in S&T index. Given the small changes in the structure of R&D expenditure in most EU11 economies, including Poland, it can be surmised that an increased involvement of the business sector is a key factor needed to improve the quality of a national science and technology system. This is confirmed by the example of Estonia. In 2004–2011, the share of the business sector in R&D expenditure in that country increased by 12 p.p., constituting over half of total R&D expenditure. During that period, Estonia's Excellence in S&T index rose the fastest (11.70% in 2005–2010) among all EU11 countries and far outpaced the EU average, which grew only 3.09% from 2005 to 2010 (Table 5).

Similar conclusions can be drawn from the Index of Economic Impact of Innovation, another indicator that describes the quality of national innovation systems.[10] In 2010–2011, this index for all EU11 economies was lower than the EU average (0.61). Poland's index, at 0.21, was just over one-third of the EU average. In the EU11 group, the following countries stand out with their Indices of Economic Impact of Innovation: Hungary (0.53), Slovenia (0.52), the Czech Republic (0.50), Slovakia (0.48), and Estonia (0.45). These countries also lead the way in the EU11 in terms of sales of innovative goods as a percentage of total sales (Figure 10). For Poland, this percentage is one of the lowest in the studied group, with a fall from 13.5% in 2004 to 8% in 2010.

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[10] The index consists of five indicators identified in the *Innovation Union Scoreboard 2013*. They are: 1) patents obtained via international PCT per 1 billion EURO GDP (PPP), 2) employment in knowledge-based manufacturing and services as a fraction of total labor employment, 3) share of exports of mid-high and high technology in the trade balance, 4) sales of innovation new to the market and to the firms as a percentage of total sales in innovative enterprises, and 5) export of knowledge-based services as a percentage of total service exports. Detailed information on the methodology behind the index and its components can be found in: (European Commission, 2013; 2013a).

Figure 10

Turnover from innovation as % of total turnover
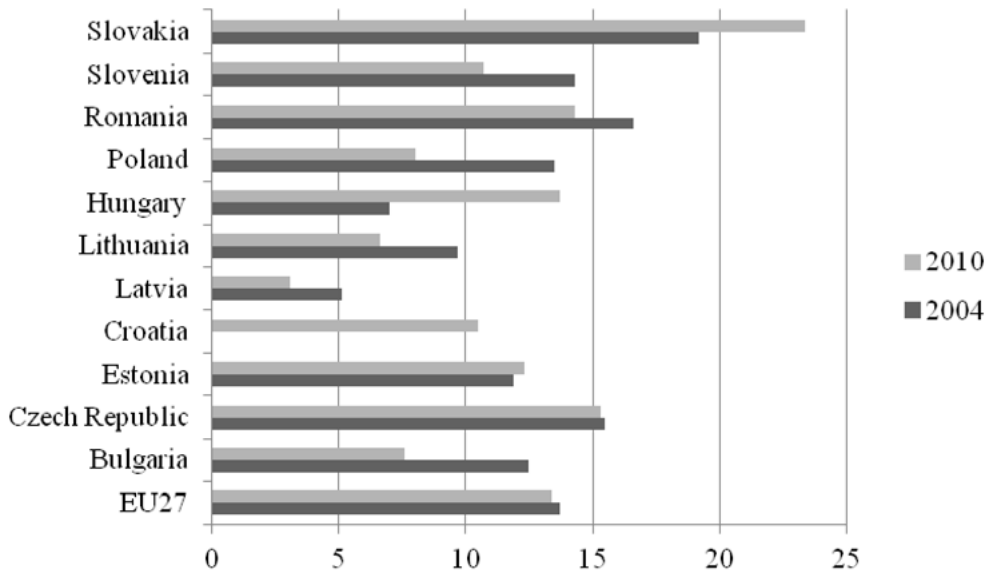
Source: Own elaboration based on Eurostat data.

There is no strong correlation between the Index of Economic Impact of Innovation and the average growth of R&D intensity in 2000–2011. The Pearson correlation coefficient between these two variables is 0.42 (Table 6), which shows that the growth of R&D expenditure is not strongly connected with the economic impact of innovation on EU11 economies. The strength of this relationship is clearly impacted by the fact that the increase of R&D expenditure in most EU11 economies is not accompanied by a new structure of research funding.

Table 6

Pearson's correlation coefficients between variables describing performance of national innovation systems in EU11 countries

Variables correlated	Index of Excellence in S&T (2010)	Index of economic impact of innovation
R&D intensity growth rate (2000–2011)	0.508	0.421

Source: Own calculations in SPSS based on data from: European Commission, (2013a).

This general picture of Poland's innovative position and changes in it since the country's accession to the European Union needs to be supplemented by a comment on Poland's technological profile. The main technologies in which EU members specialize were identified on the basis of patents granted by the European Patent Office

in 2001–2010, broken down by the investor's home country as well as the country from which the patent application originated (European Commission, 2013a). Table 7 gives an insight into Poland's technological profile against the background of other EU11 economies.

Table 7

Hot spots in key technologies in EU11 countries

Country	Hot spots in key technologies
Bulgaria	agriculture, nano- and biotechnology, ICT and energy
Croatia	healthcare sector; food processing and agribusiness; energy technology; electronics and advanced materials and digital techniques
Czech Republic	automobiles, transport, construction, materials, energy and environment
Estonia	energy, environment, food and agriculture
Hungary	health, environment, automobiles, biotechnology
Latvia	materials, health, nano-sciences, environment, energy
Lithuania	other transport technologies (other than automobiles and aeronautics), construction technologies, energy
Poland	food, agriculture and fisheries; energy; environment; security; ICT; materials
Romania	automobiles, ICT, new production technologies, nanotechnologies, and security
Slovakia	food and agriculture, energy, ICT, materials
Slovenia	health, food and agriculture, ICT, materials, new production technologies, environment

Source: Research and Innovation Performance in EU Member States and Associated Countries. Innovation Union Progress at Country Level, Directorate-General for Research and Innovation, European Commission 2013.

The key technologies in which Poland has technological advantages are in areas such as food, agriculture and fisheries, energy, IT, materials, the environment and security. The technological advantages of individual EU11 economies vary considerably. In many of these countries, technological advantages are found in traditional industries such as agriculture and food production (Bulgaria, Croatia, Poland, Slovakia, and Slovenia). Advantages in the automobile sector—which is classified as a mid-high technology industry—play a significant role in the Czech Republic, Hungary, and Romania. In some EU11 countries, for instance in Slovenia, the Czech Republic, Estonia, Poland, Latvia, and Hungary, environmental technologies are among technological specializations. Some advantages are also emerging in high-tech industries in the EU11, for example in IT and nanotechnology. Hence, there is no one model of technical specialization for all of the EU11 members, and this observation has significant implications for policy makers.

Support for innovation is especially important in the case of Poland, because this analysis shows restructuring of the national innovation system has not yet been

completed. As a result, the innovation gap between Poland and other EU economies is growing.

In this context, the question is where innovation policies should be focused so that the innovation gap can be bridged. In addition, it is worth considering whether and to what extent this gap can be narrowed through using funds for research and development from the EU budget. This question may be answered by examining the impact that EU funds set aside for R&D and absorbed by Poland have on the country's innovativeness. Such an analysis can point to new areas of interest in Polish innovation policy, especially since the role of EU funds in Poland's R&D expenditure has been growing since 2008. In 2012, EU funds accounted for more than 10% of Poland's total R&D expenditure (GUS, 2013).

Additionality of financial support for innovation from EU funds. Results of research for Polish industrial enterprises

Previous studies show that insufficient financial resources are the main barrier to the development of R&D, including in Polish enterprises (Guijarro-Madrid *et al.*, 2009; Watkins, Paff, 2009; Lewandowska, 2012).

The inability of firms to enjoy all the potential benefits from investment in innovation, which proves to be costly, is a factor responsible for the slower growth of R&D expenditures.

Likewise, the inability to capture all the potential benefits from investment in innovation, with its high cost, is responsible for underinvestment in R&D (Berube and Mohnen, 2009).

The government has at its disposal a wide range of tools that can support companies, such as deferred tax payments, tax deductions, grants, preferential loans for R&D activities, and establishing technology labs and innovation clusters. However, grants are not without drawbacks, arising from information asymmetries between the investors and government agencies, from costly administrative procedures, from corruption and often from political pressure (Czarnitzki, Hanel and Rosa, 2011).

Tax incentives directed at stimulating R&D (delayed tax payments, tax allowances and payroll withholding credit for R&D wages, preferential rates on royalty income and other income associated with knowledge ownership) can act as market tools aimed at lowering marginal costs of R&D activities. Such an approach to the problem of financing innovation can be more effective than direct support for R&D (OECD, 2012). This is because no arbitrary decisions need to be made about the distribution of support among specific economic sectors, industries, and firms. As a result, more firms are encouraged to undertake innovative activities (Bloom, 2002). The policy makers are convinced that greater public support for R&D activities will lead to an increase in R&D investments, which, in turn, will result in an increase in innovation performance. To determine if this "input additionality" is really the case, it is crucial to estimate

to what extent the use of a specific support program contributes to additional R&D investment within the firm being supported.

For the purpose of this research, in addition to analyzing the impact of public support programs on investment in R&D, we will also look for the presence of additionality in the case of investment in technologically advanced machinery and equipment used to produce new, or significantly improved, products and processes.

A large body of research has focused on whether public support for R&D is complementary and stimulates additional efforts (the so-called additionality effect), or whether it is a substitute for the undertaking of such activities (the so-called crowding-out effect). Research into R&D expenditure in German firms has found no crowding-out effect, but has confirmed the presence of an additionality effect in the case of public support (Hussinger, 2003). However, some research results confirm the crowding-out effect in R&D expenditure in big companies, while additionality has been observed in small firms (Serrano-Velarde, 2008). Moreover, it has been proven that the crowding-out effect is often at work in the case of commercial projects—a finding that feeds the debate on the need for direct support by government agencies (Bussom, 1999).

While input additionality makes it possible to determine to what extent public support encourages firms to undertake private R&D expenditure, output additionality allows for the identification of leverage effects on firms' innovation performance[11] (Luukkonen, 1998). An example of how the additionality effect can be estimated is included in the works of Halpern (2010), who, while investigating Hungarian firms, found a positive relationship between subsidies and both the level of R&D expenditure and innovation. Garcia and Mohnen (2010) have found that support from the central government increases the intensity of R&D activities as well as the share of innovative products in total sales. However, in the case of simultaneous central- government and EU support, the latter source of support decreases in significance.

Government investments impact innovation performance not only directly (Bergman, Ejermo, Fisher *et al.*, 2010, cited by Afcha, 2012), but also indirectly, leading to an improvement in the level of knowledge and relations with the surrounding environment (Norman, Klofsten, 2010). This is the rationale behind the concept of behavioral additionality, which was first formulated by Buisseret, Cameron and Georghiou (1995) and used to measure changes in the state of firms resulting from obtained public support.

Below we will try to determine if there is an additionality effect at work that strengthens the level of firms' knowledge resulting from their resources and competences—especially as the more a firm invests in in-house R&D activities, the greater

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[11] The indicator of innovation performance (*InnoPerf*) will often be used by other researchers (e.g., Lokshin, Hagedoorn and Letterie, 2011; Tether and Tajar, 2008); namely, the log of fraction of turnover from innovative products in total turnover.

its absorptive capacity,[12] i.e. the better it is prepared for the absorption of external knowledge, including knowledge resulting from cooperation (Cohen, Levinthal, 1989, 1990).

Various studies have highlighted the growing importance of nonmaterial resources to create an enterprise's competitive potential (Grant, 1991). These in particular include knowledge, which many researchers see as a strategic asset (Kogut, Zander, 1992). Other key intangible resources that enterprises should develop are employees' competences and their ability to undertake specific actions (de Wit, Meyer, 2007). In this context, it will be interesting to explore to what extent support from European funds increases the propensity of Polish enterprises to incur expenditure on staff training directly related to the introduction of new, or significantly improved, products and processes.

One dimension of behavioral additionality is cooperation additionality, which pertains to situations in which public support received by a firm for R&D impacts the scope and level of cooperation (Wanzenböck, Scherngell and Fischer, 2013).

Garcia and Mohnen (2010) found a positive relationship between public support and cooperation in terms of innovation. Likewise, Kang and Park (2012), while researching a South Korean biotech firm, showed the existence of a strong, positive relationship between government support for firms intended for R&D and these firms' cooperation with their domestic "upstream partners." The two researchers also found a significant positive effect regarding cooperation with "downstream partners." Similar conclusions were reached by Teirlinck and Spithoven (2010), though in this case only for cooperation with research institutes.

For reasons of space, we will limit this analysis to institutional cooperation undertaken by Polish firms. Only 11.4% of surveyed enterprises view universities as their important partners for cooperation, and only 0.6% said the same of research institutes run by the Polish Academy of Sciences (PAN). A paltry 0.2% mentioned foreign research institutions (GUS, 2013). This is surprising because research publications provide many examples of how cooperation with institutional partners can have a positive influence on the innovation performance of enterprises. Robin and Schubert (2013), on the basis of a Community Innovation Survey (CIS) for France and Germany, demonstrated that institutional cooperation fosters product innovation, although it does not influence process innovation. Monjon and Waelbroeck (2003) found that firms that introduce more radical innovations more often cooperate with universities, while imitator firms, to a much greater extent, use solutions already available on the market.

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[12] This variable (*AbsCap*) is operationalized as a percentage share of expenditures on R&D in total income of an enterprise in a given period (Zahra, Hayton, 2008; Cohen, Levinthal, 1990). Unfortunately, due to the fact that such data are impossible to obtain, a proxy has been used in the form of an assumption that an enterprise conducts R&D activities in a continuous manner—an indicator also used by other researchers (e.g., Veugelers, 1997).

Institutional partners often possess knowledge that fosters the creation of completely new products (Nieto, Santamaria, 2007), while not being directly affected by changes produced by those innovative projects that lead to the creation of new market segments (Monjon, Waelbroeck, 2003). As a result, their behavior is less opportunistic in nature than that of other cooperating partners (Kim, Lui, 2010).

On the basis of the above discussion, which points to the existence of significant relationships between the discussed variables, the following model can be presented as a summary of these relationships:[13]

$Y ExtR\&D = \beta_{10} + \beta_1 InnoFundEU + s \varepsilon_{ExtR\&D}$

$Y_{AcqMachEq} = \beta_{20} + \beta_1 InnoFundEU + \varepsilon_{AcqMachEq}$

$Y_{InnoPerf} = \beta_{30} + \beta_1 InnoFundEU + \beta_2 ExtR\&D + \beta_3 AcqMachEq +$
$\beta_4 TrainPers + \beta_5 AbsCap + \beta_6 InstCoop + \varepsilon_{InnoPerf}$

$Y_{AbsCap} = \beta_{40} + \beta_1 InnoFundEU + \varepsilon_{AbsCap}$

$Y TrainPers = \beta_{50} + \beta_1 1InnoFundEU + \varepsilon_{TrainPers}$

$Y_{InstCoop} = \beta_{60} + \beta_1 InnoFundEU + \beta_2 TrainPers + \beta_3 AbsCap + \varepsilon_{InstCoop}$

where β represents the estimated coefficients and ε stands for the standard error (Greene, 2003).

Details of variable operationalization are given in Table 9.

Sample description, variable operationalization, method applied

The study is based on a representative sample of 7,783 large and medium-sized enterprises that took part in a survey conducted by Poland's Central Statistical Office (GUS)—(PNT-02 questionnaire; Polish version of the Community Innovation Survey)—over the period of 2008–2010. The enterprises are from NACE sections B-E.[14]

A chi-square method with column proportions and the Bonferroni correction was applied to statistically verify significant differences between active and non-active innovators. Non-active innovators (firms that did not introduce product or process innovation in 2008–2010) constitute the majority of the research sample (N=4,988). The remainder are active innovators (N=2795), firms that introduced process (77.6%), product (73.5%), organizational (48.3%) and marketing innovation (39.6%). The analyzed sample mainly consisted of medium-sized enterprises (67.4%), from medium-

[13] The abbreviations used in the model stand for the following: *InnoFundEU* – financial support from EU; *ExtR&D* – acquisition of external R&D; *AcqMachEq* – acquisition of advanced machinery and equipment; *TrainPers* – training of personnel for innovative activities; *AbsCap* – absorptive capacity; *InstCoop*– institutional cooperation. Details of variable operationalization are given in Table 9.

[14] The selection of units for the survey was performed using the Polish Classification of Activities (PKD) 2007, consistent with the Statistical Classification of Economic Activities in the European Union (*Nomenclature statistique des Activités économiques dans la Communauté Européenne*) (NACE Rev. 2). In 2011, the study on innovation in both industry (Sections B to E) and the service sector (Sections H to M) was conducted on the entire group of entities. For details, see: *Innovation Activities of Enterprises in 2008–2010*, Central Statistical Office, Statistical Office in Szczecin, Warsaw 2012, p. 15.

technology industries (55.7%) (Eurostat classification, 2008), for which the local market is the most important sales destination (48.6%).

Table 8

Sample characteristics

Sample characteristics		Sample in the model N=652		Non-active innovators N=4,988		Active innovators N=2,795		Whole sample N=7,783	
		N	%	N	%	N	%	N	%
Introduction of product innovation		524	80.4	0	0a	2055	73.5b	2,055	26.4
Introduction of process innovation		480	82.8	0	0a	2169	77.6b	2,169	27.9
Introduction of organizational innovation		414	63.5	458	9.2a	1349	48.3b	1,807	23.2
Introduction of marketing innovation		342	52.5	402	8.1a	1107	39.6b	1,509	19.4
Firm size	Medium	331	50.8	4,356	87.3a	1885	67.4b	6,241	80.2
	Large	321	49.2	632	12.7a	910	32.6b	1,542	19.8
Technology level	Not classified	68	10.4	655	13.1a	272	9.7b	927	11.9
	Low tech	95	14.6	2,232	44.7a	843	30.2b	3,075	39.5
	Medium tech	440	67.5	2,026	40.6a	1,558	55.7b	3,584	46
	High tech	49	7.5	75	1.5a	122	4.4b	197	2.5
Dominant market	Local	588	90.2	1,667	33.4a	661	23.6b	2,328	29.9
	Domestic	581	89.1	1,981	39.7a	1,359	48.6b	3,340	42.9
	EU	524	80.4	1,165	23.4a	654	23.4a	1,819	23.4
	Other markets	412	63.2	175	3.5a	121	4.3a	296	3.8

[a] Each subscript letter (a, b) denotes a subset of categories whose column proportions (Bonferroni method) differ significantly from each other at the .05 level.

Source: Own calculation in SPSS 21 based on data from PNT-02 questionnaire, *Sprawozdanie o innowacjach w przemyśle za lata 2008–2010*, www.stat.gov.pl/formularze

Due to the PNT-02/CIS questionnaire construction, where most questions refer to innovative enterprises, we will assume, like other researchers (Veugelers, Cassiman, 2004; Mothe *et al.*, 2010), as a filter variable indication of whether the company introduced new or significantly improved products or processes in 2008–2010.

In addition, we assume that only companies that received public support for innovative activity in the researched period will be analyzed. Based on this we extract 652 companies. Details on the operationalization of all the variables are presented in Table 9.

Table 9

Variable operationalization

Variable	Description and construction of variables
InnoActComp	**Filter variable – "Innovation activity" and "Public support"**
InnoActCompPr	"1" if the firm introduced product innovation; "0" otherwise and/or
InnoActCompProc	"1" if the firm introduced product innovation; "0" otherwise
InnoFund	"1" if the firm received public financial support from local agencies, government agencies or EU
InnoFundEU	**Variable – "Financial support from EU"**
Calculated if the firm received public financial support for innovation activity from EU for personnel training; support of international cooperation; support of domestic, regional, cluster cooperation; support of exporting; specialized consulting; support for investments; support for cooperation with institutional partners; support for R&D activity; other programs.	
InnoPerf	**Dependent variable – "Innovation performance"**
Log of fraction (from 0 to 100) of turnover from innovative products introduced in 2008–2010 in total turnover in 2010.	
InnoExp	**Variables – "Expenditures on innovation activities"**
ExtR&D	Calculated if the firm declared acquisition of external R&D and/or acquisition of external knowledge (purchase or licensing of patents and non-patented inventions, know-how, and other types of knowledge from other enterprises or organizations for the development of new or significantly improved products and processes).
AcqMachEq	"1" if the firm declared acquisition of advanced machinery or equipment (including computer hardware) or software to produce new or significantly improved products and processes; "0" otherwise.
AbsCap	**Variable – "Absorptive capacity"**
"1" if the firm performed R&D continuously (had permanent R&D staff in-house) from 2008 to 2010; "0" otherwise.	
TrainPers	**Variable – "Training for innovative activities"**
"1" if the firm conducted internal or external training for its personnel, specifically for the development and/or introduction of new or significantly improved products and processes; "0" otherwise.	
InstCoop	**Variable – "Cooperation with institutional partners"**
Calculated if the firm declares cooperation with the Polish Academy of Sciences; domestic research institutes; domestic universities; foreign research institutes; foreign universities.	

Source: Own compilation based on PNT-02 questionnaire for 2008–2010, www.stat.gov.pl/formularze

The structural equation modeling (SEM) method—specifically a technique known as path analysis, designed to examine the structure and strength of linear relationships between at least one independent variable and one or more dependent variables—will be used to assess the relationships between the variables (Bedyńska, Książek, 2012). The aim of SEM is to find a model that describes reality in the best way (Perek-Białas,

Pleśniak, 2013). In order to verify the hierarchy of variables, an analysis was conducted of critical values between parameters.

Since reasoning based only on data from a single sample may result in an over- or under-estimation of the parameters of the population, the analysis of the distribution of the estimation errors was made with multiple sampling with replacement from the sample (non-parametric bootstrap method) (Hayes, 2009; Efron,1979). The models applied the Bollen and Stine (1992) correction for the p level to test the null hypothesis of model fit.

Results of analysis, hypothesis verification

Our Structural Modeling Analysis (IBM AMOS, ADF (Asymptotically Distribution Free estimation[15])), with 10,000 bootstrap samples, resulted in a model that very well fits to the data (x^2 (2) = 0.570; p = 0.752; Cmin/Df = 0.285; CFI = 1.00; RMSEA = 0.000). Additionally, the Bollen-Stine correction to the significance of the chi-square model did not significantly change the model (p = 0.750). There were 2,504 cases when the model was better fit.

The analysis of standardized estimations (*bias-corrected*, 95% CI) showed that most paths in the model are statistically significant at a level of p < 0.05 (with simultaneous 95% CI).

The analysis of "input additionality"—conducted to determine the impact of EU funds on innovation (*InnoFundEU*)—showed there is a positive and statistically significant relationship between the funds granted and the acquisition of advanced machinery and equipment (*AcqMachEq*) to produce new or significantly improved products and processes.

The negative and statistically significant relationship between the received funds (*InnoFundEU*) and expenditures on external R&D (*ExtR&D*) indicates that an increase in EU funds leads to a decreased propensity for external expenditures, which may suggest the existence of the crowding-out effect. A clear confirmation of this effect would require additional in-depth research.

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[15] The ADF method does not require the assumption of multivariate normal distribution, yet an estimation based on this method is only possible with large samples (Bedyńska, Książek, 2012). This study meets this requirement.

Table 10

Standardized estimates for the structural model

Parameter			Estimate	LC	UCI	P value
Dependence between expenditures on innovation activities and EU financial support (input additionality)						
AcqMachEq	<---	InnoFundEU	0.185***	0.140	0.225	0.000
ExtR&D	<---	InnoFundEU	–0.076*	–0.141	–0.011	0.022
Hierarchy of variables influencing innovation performance, including output additionality						
InnoPerf	<---	AbsCap	0.113**	0.051	0.173	0.001
InnoPerf	<---	TrainPers	0.084**	0.021	0.149	0.008
InnoPerf	<---	AcqMachEq	0.084*	0.018	0.152	0.014
InnoPerf	<---	ExtR&D	–0.074*	–0.137	–0.006	0.034
InnoPerf	<---	InnoFundEU	–0.035	–0.103	0.029	0.287
InnoPerf	<---	InstCoop	0.021	–0.049	0.090	0.556
Dependence between expenditures on creation of absorptive capacity and EU financial support (behavioral additionality)						
TrainPers	<---	InnoFundEU	0.059	–0.003	0.118	0.065
AbsCap	<---	InnoFundEU	0.047	–0.017	0.110	0.148
Hierarchy of variables influencing institutional cooperation, including cooperation additionality						
InstCoop	<---	InnoFundEU	0.143***	0.080	0.207	0.000
InstCoop	<---	TrainPers	0.075*	0.011	0.140	0.020
InstCoop	<---	AbsCap	0.048	–0.013	0.107	0.136
Dependence among different innovation activity expenditures						
ExtR&D	<---	AcqMachEq	–0.095**	–0.160	–0.030	0.006
ExtR&D	<---	TrainPers	–0.084*	–0.149	–0.018	0.014

Significant for: ***p< 0.001, **p<0.01, *p<0.05

<--- (direction of dependence).

The standardized coefficients (standardized estimates) show by how many standard deviations the value of the dependent variable will change when the value of the explanatory variable will increase by one standard deviation (Bedyńska, Książek, 2012).

Source: Own calculations in AMOS21 based on the obtained structural model.

Further analysis showed that three determinants of innovation performance (*InnoPerf*) (operationalized by the log of fraction of sales of innovative products in total sales) have a positive and statistically significant impact on enterprise innovation performance. In descending order, these are: absorptive capacity (*AbsCap*), training for innovative activities (*TrainPers*); and expenditures on machinery and equipment (*AcqMachEq*). By contrast, innovation performance (*InnoPerf*) decreases when expenditure on the purchase of external R&D (*ExtR&D*) grows.

Neither EU financial support nor institutional cooperation has a statistically significant influence on the innovation performance of the surveyed firms. Therefore

the existence of output additionality resulting from EU financial support has not been confirmed.

The Critical Ratio (CR) Analysis showed that absorptive capacity is a stronger determinant of innovation performance than external R&D expenditures. Differences between other determinants were not statistically significant.

The study did not confirm a statistically significant behavioral additionality effect for the studied group of enterprises.

The relationship between EU financial support (*InnoFundEU*) and absorptive capacity (*AbsCap*) proved to be statistically insignificant, while in the case of expenditure on personnel training related to the introduction of innovations (*TrainPers*), only a statistical trend was demonstrated.

In addition, the study showed that obtaining financial support from the EU (*InnoFundEU*) as well as staff training (*TrainPers*) result in an increase in institutional cooperation (*InstCoop*). The Critical Ratio (CR) Analysis showed there is no difference between the strength of the influence of individual factors. The positive relationship between EU funds (*InnoFundEU*) and institutional cooperation (*InstCoop*) may testify to the existence of the cooperation additionality effect. The detailed results are presented in Table 10.

Conclusions

This study of the impact of European Union funds on innovative activities among Polish industrial enterprises showed the existence of input additionality, which means that EU funds earmarked for R&D have contributed to an increase in enterprise expenditure on machinery and equipment. At the same time, the research showed a negative relationship between EU financial support and expenditures on external R&D and a negative relationship between expenditures on machinery and equipment as well as training and expenditures on external R&D. These results suggest that European funds are chiefly spent by enterprises to buy machinery and equipment and to finance training programs rather than purchase external R&D services. At this point, it should be noted that EU funds appear to play a less important role if the innovation activities of enterprises are simultaneously financed from funds obtained from the national government (further study would be needed to prove this). In addition, the research sample was composed of medium-sized and large enterprises, where the crowding-out effect is observed more often than with small firms.

Among factors that stimulate the innovation performance of enterprises, of special importance are their knowledge and absorptive capacity, as well as staff training and acquisition of machinery and equipment. However, no output additionality was found, which means that there is no direct connection between EU funds and an increase in innovation performance, as measured by the percentage of innovative products in total sales. But the innovation process cannot be reduced to linear compounds only. Therefore, a study of indirect relationships between EU support and enterprise

innovation performance could reveal some additional relationships that have not been verified here.

Nor has this study confirmed the existence of a statistically significant behavioral additionality, though, in this case as well, it can be expected that such an effect could be deferred over time. Instead, the analysis showed the existence of cooperation additionality in enterprises' cooperation with institutional partners.

Notably, our empirical studies are based on a representative sample of medium-sized and large industrial firms from NACE sections B to E. The structural equation model shows a high level of convergence with the empirical data; ($CFI = 1.00$; $RMSEA = 0.000$). Therefore, the results substantially reflect the business practices of the analyzed firms.

The research, however, has its limitations and these should be taken into consideration when interpreting the results. First, there is the issue of sample selection bias, which stems from the fact that a proven record of cooperation with institutional partners is one of the conditions for receiving EU funds. Also, there is a set of other enterprise features that have not been analyzed here even though they increase the probability of support being granted. Second, public support for innovative businesses is, by definition, long-term, and its effects can be significantly delayed. Third, the research looked at large and medium-sized manufacturing enterprises, which means the conclusions pertaining to this group cannot be extended to apply to small firms and the service sector.

Space constraints do not allow for a deeper analysis to identify issues such as to what extent, if at all, the discussed relationships depend on such enterprise features as their technological level or the intensity and geographical span of sales.

Despite these limitations, the survey results offer an insight into some aspects of the impact of R&D funding from the EU on the innovativeness of Polish firms.

To sum up, the results of the analysis conducted in this subchapter show that Poland's national innovation system is in need of further restructuring. Even though most innovativeness indicators in the Polish economy improved in 2004–2013, this improvement was too slow to guarantee convergence with their average indicators in the EU. This means that the innovation gap that separates Poland from the average EU level is widening.

Poland's integration with the EU is undoubtedly one of the factors that has helped the country embark on a path of catching up with European innovation leaders. Coordination of Polish innovation policy with EU policy, monitoring and constant benchmarking of advances in innovation performance, and access to R&D funding from the EU—these are just some of the activities that support the restructuring of Poland's national innovation system. The study of the additionalities of EU R&D funding has confirmed the importance of these funds for the modernization of Polish firms. The modernization process is chiefly taking place through the procurement of new machines and equipment. In addition, EU funds contribute to the growth of the absorption capacity of firms via training and the development of cooperation, especially

cooperation with institutional partners (as shown by the analysis of the additionalities of innovation policy). The financing of R&D activities with EU funds has not had an impact so far on an increase of companies' own R&D funding, nor has it stimulated the procurement of outside research services or an increased innovativeness of Polish firms as measured by sales of innovative products as a percentage share of total sales. However, these effects can appear with some delay in reference to inputs, which means that capturing them in the short term, as attempted in this analysis, is very hard to do. Still, it is clear that outside resources, including those from the EU, can play a supportive role in the development of enterprises' ability to innovate (Weresa, 2004; 2013). However, the key role in this process is played by domestic factors and their quality. Enhanced development of these resources and an improved ability to absorb new knowledge are the problems that should be solved by Polish innovation policy makers over the next decade.

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3.4. Changes in Total Factor Productivity in 2004–2013 and the Competitiveness of the Polish Economy

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 an earlier edition of this report,[16] includes two measurable factor inputs: labor and physical capital. To calculate the TFP growth rate, the following equation is used:

$$\text{TFP growth} \equiv \frac{\dot{A}}{A} = \frac{\dot{Y}}{Y} - \left[s_K \frac{\dot{K}}{K} + \left(1 - s_K\right) \frac{\dot{L}}{L} \right], \tag{1}$$

where Y – output (GDP), A – level of technology, K – physical capital, L – labor, s_K – physical capital share in income.

Since this edition of the report focuses on how Central and Eastern European (CEE) countries, including Poland, have benefited from their first 10 years in the European Union, this study has been expanded to include the human-capital augmented model of growth accounting. Such an approach enables a more detailed assessment of changes in total factor productivity in the studied countries.

In addition to the standard model of growth accounting, we also analyze its extended version with three factors: labor, physical capital, and human capital. The inclusion of human capital supplements the analysis presented in the 2012 edition

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[16] This paper is a follow-up study to the author's previous analyses on the subject (see for instance: Próchniak, 2013). The methodology of the analysis is described in detail in the 2008 edition of the report (Próchniak, 2008). Rapacki and Próchniak (2006) carry out the growth accounting framework for the whole group of post-socialist countries.

of the report.[17] To calculate the TFP growth rate in the human capital-augmented model, we use the following equation:

$$\text{TFP growth} \equiv \frac{\dot{A}}{A} = \frac{\dot{Y}}{Y} - \left[s_K \frac{\dot{K}}{K} + s_H \frac{\dot{H}}{H} + \left(1 - s_K - s_H\right) \frac{\dot{L}}{L} \right], \tag{1}$$

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. Thus, in both the basic and extended models, TFP is measured as a residual.

The analysis covers 11 CEE countries, referred to as the EU11 (Poland, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Slovakia, and Slovenia), and the 2004–2013 period. A new element in this edition of the report is that the analysis also covers Croatia, which is the youngest EU member. Moreover, taking into account the aims of this edition of the report, the study also provides growth accounting for the EU15, or the 15 "old" EU members in Western Europe. Data for the EU15 constitute a reference point. We do not show the detailed estimates for individual EU15 countries but only aggregated figures for the entire group. All the calculations for the EU15 are weighted averages to make the results comparable. The time period of 2004–2013 covers the years of membership of most of the CEE countries in the EU. In this round of research, we updated all the time series of the analyzed variables. All the steps of the analysis were recalculated. Moreover, some time series have new coverage. Thus, all the results are fully documented in the study and the analysis does not use information from previous editions of the report.

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, and (d) the growth rate of human capital. The data are derived from the following sources: the World Bank (World Bank, 2014), the International Monetary Fund (IMF, 2014), and the International Labor Organization (ILO, 2014a, 2014b).

The economic growth rate is the real annual GDP growth rate. The growth rate for labor is the change in total employment according to the International Labor Organization data (ILO (2014a) for the 2004–2012 period and ILO (2014b) for 2013). The figures for 2013 cover only three quarters; therefore, when calculating the 2013 employment dynamics, we compare these figures with those for the first three quarters of 2012 in order to compare with the corresponding period of the previous year.

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[17] See: Próchniak (2012).

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.[18] (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; this is the year for which we assume the capital-output ratio of 3).

The most difficult issue in selecting variables is the 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 for measuring human capital, and there are many variables used in the literature; each of them has its advantages and disadvantages, and the choice of a specific variable to a large extent depends on the availability of data. School enrollment ratios (secondary or tertiary) are often used to account for human capital. In our analysis, which is based on yearly data, the inclusion of school enrollment rates would not be proper from the economic point of view because their impact on economic growth is delayed (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 currently employed. The International Labor Organization provides data on the structure of education of those employed (grouped into various educational levels). When comparing a homogenous group of countries, as in the case of the EU11, the best human capital variable would be the number of people with a tertiary education. Therefore, in our research we measure the human capital stock by the number of employed persons aged 15–74 years (15–64 and 15–66 years in the case of two countries) and with a tertiary education. As in the case of labor inputs, the figures for 2013 cover only three quarters; thus, when calculating the 2013 dynamics, we compare these figures with those for the first three quarters of 2012 in order to compare with the corresponding period of the previous year.

We also assume that all the factor shares in income are the same. This means that, in the extended model, labor, physical capital, and human capital shares are all equal to one-third while, in the standard model, labor and physical capital shares are equal to one-half.[19]

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[18] According to estimates by King and Levine (1994), the capital/output ratio for the 24 OECD countries was around 2.5. Our assumption of 3 does not differ much from these estimates.

[19] Arbitrary values of factor shares are widely assumed in 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, a physical capital share of 0.3 is assumed. However, for some countries (especially Poland), the physical capital share of 0.3 significantly overestimates the TFP growth rate. Thus, in line with a suggestion by Welfe (2001), this share in the standard model has been increased to 0.5 in order to better fit the real values.

Significantly, the adopted measure of human capital and the assumption that the human capital share in income is equal to one-third are both substantial simplifications of reality. As a result, when interpreting these TFP estimates, it is necessary to take into account our assumptions about human capital.

Table 11 shows the detailed breakdown of economic growth in the model with human capital. 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 percentage terms. Table 12 illustrates the economic growth decomposition in the model without human capital. Its structure is analogous to that in Table 11, with some exceptions. The row concerning human capital is not related with the model presented in Table 12 and is consequently excluded. The column "growth (%)" and the row "GDP" are not shown in Table 12 to avoid redundant data (these data are the same as in Table 11).

Tables 13–15 sum up the data given in Tables 11 and 12. Tables 13 and 14 show the average values of the TFP growth rates in the EU11 throughout the 2004–2013 period as well as in three different subperiods: (a) in the first years of these countries' EU membership (2004–2007), (b) during the crisis or economic slowdown (2008–2009), (c) in the 2010–2013 period, which, for some countries, marked a time of recovery while for others was a period of continued poor macroeconomic performance. Table 13 concerns the human capital-augmented model, while Table 14 describes the model without human capital. Table 15 shows the percentage values of TFP contribution to economic growth for the 2004–2013 period in both models. Moreover, all three tables provide the minimum and maximum values of a given variable for the entire period.

We have divided the analyzed period into various subperiods for two reasons. First, we are interested in showing the changes in total factor productivity during various stages of EU membership; second, the global financial crisis and economic recession could disrupt the mechanisms driving the economy and lead to new trends and relationships between some macroeconomic variables. For example, in the years with negative GDP growth, the changes in TFP influence economic growth in a different way than in the years with positive GDP growth.[20]

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[20] For example, an increase in TFP has a positive impact on economic growth during an expansionary period but a negative impact during a recession.

Table 11

Labor, physical capital, human capital, and TFP contribution to economic growth, 2004–2013

		2004			2005			2006			2007			2008		
		growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)
Bulgaria	L	3.2	1.1	16	0.3	0.1	2	4.7	1.6	24	4.5	1.5	23	3.2	1.1	17
	K	2.3	0.8	12	3.1	1.0	16	5.3	1.8	27	6.1	2.0	31	6.7	2.2	36
	H	3.6	1.2	18	1.4	0.5	7	3.7	1.2	19	4.6	1.5	24	3.3	1.1	18
	TFP	3.7	3.7	55	4.7	4.7	75	2.0	2.0	30	1.4	1.4	21	1.8	1.8	29
	ODP	6.7	6.7	100	6.4	6.4	100	6.5	6.5	100	6.4	6.4	100	6.2	6.2	100
Croatia	L	2.6	0.9	21	0.8	0.3	6	0.5	0.2	4	2.1	0.7	14	1.1	0.4	17
	K	3.9	1.3	31	4.0	1.3	31	4.0	1.3	27	4.7	1.6	31	4.9	1.6	78
	H	1.8	0.6	14	–0.7	–0.2	–5	2.3	0.8	15	1.7	0.6	11	3.0	1.0	48
	TFP	1.4	1.4	34	2.9	2.9	68	2.7	2.7	54	2.2	2.2	44	–0.9	–0.9	–43
	ODP	4.1	4.1	100	4.3	4.3	100	4.9	4.9	100	5.1	5.1	100	2.1	2.1	100
Czech Rep.	L	–0.7	–0.2	–5	1.2	0.4	6	1.4	0.5	6	2.1	0.7	12	1.3	0.4	14
	K	3.6	1.2	25	3.5	1.2	18	3.8	1.3	18	3.9	1.3	23	4.7	1.6	51
	H	4.8	1.6	34	5.8	1.9	29	3.5	1.2	17	2.5	0.8	15	7.0	2.3	76
	TFP	2.2	2.2	46	3.2	3.2	48	4.1	4.1	59	2.9	2.9	50	–1.2	–1.2	–40
	ODP	4.7	4.7	100	6.8	6.8	100	7.0	7.0	100	5.7	5.7	100	3.1	3.1	100
Estonia	L	1.1	0.4	6	1.7	0.6	6	5.4	1.8	18	1.3	0.4	6	–0.2	–0.1	1
	K	6.1	2.0	32	6.1	2.0	23	7.1	2.4	23	8.9	3.0	39	8.9	3.0	–72
	H	5.4	1.8	28	9.9	3.3	37	4.3	1.4	14	–0.6	–0.2	–3	0.7	0.2	–6
	TFP	2.1	2.1	34	3.0	3.0	33	4.5	4.5	45	4.3	4.3	58	–7.3	–7.3	176
	ODP	6.3	6.3	100	8.9	8.9	100	10.1	10.1	100	7.5	7.5	100	–4.2	–4.2	100
Hungary	L	–0.3	–0.1	–2	–0.1	0.0	–1	0.5	0.2	5	–0.1	0.0	–39	–1.2	–0.4	–43
	K	2.7	0.9	19	3.0	1.0	26	3.2	1.1	27	2.7	0.9	817	2.8	0.9	104
	H	9.5	3.2	66	3.0	1.0	25	1.8	0.6	15	0.8	0.3	245	5.6	1.9	208
	TFP	0.8	0.8	17	2.0	2.0	50	2.1	2.1	53	–1.0	–1.0	–922	–1.5	–1.5	–169
	ODP	4.8	4.8	100	4.0	4.0	100	3.9	3.9	100	0.1	0.1	100	0.9	0.9	100
Latvia	L	0.5	0.2	2	0.3	0.1	1	4.0	1.3	12	1.9	0.6	7	–0.6	–0.2	7
	K	4.1	1.4	16	5.9	2.0	19	7.7	2.6	23	8.7	2.9	30	8.6	2.9	–87
	H	14.6	4.9	55	5.6	1.9	18	5.7	1.9	17	6.2	2.1	21	13.1	4.4	–134
	TFP	2.5	2.5	28	6.2	6.2	61	5.4	5.4	48	4.0	4.0	42	–10.3	–10.3	314
	ODP	8.9	8.9	100	10.1	10.1	100	11.2	11.2	100	9.6	9.6	100	–3.3	–3.3	100
Lithuania	L	–3.5	–1.2	–16	1.0	0.3	4	1.0	0.3	4	1.3	0.4	4	–1.8	–0.6	–21
	K	3.2	1.1	14	4.2	1.4	18	4.8	1.6	20	6.1	2.0	21	7.9	2.6	90
	H	3.8	1.3	17	11.3	3.8	48	3.2	1.1	14	8.4	2.8	29	4.8	1.6	54
	TFP	6.2	6.2	84	2.3	2.3	30	4.8	4.8	62	4.5	4.5	46	–0.7	–0.7	–24
	ODP	7.4	7.4	100	7.8	7.8	100	7.8	7.8	100	9.8	9.8	100	2.9	2.9	100
Poland	L	1.2	0.4	8	2.3	0.8	21	4.1	1.4	22	5.1	1.7	25	4.2	1.4	28
	K	0.9	0.3	6	1.3	0.4	12	1.6	0.5	9	2.5	0.8	12	3.6	1.2	23
	H	9.6	3.2	60	12.8	4.3	118	8.0	2.7	43	6.3	2.1	31	6.8	2.3	44
	TFP	1.4	1.4	27	–1.8	–1.8	–51	1.7	1.7	27	2.2	2.2	32	0.3	0.3	5
	ODP	5.3	5.3	100	3.6	3.6	100	6.2	6.2	100	6.8	6.8	100	5.1	5.1	100
Romania	L	–1.3	–0.4	–5	–1.9	–0.6	–15	1.8	0.6	8	0.9	0.3	5	0.2	0.1	1
	K	3.4	1.1	13	3.9	1.3	31	3.8	1.3	16	4.3	1.4	23	6.6	2.2	30
	H	12.6	4.2	50	4.4	1.5	36	8.9	3.0	38	3.0	1.0	16	7.4	2.5	34
	TFP	3.6	3.6	42	2.0	2.0	49	3.1	3.1	39	3.6	3.6	57	2.6	2.6	35
	ODP	8.5	8.5	100	4.2	4.2	100	7.9	7.9	100	6.3	6.3	100	7.3	7.3	100
Slovakia	L	–0.5	–0.2	–3	1.9	0.6	10	3.3	1.1	13	2.7	0.9	9	3.3	1.1	19
	K	3.2	1.1	21	3.3	1.1	17	4.5	1.5	18	4.9	1.6	16	5.3	1.8	31
	H	6.3	2.1	42	12.5	4.2	63	6.6	2.2	26	–1.0	–0.3	–3	5.4	1.8	31
	TFP	2.0	2.0	40	0.7	0.7	11	3.6	3.6	43	8.3	8.3	79	1.1	1.1	19
	ODP	5.1	5.1	100	6.7	6.7	100	8.3	8.3	100	10.5	10.5	100	5.8	5.8	100
Slovenia	L	5.3	1.8	40	0.5	0.2	4	1.4	0.5	8	2.7	0.9	13	0.6	0.2	6
	K	3.5	1.2	26	3.6	1.2	30	3.5	1.2	20	4.1	1.4	20	4.9	1.6	48
	H	9.9	3.3	75	7.4	2.5	61	8.2	2.7	47	4.1	1.4	20	2.9	1.0	29
	TFP	–1.8	–1.8	–41	0.2	0.2	4	1.5	1.5	25	3.3	3.3	48	0.6	0.6	17
	ODP	4.4	4.4	100	4.0	4.0	100	5.9	5.9	100	7.0	7.0	100	3.4	3.4	100
UE15	L	1.1	0.4	16	1.2	0.4	20	1.7	0.6	17	1.7	0.6	18	0.9	0.3	823
	K	1.5	0.5	21	1.6	0.5	25	1.7	0.6	17	1.9	0.6	21	2.2	0.7	1,971
	H	5.3	1.8	76	4.6	1.5	74	3.1	1.0	32	3.5	1.2	39	3.7	1.2	3,388
	TFP	–0.3	–0.3	–13	–0.4	–0.4	–20	1.1	1.1	33	0.6	0.6	21	–2.2	–2.2	–6,081
	ODP	2.3	2.3	100	2.1	2.1	100	3.2	3.2	100	3.0	3.0	100	0.0	0.0	100

		2009			2010			2011			2012			2013		
		growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)
Bulgaria	L	-3.4	-1.1	21	-6.1	-2.0	-520	-3.4	-1.1	-62	-1.0	-0.3	-41	0.3	0.1	18
	K	8.3	2.8	-51	5.1	1.7	437	3.1	1.0	55	2.6	0.9	111	2.0	0.7	135
	H	0.3	0.1	-2	-3.2	-1.1	-272	-0.2	-0.1	-4	1.0	0.3	43	7.2	2.4	482
	TFP	-7.2	-7.2	132	1.8	1.8	456	2.0	2.0	110	-0.1	-0.1	-13	-2.7	-2.7	-536
	ODP	-5.5	-5.5	100	0.4	0.4	100	1.8	1.8	100	0.8	0.8	100	0.5	0.5	100
Croatia	L	-1.4	-0.5	7	-4.1	-1.4	61	-3.0	-1.0	2,119	-3.5	-1.2	59	-4.7	-1.6	265
	K	5.2	1.7	-25	3.4	1.1	-49	1.9	0.6	-1,329	1.3	0.4	-22	0.9	0.3	-53
	H	5.6	1.9	-27	1.3	0.4	-19	-4.5	-1.5	3,218	2.7	0.9	-46	1.6	0.5	-90
	TFP	-10.1	-10.1	145	-2.5	-2.5	108	1.8	1.8	-3,908	-2.2	-2.2	110	0.1	0.1	-22
	ODP	-6.9	-6.9	100	-2.3	-2.3	100	0.0	0.0	100	-2.0	-2.0	100	-0.6	-0.6	100
Czech Rep.	L	-1.4	-0.5	10	-0.5	-0.2	-7	0.8	0.3	16	0.8	0.3	-20	1.0	0.3	-92
	K	4.7	1.6	-35	3.2	1.1	56	3.0	1.0	56	2.8	0.9	-76	2.3	0.8	-207
	H	7.0	2.3	-52	6.4	2.1	86	7.5	2.5	137	6.3	2.1	-171	8.8	2.9	-808
	TFP	-7.9	-7.9	176	-0.6	-0.6	-23	-2.0	-2.0	-108	-4.5	-4.5	368	-4.4	-4.4	1207
	ODP	-4.5	-4.5	100	2.5	2.5	100	1.8	1.8	100	-1.2	-1.2	100	-0.4	-0.4	100
Estonia	L	-9.4	-3.1	22	-4.4	-1.5	-57	6.4	2.1	22	1.3	0.4	11	1.9	0.6	42
	K	6.1	2.0	-14	1.4	0.5	18	0.8	0.3	3	3.0	1.0	25	3.6	1.2	77
	H	1.3	0.4	-3	-4.7	-1.6	-61	5.1	1.7	18	5.1	1.7	43	3.2	1.1	68
	TFP	-13.4	-13.4	95	5.1	5.1	200	5.4	5.4	57	0.8	0.8	21	-1.3	-1.3	-87
	ODP	-14.1	-14.1	100	2.6	2.6	100	9.6	9.6	100	3.9	3.9	100	1.5	1.5	100
Hungary	L	-2.3	-0.8	11	-0.2	-0.1	-5	0.8	0.3	17	1.6	0.5	-31	1.2	0.4	238
	K	2.8	0.9	-14	1.7	0.6	44	1.0	0.3	20	0.6	0.2	-12	0.3	0.1	66
	H	1.3	0.4	-6	1.3	0.4	32	6.4	2.1	129	4.3	1.4	-83	3.0	1.0	604
	TFP	-7.4	-7.4	109	0.4	0.4	28	-1.1	-1.1	-66	-3.9	-3.9	226	-1.3	-1.3	-808
	ODP	-6.8	-6.8	100	1.3	1.3	100	1.6	1.6	100	-1.7	-1.7	100	0.2	0.2	100
Latvia	L	-13.5	-4.5	25	-5.5	-1.8	195	1.8	0.6	11	2.9	1.0	17	2.5	0.8	21
	K	5.8	1.9	-11	1.4	0.5	-49	0.1	0.0	0	1.6	0.5	9	2.3	0.8	19
	H	-4.5	-1.5	9	-0.5	-0.2	17	-2.8	-0.9	-17	6.9	2.3	41	6.2	2.1	52
	TFP	-13.6	-13.6	77	0.6	0.6	-62	5.8	5.8	106	1.8	1.8	32	0.3	0.3	8
	ODP	-17.7	-17.7	100	-0.9	-0.9	100	5.5	5.5	100	5.6	5.6	100	4.0	4.0	100
Lithuania	L	-7.5	-2.5	17	-4.8	-1.6	-105	4.3	1.4	24	2.9	1.0	27	1.0	0.3	10
	K	6.3	2.1	-14	1.4	0.5	30	1.3	0.4	7	1.6	0.5	15	1.2	0.4	12
	H	-1.7	-0.6	4	-3.9	-1.3	-85	1.7	0.6	10	1.2	0.4	11	2.7	0.9	26
	TFP	-13.9	-13.9	94	3.9	3.9	259	3.4	3.4	58	1.7	1.7	47	1.8	1.8	52
	ODP	-14.8	-14.8	100	1.5	1.5	100	5.9	5.9	100	3.6	3.6	100	3.4	3.4	100
Poland	L	0.4	0.1	8	-0.2	-0.1	-1	0.5	0.2	4	0.2	0.1	3	-0.4	-0.1	-9
	K	4.1	1.4	83	3.6	1.2	31	3.3	1.1	24	3.0	1.0	54	2.5	0.8	62
	H	9.5	3.2	194	4.0	1.3	34	4.0	1.3	29	5.4	1.8	97	5.0	1.7	124
	TFP	-3.0	-3.0	-185	1.4	1.4	36	1.9	1.9	43	-1.0	-1.0	-54	-1.0	-1.0	-78
	ODP	1.6	1.6	100	3.9	3.9	100	4.5	4.5	100	1.9	1.9	100	1.3	1.3	100
Romania	L	-1.5	-0.5	8	-0.1	0.0	3	-1.0	-0.3	-16	1.2	0.4	58	-0.1	0.0	-2
	K	8.0	2.7	-40	3.6	1.2	-105	3.0	1.0	47	3.5	1.2	168	3.6	1.2	60
	H	3.0	1.0	-15	3.6	1.2	-105	8.5	2.8	131	3.4	1.1	164	2.8	0.9	47
	TFP	-9.7	-9.7	148	-3.5	-3.5	307	-1.3	-1.3	-62	-2.0	-2.0	-290	-0.1	-0.1	-5
	ODP	-6.6	-6.6	100	-1.1	-1.1	100	2.2	2.2	100	0.7	0.7	100	2.0	2.0	100
Slovakia	L	-3.0	-1.0	20	-2.1	-0.7	-16	1.3	0.4	13	0.4	0.1	7	-0.2	-0.1	-7
	K	4.9	1.6	-33	2.6	0.9	19	3.3	1.1	34	3.3	1.1	54	2.1	0.7	83
	H	5.1	1.7	-34	8.9	3.0	68	6.0	2.0	62	1.3	0.4	21	2.1	0.7	84
	TFP	-7.3	-7.3	147	1.3	1.3	29	-0.3	-0.3	-9	0.4	0.4	18	-0.5	-0.5	-60
	ODP	-4.9	-4.9	100	4.4	4.4	100	3.2	3.2	100	2.0	2.0	100	0.8	0.8	100
Slovenia	L	-1.1	-0.4	5	-1.4	-0.5	-37	-2.6	-0.9	-121	-1.1	-0.4	14	-2.1	-0.7	27
	K	5.2	1.7	-22	2.4	0.8	64	1.6	0.5	77	0.6	0.2	-7	0.2	0.1	-2
	H	3.7	1.2	-16	2.5	0.8	66	4.7	1.6	221	4.0	1.3	-53	3.9	1.3	-50
	TFP	-10.6	-10.6	133	0.1	0.1	7	-0.5	-0.5	-78	-3.7	-3.7	147	-3.2	-3.2	125
	ODP	-7.9	-7.9	100	1.3	1.3	100	0.7	0.7	100	-2.5	-2.5	100	-2.6	-2.6	100
UE15	L	-1.8	-0.6	13	-0.3	-0.1	-5	0.4	0.1	7	-0.4	-0.1	38	-0.5	-0.2	295
	K	1.9	0.6	-14	0.8	0.3	14	0.8	0.3	17	0.8	0.3	-71	0.6	0.2	-385
	H	2.4	0.8	-18	2.3	0.8	37	3.2	1.1	68	3.2	1.1	-276	2.7	0.9	-1,735
	TFP	-5.4	-5.4	118	1.1	1.1	54	0.1	0.1	8	-1.6	-1.6	409	-1.0	-1.0	1,925
	ODP	-4.6	-4.6	100	2.0	2.0	100	1.6	1.6	100	-0.4	-0.4	100	-0.1	-0.1	100

Source: Author's calculations.

Table 12

Labor, physical capital, and TFP contribution to economic growth in the model without human capital, 2004–2013

		2004		2005		2006		2007		2008	
		contr. (% points)	contr. (%)	contr. (% points)	contr. (%)	contr. (% points)	contr. (%)	contr. (% points)	contr. (%)	contr. (% points)	contr. (%)
Bulgaria	L	1.6	23	0.2	2	2.3	36	2.2	35	1.6	26
	K	1.2	17	1.6	25	2.7	41	3.0	47	3.3	54
	TFP	4.0	59	4.6	73	1.5	23	1.2	18	1.2	20
Croatia	L	1.3	31	0.4	10	0.3	5	1.1	21	0.5	26
	K	1.9	47	2.0	46	2.0	41	2.3	46	2.4	117
	TFP	0.9	22	1.9	44	2.6	54	1.7	33	–0.9	–43
Czech R.	L	–0.4	–7	0.6	9	0.7	10	1.1	18	0.6	21
	K	1.8	38	1.8	26	1.9	27	2.0	34	2.4	76
	TFP	3.3	69	4.4	65	4.5	64	2.7	47	0.1	3
Estonia	L	0.5	9	0.8	9	2.7	27	0.6	8	–0.1	2
	K	3.1	48	3.1	34	3.5	35	4.4	59	4.5	–107
	TFP	2.7	43	5.0	56	3.9	38	2.4	33	–8.5	205
Hungary	L	–0.2	–4	–0.1	–1	0.3	7	–0.1	–58	–0.6	–65
	K	1.4	28	1.5	38	1.6	40	1.3	1,225	1.4	156
	TFP	3.6	75	2.5	63	2.0	52	–1.2	–1,066	0.1	9
Latvia	L	0.2	3	0.1	1	2.0	18	1.0	10	–0.3	10
	K	2.1	23	2.9	29	3.8	34	4.4	45	4.3	–131
	TFP	6.6	74	7.1	70	5.3	48	4.3	45	–7.2	221
Lithuania	L	–1.7	–23	0.5	6	0.5	6	0.6	6	–0.9	–31
	K	1.6	21	2.1	27	2.4	31	3.1	31	3.9	136
	TFP	7.5	102	5.2	67	4.9	63	6.1	62	–0.1	–5
Poland	L	0.6	11	1.2	32	2.1	33	2.5	37	2.1	41
	K	0.5	9	0.6	18	0.8	13	1.2	18	1.8	35
	TFP	4.3	80	1.8	50	3.4	54	3.0	45	1.2	24
Romania	L	–0.6	–7	–1.0	–23	0.9	12	0.4	7	0.1	1
	K	1.7	20	1.9	47	1.9	24	2.1	34	3.3	45
	TFP	7.4	88	3.2	76	5.1	64	3.8	59	4.0	54
Slovakia	L	–0.2	–5	1.0	15	1.7	20	1.4	13	1.6	29
	K	1.6	31	1.7	25	2.2	27	2.4	23	2.6	46
	TFP	3.7	73	4.0	61	4.4	53	6.7	64	1.5	25
Slovenia	L	2.7	60	0.3	7	0.7	12	1.4	19	0.3	10
	K	1.7	39	1.8	45	1.8	30	2.1	30	2.5	73
	TFP	0.0	0	1.9	49	3.4	58	3.5	51	0.6	18
EU15	L	0.5	23	0.6	30	0.8	26	0.8	28	0.5	1,234
	K	0.7	31	0.8	38	0.8	26	1.0	32	1.1	2,956
	TFP	1.1	45	0.7	32	1.5	48	1.2	40	–1.5	–4,090

		2009		2010		2011		2012		2013	
		contr. (% points)	contr. (%)	contr. (% points)	contr. (%)	contr. (% points)	contr. (%)	contr. (% points)	contr. (%)	contr. (% points)	contr. (%)
Bulgaria	L	–1.7	31	–3.1	–781	–1.7	–92	–0.5	–62	0.1	27
	K	4.2	–76	2.6	655	1.5	83	1.3	167	1.0	203
	TFP	–7.9	145	0.9	225	2.0	109	0.0	–5	–0.7	–130
Croatia	L	–0.7	10	–2.1	91	–1.5	3,179	–1.7	88	–2.4	397
	K	2.6	–38	1.7	–74	0.9	–1,994	0.7	–33	0.5	–79
	TFP	–8.9	128	–1.9	83	0.5	–1,085	–0.9	45	1.3	–218
Czech R.	L	–0.7	16	–0.3	–11	0.4	23	0.4	–31	0.5	–138
	K	2.3	–52	1.6	65	1.5	84	1.4	–115	1.1	–311
	TFP	–6.1	136	1.1	46	–0.1	–7	–3.0	245	–2.0	549
Estonia	L	–4.7	33	–2.2	–86	3.2	33	0.7	17	1.0	63
	K	3.0	–22	0.7	27	0.4	4	1.5	37	1.8	116
	TFP	–12.4	88	4.1	159	6.0	62	1.8	45	–1.2	–79
Hungary	L	–1.2	17	–0.1	–7	0.4	25	0.8	–47	0.6	356
	K	1.4	–21	0.9	66	0.5	30	0.3	–18	0.2	99
	TFP	–7.0	103	0.5	41	0.7	45	–2.8	164	–0.6	–355
Latvia	L	–6.8	38	–2.7	292	0.9	16	1.4	26	1.3	31
	K	2.9	–16	0.7	–74	0.0	1	0.8	14	1.1	29
	TFP	–13.9	78	1.1	–118	4.6	83	3.4	60	1.6	40
Lithuania	L	–3.7	25	–2.4	–157	2.1	37	1.5	41	0.5	15
	K	3.2	–21	0.7	46	0.7	11	0.8	22	0.6	17
	TFP	–14.3	96	3.2	211	3.1	52	1.4	37	2.3	68
Poland	L	0.2	12	–0.1	–2	0.2	5	0.1	5	–0.2	–13
	K	2.0	124	1.8	46	1.6	36	1.5	81	1.2	94
	TFP	–0.6	–37	2.2	56	2.6	58	0.3	14	0.3	20
Romania	L	–0.8	12	–0.1	5	–0.5	–24	0.6	87	–0.1	–4
	K	4.0	–61	1.8	–158	1.5	70	1.7	252	1.8	91
	TFP	–9.8	149	–2.9	253	1.2	54	–1.6	–239	0.3	13
Slovakia	L	–1.5	30	–1.0	–24	0.6	19	0.2	10	–0.1	–10
	K	2.4	–49	1.3	29	1.6	51	1.6	81	1.1	125
	TFP	–5.9	119	4.2	95	1.0	30	0.2	8	–0.1	–14
Slovenia	L	–0.6	7	–0.7	–55	–1.3	–182	–0.5	21	–1.1	41
	K	2.6	–33	1.2	96	0.8	116	0.3	–11	0.1	–3
	TFP	–10.0	126	0.7	59	1.2	166	–2.3	90	–1.6	62
EU15	L	–0.9	20	–0.2	–8	0.2	11	–0.2	58	–0.2	442
	K	0.9	–21	0.4	21	0.4	26	0.4	–106	0.3	–577
	TFP	–4.6	101	1.8	87	1.0	63	–0.6	149	–0.1	236

Source: Author's calculations.

The data in Tables 11–15 yield a number of findings. Over the entire period, the highest TFP growth rate in the model without human capital was recorded in Slovakia, Lithuania, and Poland. In 2004–2013, total factor productivity grew at an average rate of 2.0% per annum in Slovakia, 1.9% in Lithuania, and 1.8% in Poland. In the model without human capital, the average TFP growth rate of at least 1% was also noted by

Latvia (1.3%) and Romania (1.0%). In the remaining EU11 countries, the growth of productivity was much slower, not exceeding 0.5%, and sometimes it was even negative. Bulgaria, the Czech Republic and Estonia recorded TFP growth rates of 0.7%, 0.5% and 0.4% per annum respectively in 2004–2013, while Croatia, Slovenia and Hungary noted a fall in TFP on average by 0.4%, 0.2% and 0.2% respectively.

Table 13

TFP growth rates in the model with human capital (%)

Country	The whole 2004–2013 period			2004–2007	2008–2009	2010–2013
	Mean	Min	Max	Mean	Mean	Mean
Bulgaria	0.7	–7.2	4.7	2.9	–2.7	0.3
Croatia	–0.4	–10.1	2.9	2.3	–5.5	–0.7
Czech Republic	–0.8	–7.9	4.1	3.1	–4.6	–2.9
Estonia	0.3	–13.4	5.4	3.5	–10.3	2.5
Hungary	–1.1	–7.4	2.1	1.0	–4.4	–1.5
Latvia	0.3	–13.6	6.2	4.5	–12.0	2.1
Lithuania	1.4	–13.9	6.2	4.5	–7.3	2.7
Poland	**0.2**	**–3.0**	**2.2**	**0.9**	**–1.4**	**0.3**
Romania	–0.2	–9.7	3.6	3.1	–3.6	–1.7
Slovakia	0.9	–7.3	8.3	3.6	–3.1	0.2
Slovenia	–1.4	–10.6	3.3	0.8	–5.0	–1.9
EU15	–0.8	–5.4	1.1	0.3	–3.8	–0.3

Source: Author's calculations.

Table 14

TFP growth rates in the model without human capital (%)

Country	The whole 2004–2013 period			2004–2007	2008–2009	2010–2013
	Mean	Min	Max	Mean	Mean	Mean
Bulgaria	0.7	–7.9	4.6	2.8	–3.3	0.6
Croatia	–0.4	–8.9	2.6	1.8	–4.9	–0.2
Czech Republic	0.5	–6.1	4.5	3.7	–3.0	–1.0
Estonia	0.4	–12.4	6.0	3.5	–10.5	2.7
Hungary	–0.2	–7.0	3.6	1.7	–3.5	–0.5
Latvia	1.3	–13.9	7.1	5.8	–10.5	2.7
Lithuania	1.9	–14.3	7.5	5.9	–7.2	2.5
Poland	**1.8**	**–0.6**	**4.3**	**3.1**	**0.3**	**1.3**
Romania	1.0	–9.8	7.4	4.9	–2.9	–0.8
Slovakia	2.0	–5.9	6.7	4.7	–2.2	1.3
Slovenia	–0.2	–10.0	3.5	2.2	–4.7	–0.5
EU15	0.0	–4.6	1.8	1.1	–3.1	0.5

Source: Author's calculations.

Table 15
TFP contribution to economic growth (%)

Country	The whole 2004–2013 period					
	Model with human capital			Model without human capital		
	Mean	Min	Max	Mean	Min	Max
Bulgaria	36	–536	456	54	–130	225
Croatia	–341	–3,908	145	–94	–1,085	128
Czech Republic	178	–108	1,207	122	–7	549
Estonia	63	–87	200	65	–79	205
Hungary	–148	–922	226	–87	–1,066	164
Latvia	66	–62	314	60	–118	221
Lithuania	71	–24	259	75	–5	211
Poland	**–20**	**–185**	**43**	**36**	**–37**	**80**
Romania	32	–290	307	57	–239	253
Slovakia	32	–60	147	51	–14	119
Slovenia	39	–78	147	68	0	166
EU15	–354	–6,081	1,925	–329	–4,090	236

Source: Author's calculations.

Comparing the results achieved by the CEE countries with average outcomes for the EU15 group (in the model without human capital), it turns out that the CEE countries displayed more rapid TFP growth on average. In the EU15, total factor productivity did not change over the 2004–2013 period (the growth rate was 0.0%). This last figure means that the economic growth of the EU15 area as a whole can be explained by both physical capital and employment dynamics. Eight of the 11 CEE countries recorded a positive TFP growth rate in 2004–2013. Consequently, the competitive position of most EU11 countries—as measured by changes in total factor productivity—improved, compared with the Western European economies. This especially applies to Poland, which displayed rapid TFP growth in the analyzed period.

The human capital-augmented model shows that the inclusion of three factors leads to lower TFP growth estimates for most countries in the 2004–2013 period. This reflects the nature of these countries' economic growth path. Economic growth in these countries chiefly resulted from an increased accumulation of human capital. The detailed data in Table 11 confirm this. The applied methodology shows that—among the three measurable factors of production—the biggest role in explaining GDP growth should be attributed to human capital. The role of labor and physical capital was less important (although there are major differences between individual countries and years). As a result, in the human capital-augmented model, almost all economic growth can be explained by the accumulation of both labor and two types of capital; thus, the TFP growth rates were estimated at a very low level. Only six CEE countries recorded a positive average TFP growth rate in 2004–2013: Lithuania at 1.4% per annum, Slovakia at 0.9%, Bulgaria at 0.7%, Estonia and Latvia each

at 0.3%, and Poland at 0.2%. In the remaining five EU11 countries, TFP dynamics was negative throughout the analyzed period. The EU15 group as a whole also saw a drop in TFP. As in the model without human capital, the human capital-augmented model also shows that the new EU member states achieved better results in total factor productivity growth than Western Europe on average. This means that the level of competitiveness in the CEE countries improved in relative terms compared with the EU15.

Regardless of the model, the highest variance of TFP growth rates in the analyzed period was noted in the Baltic states. The strong differences in how productivity grew in these countries to a large extent result from high fluctuations in GDP growth rates. The Baltic states recorded rapid economic growth in the first few years of their EU membership, at times exceeding 10% per annum. These countries were also hardest hit by the implications of the global crisis because, in 2009, they noted a double-digit fall in GDP. As a result, TFP changes in the Baltics were the most differentiated among EU11 countries. The difference between the highest and the lowest TFP growth rates in the human capital-augmented model was 20.1 percentage points in Lithuania (ranging between 13.9% and 6.2%), 19.8 p.p. in Latvia, and 18.8 p.p. in Estonia. In the model without human capital, these differences were 21–22 p.p. in Lithuania and Latvia, and 18.4 p.p. in Estonia. Poland, which exhibited relatively regular growth in output throughout the 2004–2013 period and was the only EU country to avoid recession, recorded exceptionally small variations in TFP in both models, at 5.2 percentage points in the human capital-augmented model and at 4.9 p.p. in the model without human capital.

In the model without human capital, the percentage TFP contributions in most countries (except Croatia, the Czech Republic, Hungary, and Poland) ranged between 50% and 80% in 2004–2013. This confirms the important role of TFP in the economic growth of the studied countries after their EU entry. In Poland, the TFP contribution to economic growth was 36% on average in 2004–2013.

In the human capital-augmented model, TFP contributions to economic growth are much lower due to an important role of human capital in explaining GDP dynamics. As a result, negative percentage contributions were often noted for TFP. This, however, should be treated as a spurious result reflecting the residual method of calculating TFP, and is no way indicative of technological regression in some EU countries or regions.

Given the large differentiation of the results in the studied period, the calculations for individual subperiods yield a better assessment of the nature of the total factor productivity changes. The EU11 countries recorded very high TFP growth rates in the first few years of membership. The highest growth rates for productivity were noted by two Baltic states, Latvia and Lithuania. In the 2004–2007 period, Poland had an average TFP growth rate of 3.1% in the model without human capital and 0.9% in the

human capital-augmented model.[21] The period of crisis and economic slowdown has considerably changed the growth accounting results, which were quite stable earlier. The global crisis has negatively affected TFP growth in the EU11 group. All the analyzed CEE countries noted negative TFP growth rates during the recession. The three Baltic states experienced the greatest deceleration in total factor productivity in the 2008–2009 period, compared with the 2004–2007 period. The fall of TFP in these countries was in the double digits in 2008–2009. In that two-year period, the best results in terms of productivity changes were achieved by Poland, where TFP growth was slightly positive in the model without human capital (with the average growth rate at 0.3%), while in the human capital-augmented model TFP dropped by 1.4% on average per annum. In the 2010–2013 period, average TFP growth was positive for most CEE countries with a few exceptions. During this period, the fastest TFP growth prevailed in the three Baltic states. Poland, with a GDP growth rate of 1.3%-4.5% in the 2010–2013 period, recorded 1.3% TFP growth per annum in the model without human capital and 0.3% in the human capital-augmented model.

The detailed results for the EU11 countries in 2013 show, however, that treating the averaged data for the 2010–2013 period as an optimistic forecast for the future may be misleading. In 2013, most of the countries in the analyzed group recorded negative TFP growth in both models, in part due to a return of the recession or continued slowdown. In the human capital-augmented model, an expansion in TFP in 2013 was only noted by Lithuania (1.8%), Latvia (0.3%), and Croatia (0.1%). In the model without human capital, the growth of TFP in 2013 also occurred in Poland and Romania. The results achieved by these CEE countries were relatively good compared with the EU15 group because in 2013, Western Europe as a whole revealed a drop in total factor productivity (measured in a residual manner) in both growth accounting models.

As we can see, in 2013 the EU11 countries, with a few exceptions, did not return to their TFP growth rates from their first few years of EU membership. Moreover, these countries' economic growth paths have not yet stabilized, as reflected by the large fluctuations in TFP growth rates in the last several years. The direction of further changes is uncertain and will depend on a number of factors determining economic growth in the EU11 countries in the years ahead.

Summing up, our results show that changes in productivity played an important role in the economic growth of Poland and other EU11 countries in the analyzed period. The TFP growth rates of the EU11 countries were higher than in Western Europe as a whole. This means that the new EU member states, including Poland, improved their relative competitive position measured by changes in total factor productivity after EU enlargement. This is a positive outcome of the Central and Eastern European countries' first 10 years in the European Union.

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[21] For the TFP growth rates for Poland in previous years, see e.g.: Rapacki (2002).

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Chapter 4
Policies and Institutions

This chapter evaluates selected intangible factors that determine changes in the competitiveness of the Polish economy. We analyze changes in economic policy from 2004 to 2013 and adjustments in the financial system, whose efficiency is of key importance to the competitiveness of the economy.

4.1. The Influence of EU Membership
   on Poland's Economic Policies in 2004–2013

Jan W. Bossak

EU membership has substantially changed Poland's economic policies. The adjustment of the country's legal system to European law has meant an increased role for market processes, entrepreneurship and competition. Poland can extensively take part in Community projects, programs and economic policies. It has access to European funds for the modernization and development of infrastructure, and benefits from funds earmarked for a reduction in regional and social disparities. The liberalization of external economic relations, demonopolization, deregulation, privatization, and a substantial reduction in state aid to enterprises have reduced the role of industrial policy. These reforms have contributed to increased economic cooperation with foreign countries, boosted entrepreneurship and spurred the development of small and medium-sized enterprises in Poland. Institutional changes have reduced the scope and changed the nature of economic policy.

Market-oriented reforms have improved the functioning of goods, services, and financial and labor markets. They have led to the introduction of new standards to improve the efficiency of market processes. Moreover, the reforms have facilitated

entrepreneurship and innovation and opened up new opportunities for society and the economy, with reduced risk and transaction costs (Bossak, 2008).

EU membership has brought the Polish economy in line with international standards. It has promoted a more efficient use of the achievements of the information and communication (ICT) revolution and led to the liberalization of economic ties with foreign countries. It has contributed to a more active role of regions and local communities as well as local and regional governments. The country's EU entry has helped increase the role of international factors in shaping Poland's economic policies. This does not mean a reduction of sovereignty, but broader development opportunities related to internationalization and globalization. Membership has reduced the role of domestic political factors, while increasing the role of society and its impact on the shape of economic processes.[1]

EU membership has had both a direct and an indirect impact on Poland's economic policies. The direct impact is associated with changes in Polish law, including the institutional adaptation of national legal regulations to European standards. The indirect impact is the contribution to an improvement in Poland's investment attractiveness.

As a result of signing the accession treaty in Athens, Poland gained access to substantial funding. It has become the largest recipient of EU structural funds. Nevertheless, these funds in relation to GDP were clearly less than those allocated to Ireland, for example.[2] As regulated by the accession treaty, Poland also has a relatively lower level of funding for farmers under the bloc's Common Agricultural Policy than old member states. This difference originally reached 40% and was justified by Poland's lower level of development and GDP per capita as well as differences in the purchasing power of currencies. Access to funding from the European Investment Bank also had a direct, tangible impact on the Polish economy.

In the initial period, Poland experienced difficulties with the efficient absorption of EU funds. A serious problem was posed by highly formalized procedures that impeded the process of accepting applications. Another stumbling block was that a significant portion of the applications had to be approved in Brussels.

Despite all these factors, which reduced the potential benefits of EU entry, Poland has substantially increased spending on development and modernization.

Access to the common labor market, initially limited by transition periods imposed by Germany, France, Spain, and Italy, has contributed to significant labor migration. The United Kingdom, Ireland, Sweden, and the Netherlands opened their labor markets to Polish workers immediately after the EU's eastward enlargement. At the height of the migration, 1.5 million Poles worked in EU countries. Labor migration

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[1] The constitution defines the nature of Poland's social and economic system as a social market economy.

[2] In the case of Ireland, European financing reached 4% of that country's GDP, while in the case of Poland it was 2.5% of the GDP.

has thus helped reduce the unemployment rate in Poland and the related financial burden on the government. Significantly, Poles taking up work throughout the EU are able to repatriate some of their incomes to their families back home. In 2004–2013, the amount of private transfers, apart from direct transport of cash and goods, reached €4-6 billion a year. These transfers not only boosted consumption in the country, but significantly increased the level of savings and the investment rate.

The improved investment attractiveness of the Polish economy due to the country's EU membership led to an increased inflow of foreign funds. Nominal and real interest rates in Poland were higher than in the EU15. This, accompanied by progress in reducing inflation and the appreciation of the zloty, encouraged an inflow of short-, medium- and long-term capital. Particularly attractive were financial investments in Polish Treasury bonds. The process of privatization, combined with the country's economic growth and the rapid development of the capital market before the outbreak of the financial crisis in September 2008, encouraged foreign investors to invest in debt securities and shares of companies listed on the stock exchange. The contribution of foreign investors to the capitalization of the Warsaw Stock Exchange ranged from 35% to 50%. The overwhelming majority of investors came from other EU countries.

According to the Ministry of Finance, in 2004–2013 total EU funding amounted to €92.4 billion, while the value of foreign direct investment increased from €63.6 billion to €178.2 billion. Portfolio investments and investments in Treasury bonds increased from €41.5 billion to €128 billion. Investment in shares rose from €10 billion to €28.3 billion. Investment in Treasury debt more than tripled, from €31.4 billion to €100.5 billion. Trade credit and loans rose from €47 billion to €114 billion.

The impact of liberalization on the market for goods, services, capital, and labor

The liberalization and creation of a common market for goods, services, capital, and labor have been of fundamental importance to Polish economic policy after EU accession. A set of new policies increased the scope of economic freedom. Privatization, deregulation, and demonopolization stimulated competition and innovation (Bossak, 2013). Faster economic growth and structural change ensured a better use of resources and opened up new development opportunities, especially for small and medium-sized enterprises.

EU membership and the adoption of an EU directive restricting state aid to enterprises contributed to more market-oriented policies in public undertakings and dramatically reduced the government's involvement in industry. They also accelerated the process of privatization in the economy.

The Maastricht criteria and Polish financial and monetary policy

As with all member states, Poland must comply with the financial and monetary criteria defined in the Maastricht Treaty and the Stability and Growth Pact. These criteria are designed to maintain a relatively low level of inflation, budget deficit, public debt and low interest rates for long-term bond debt and to stabilize fluctuations in the exchange rate of the zloty. Adherence to these criteria, as well as the objectives adopted in the Lisbon Strategy in March 2000 and subsequently upheld in the Europe 2020 strategy, are of fundamental importance to those seeking access to structural funds.

In 1997, Poland adopted a new democratic constitution that guarantees financial stability and a market economy system. The constitution also guarantees autonomy for the National Bank of Poland in monetary policy making. This means that regardless of changes in the political situation, the NBP's key goal is to ensure monetary stability and combat inflation.

Under the constitution, public debt must be kept below 60% of the country's GDP, thus leading to an increased level of confidence in Poland among foreign business partners. Confirming the irreversibility of market-based economic reforms, the constitution creates a good basis for the development of entrepreneurship, competition and innovation. This significant reduction in the level of systemic risk has helped increase Poland's investment attractiveness.

The excessive deficit procedure and Polish financial policy

In the event of a significant and persistent budget deficit, EU member states are obligated to take action to improve the sustainability of their public finances. This is in compliance with the Polish constitution. In recent years, the problem of imbalances in public finances has grown in Poland, as has the country's budget deficit. To a large extent this is due to slower economic growth combined with increased government spending on growing unemployment. Slower economic activity and difficulties experienced by various EU economies have reduced employment opportunities for Poles working abroad. As a result, their incomes, savings and private transfers to Poland have decreased.

An important negative impact on public finances is the growing indebtedness of the state pension system. This is due to demographic changes and the implications of a pension system reform carried out in 1999. Contrary to expectations, the reform has deepened the country's public debt and prompted the government to reduce it by resorting to controversial changes in the open pension fund system (OFE) in 2013.

Under the excessive budget debt procedure, Poland must reduce its budget deficit below 3% of GDP by 2015. To meet this target, in 2012 the government came up with legislation to raise the retirement age to 67 years for men and to 65 years for women. The reform limited access to early retirement and pension benefits. It also enabled

citizens to choose between a pension fund (OFE) and the pay-as-you-go (ZUS) system.

The Lisbon and Europe 2020 strategies and their impact on Polish economic policy and strategy

The Lisbon strategy adopted by the European Union in March 2000 has had a significant impact on Poland's economic policies. The strategy was intended to improve the international competitiveness of EU countries in 2000–2010. It identified 10 key objectives related to both new regulatory measures and the use of structural funds and Operational Programmes. Substantial EU funds were earmarked for improving the competitiveness of member economies, including the modernization and expansion of road, telecommunications, and energy infrastructure. The strategy also urged governments to mobilize national savings to help finance these projects

Procedures related to the implementation of the strategy's objectives required member states to come up with their National Strategic Reference Frameworks (NSRF) under the EU's Financial Perspective for the 2007–2013 period. Member states, including Poland, were also expected to prepare the National Reform Programmes (NRPs) and reports on the implementation of the strategy's objectives. These documents were the basis for the evaluation and preparation of the European Commission's recommendations for individual countries and consequently had an influence on access to structural funds.

In 2005, the Lisbon strategy changed fundamentally after a summit in Stockholm and a critical report by former Dutch prime minister Wim Kok. The report proposed measures to increase labor force activity and employment, while reducing the unemployment rate. It stressed the need for the development of human capital, a knowledge-based economy and the need to enhance entrepreneurship. It also recommended support for the development of small and medium-sized enterprises. Further changes in the Lisbon strategy in 2007–2008 led to what was in fact a retreat from the policy of increasing the competitiveness of the EU economy. Instead, the European Union focused on energy policy and climate change. The result was the adoption of ambitious CO_2 emission reduction targets and a call for an increased use of renewable energy sources. In the new Europe 2020 strategy, smart, sustainable, and inclusive economic growth is seen as the main goal for the European Union.

The impact of the financial crisis and EU policies on Poland's economic policy

The financial crisis has had a significant impact on Poland's economic situation and its economic policies. In its early stages, the crisis was linked with the expansion of mortgage loans and their securitization in the United States. The negative impact of the crisis on the banking sector in EU countries called for state intervention, which

led to a significant increase in the budget deficit and public debt, in particular in Mediterranean countries such as Greece, Portugal, Spain, and Italy as well as in Ireland. This was accompanied by a radical increase in the risk and cost of credit insurance and foreign loans needed to finance growing budget deficits. As a consequence, these countries lost their financial liquidity and worsened their credit standing. They also recorded a rapid increase in their sovereign debt.

As the financial condition of banks deteriorated, in order to prevent bankruptcies, the European Central Bank (ECB) and the European System of Central Banks (ESCB)—composed of the European Central Bank and the national central banks of all EU member states—implemented a series of measures to improve liquidity, in particular in those EU countries that are members of the Economic and Monetary Union, or the eurozone.

Countries from outside the euro area, including Poland, were in a different economic and financial situation and thus maintained high interest rates in both nominal and real terms until 2013. The relatively high rate of the Polish central bank, the NBP, encouraged households to increase savings. The relatively good financial situation of the banking sector enabled a high level of credit growth. Unlike its counterparts in most other EU countries, the Polish government did not become engaged in lifesaving operations to benefit private banks. The Polish Financial Supervision Authority (KNF) and the Financial Stability Committee (KSF) implemented measures to stabilize finances by increasing guarantees on deposits in private banks. They recommended that banks increase equity and improve their capital adequacy ratios. Poland also introduced the so-called Basel III regulatory standards on bank capital adequacy and market liquidity risk. Moreover, the Polish financial system was brought in line with the EU's Markets in Financial Instruments Directive (MIFID), which provides harmonized regulation for investment services across the eurozone, and with the CRD III directive, which reduces the salaries of bank executives and bonuses for risk managers at banks.

Common energy policy and the EU's climate policy and its impact on Poland

Poland attaches great importance to the common energy policy. The EU's dependence on external sources of energy exceeds 50% of its energy balance sheet in the case of oil and gas. The supply of these fuels is highly dependent on supplies from the Middle East and Russia. This increases the level of risk, in particular for EU members in Central and Eastern Europe.

The smooth functioning of the EU energy market requires regulation and infrastructure. This is being accomplished through liberalization and the creation of a common energy market, in addition to the development of cross-border links, which are expected to ensure smooth flows of gas, oil and electricity.

The European Commission's *Energy Infrastructure Priorities for 2020 and Beyond* report determines the EU's regulatory and infrastructure priorities. In the report, the Commission identified 12 priority corridors and areas covering electricity, gas, oil and carbon dioxide transport networks. A special Priority Interconnection Plan (PIP) was drawn up to supplement Trans-European energy networks (TEN-E).

According to the Polish government, external interconnections require particular attention because they are responsible for more than 50% of the EU's energy supplies. The problem is that energy supplies are increasingly becoming a political issue. This has been confirmed by events in Ukraine, Georgia, Syria, and Libya.

The European Union pays special attention to four projects: a power link between Germany, Poland, and Lithuania; interconnections between wind farms on the North Sea and the continent; energy links between France and Spain; and a southern corridor linking the Caspian and Baltic Sea basins with the European Union—including the Nabucco gas pipeline running to Austria and Germany via Turkey, Bulgaria, Romania, and Hungary.

Energy-efficient infrastructure networks are essential not only for the internal energy market, but also for sustainable development, competitiveness and secure energy supplies. This requires considerable investment in the existing gas and electricity networks, along with rapid development of interconnections. These are vital to the development of healthy competition and an effective internal energy market. They would also help prevent the risk of insufficient supplies by diversifying the sources of supply.

On Jan. 22, 2014, the European Commission presented the objectives of the EU's energy and climate policies until 2030. Poland is critical about the Commission's proposal to reduce CO_2 emissions by 40% by 2030 and to increase the share of renewable energy to 27%.

In November 2013, the European Union continued to debate energy policy at a Climate Summit in Warsaw. Poland underlined the need for a global agreement in this area. At the same time, the Polish government called for the need to promote energy efficiency in EU policy to help build the bloc's international competitiveness.

Under Poland's energy policy, which is a key component of the country's development and economic security strategy, domestic coal and lignite deposits are seen as a major item in the country's energy mix. According to the Polish government, coal should remain the basis for the Polish energy sector due to its competitive cost and strategic importance to the country's energy security.

Despite a number of positive effects, the EU's climate and energy policy could have a negative impact on the Polish economy. It could lead to a significant reduction of production in energy-intensive sectors such as steel, metallurgy, cement, and nitrogen fertilizers.

The costs of this policy for the Polish economy could be much higher than for the EU as a whole. Polish deputies at the European Parliament are warning that Brussels' drive to tighten the EU's climate policy could harm the European economy, in particular

Poland. The Polish government is pushing for a departure from the policy of identical emission reduction targets for all member states and calling for the introduction of per capita CO_2 emissions targets instead. Such a change would reduce the costs of the emission reduction policy for Poland because the country has lower levels of CO_2 emissions per capita than most developed EU countries.

Transatlantic Trade and Investment Partnership (TTIP) and its potential impact on Poland

The ICT revolution and progress in the internationalization of economies has resulted in increased competition and innovation worldwide. The United States and EU countries have entered a postindustrial stage of development based on innovation. Their competitive advantage has moved from the trade of goods to exports of services, technology, know-how, financial income, and intellectual property rights. The EU's Transatlantic Trade and Investment Partnership (TTIP) negotiations with the United States, which started in June 2013, come after the bloc's Economic Partnership Agreements (EPA) with South Korea and Canada as well as negotiations with Japan. In Asia, a series of Free Trade Agreements (FTA) have been reached by countries around the Pacific—known as Transpacific Trade Partnerships (TTP). The importance of the TTIP is related to the role of the United States and the European Union in the global economy. The TTIP is also a reaction to potentially dangerous plans by China, Japan and South Korea to establish a special partnership comprising a FTA and a currency union. Such a partnership could reduce the role of the U.S. dollar and the euro in world finance and exchanges.

In the last five years, the EU has lost some of its dynamism and widened the gap with the more competitive U.S. economy. The European Union faces problems related to its relatively high unemployment rate in addition to fiscal problems, public debt, and high energy costs. The TTIP is expected to encourage entrepreneurship through liberalization, demonopolization, stronger competition, and innovation. Given the role of the United States and the EU in global GDP, trade, services, technology and know-how turnover, research, innovation, finance and investment, the TTIP would open up new opportunities for innovation and increased incomes and employment. Liberalization is expected to stimulate competition and provide a greater choice and new market alternatives. Increased competition is expected to upgrade adjustment and innovation processes, promote better allocation of resources, improve efficiency, help increase incomes and the purchasing power of the population, and offer a wider choice for buyers.

Besides barriers to trade, there are important problems related to public procurement, finance and investment. Also of strategic importance is liberalization of energy trade. Lifting the ban on American shale gas exports to Europe could have serious repercussions for the energy and climate policy and offer far-reaching benefits for both partners. The importance of the EU's CO_2 emission targets would be reduced and the bloc would be less dependent on Russian gas imports. The question is if shale gas imports to the EU would lead to reduced subsidies to renewable energy sources such as wind and solar power. Another question is how potentially cheaper and more secure

energy would influence the plan to build nuclear power plants in Poland; and how it would influence projects related to the extraction of shale gas in Europe. One final question is how shale gas exports from the United States to the EU would influence the price of Russian gas and oil as well as that country's export revenue and imperial ambitions. Depending on the answers to these questions, the TTIP could have a fundamental impact on Poland's energy and climate policies as well as on the structure of the Polish economy.

An important issue related to the TTIP is agricultural trade and GMOs. Another vital issue is the agreement's potential impact on employment and structural changes following price and income adjustments.

The London-based Centre for Economic Policy Research has published an analysis of the potential benefits of the TTIP. The annual gains for the EU are estimated at €119 billion and those for the United States at €95 billion. The TTIP would bring an extra €545 in disposable income for households in the EU and €655 euro per family in the United States. And the benefits for the parties to the TTIP would not be at the expense of the rest of the world; global benefits would amount to almost €100 billion.

The TTIP agreement would contribute to an increase in EU goods and service exports to the United States by 28% to €187 trillion. Eighty percent of the total potential gains are expected to come from lower costs of bureaucracy and trade, services, and public procurement regulations.

It is not clear when the TTIP negotiations will end. After three rounds of negotiations it is expected that an agreement will be reached by the beginning of 2015.

EU membership, internationalization and benefits

Poland made significant economic progress during its first 10 years in the European Union, despite a stagnation in many EU economies in the second half of the decade. In the difficult years of the international financial crisis, Poland was the only European country to record GDP growth. Poland reduced its development gap by undertaking projects involving the modernization and expansion of its road, energy and railway infrastructure. At the time of the international financial crisis, Poland strengthened its net investment position. As a result, the country's credit rating remained stable, while the ratings of many other European countries deteriorated. Poland's stable financial position was confirmed by lower costs at which Treasury bonds were issued on the international financial market in 2013. In the spring of 2013, the cost of interest on Polish bonds decreased from about 7% to 3.5%.

Poland has taken many measures to improve its public finances in the short, medium and long terms. These have included decisions to extend the retirement age and reform the social security system in order to reduce the budget deficit, in addition to the deregulation of a number of professions, changes in construction law and funding for developers, energy market liberalization, and the introduction of new regulations on the extraction of shale gas.

The internationalization of the Polish economy increased significantly in 2004–2013. Poland's foreign trade-to-GDP ratio is above 84% and comparable to those in other

countries of similar size. It is similar to that in Germany and markedly better than those in Spain and France, but far below Hungary's (Łapiński, 2013).

Poland exports 76% of its goods and services to other EU countries, while non-EU countries account for the remaining 24% of Poland's exports. In the case of imports, the EU as a whole accounts for 67.7% of Poland's total imports, while non-EU countries provide the remaining 32.3%. However, in the last five years, the role of EU countries in both Poland's exports and imports has dropped in favor of BRICS markets—Brazil, Russia, India, China, and South Africa. The participation of non-EU countries in Polish imports increased from 27% in 2007 to 32.3% in 2012, and in exports the rise was from 21.1% to 24%.

An important contribution to Polish exports comes from foreign-owned companies. The European Union has agreed to extend the life span of Poland's special economic zones, which create favorable conditions for foreign investors. The EU accepts the use of differentiated CIT tax rates. This contributes to an increase in Poland's investment attractiveness and an increased inflow of foreign savings, which expedites the implementation of projects enhancing Poland's economic potential. Enterprises with foreign capital provide more than a half of the value of all Polish exports. In imports, the role of foreign-owned companies is relatively smaller. According to the Polish Information and Foreign Investment Agency (PAIiIZ), multinational corporations registered in various EU countries account for about 80% of all foreign investors in Poland. Some of these are American, Japanese, South Korean, and Indian corporations (UNCTAD, 2013). This means that a substantial part of the trade in goods and services throughout the European Union is generated by big non-European transnational corporations. All this confirms that EU membership does not restrict Poland's international relations and cooperation with partners worldwide, but substantially helps the country benefit from the internationalization of economic activity.

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4.2. Financial System Development

Oskar Kowalewski

This subchapter focuses on the key aspects of the development of Poland's financial system since the country joined the European Union in 2004. We look at how Poland's financial system evolved compared with its counterparts in other EU countries from 2004 to 2013. The study excludes Croatia because that country did not join the EU until July 2013.

Using financial measures, we look at substantial differences in the development of the key components of the financial systems in Poland and other EU member states after the bloc's 2004 enlargement. Based on this analysis, conclusions are drawn about the progress of other former post-communist countries that are now EU members (EU10) as well as old EU member states (EU15). The aim of the comparison is to provide empirical evidence to support the claim that the stability and—paradoxically—underdevelopment of Poland's financial system was one of the factors that helped the country emerge relatively unscathed from the latest global economic turbulence.

In comparison with the EU27 as a whole, Poland has a relatively shallow financial system and a limited financial services industry whose total assets represented 175% of GDP in 2012, far below the EU average of about 910% of GDP (Table 1).

Table 1

Assets of financial intermediaries in the EU27 and Poland as a percentage of GDP in 2012

	EU27	Poland
Banking system assets	377.73	93.04
Stock market capitalization	42.91	36.29
Insurance assets	59.34	10.67
Pension fund assets	18.22	19.79
Mutual fund assets	412.68	15.10
Total financial sector assets	910.88	174.89

Source: European Central Bank, World Federation of Stock Exchanges, Swissre.

The total assets of the financial services industry in the EU27 increased from 558% of GDP in 2002 to 911% of GDP in 2012. This growth can mainly be attributed to the liberalization of international capital movements in order to create a common regulatory framework for providing financial services as part of the European Internal Market. Moreover, increased innovation in the financial industry led to a further increase in its total assets, a development that was widely seen as a key cause of the global financial crisis of 2008.

In response to the crisis, new pan-European supervisory institutions were founded in the last several years, such as the European Systemic Risk Board (ESRB) and the European System of Financial Supervisors (ESFS). The ESRB aims to monitor and assess risks to the stability of the EU financial system, while the ESFS brings together national supervisors and three new European Supervisory Authorities for the banking sector, the stock market, the trading of securities, insurance, and the pension system.

In the EU as a whole and in Poland, credit institutions dominate the financial system, accounting for 41% and 53% of total assets respectively. The EU27 financial system remains mainly bank-based, though in some member states, such as the United Kingdom and the Netherlands, capital markets are also relatively important.

Over the past decade, other financial intermediaries have also gained importance in Poland, yet their position is still relatively weak in terms of assets to GDP, compared with credit institutions. Although the domination of credit institutions has declined in Poland in the last decade, the role of insurance companies, investment funds and pension funds is still underdeveloped in comparison with EU15 countries. Credit institutions, followed by capital markets, are the main components of the financial system in both Poland and throughout the EU.

Banking sector

Poland's banking sector is the largest in Central and Eastern Europe (CEE) and comprised 612 credit institutions and 28 branches of foreign banks as of December 2013. Forty-one of the 612 credit institutions were commercial banks, while the remaining institutions were cooperative banks. The ownership structure of Poland's banking sector remains dominated by multinational bank holding companies, most of them of European origin.

Credit institutions in both Poland and other EU countries responded to the financial crisis and declining revenues by consolidating their activities in order to increase in size and scope. This applied to all types of credit institutions, including cooperative banks and mutual savings banks. The number of credit institutions in the EU fell from 8,915 in 2004 to 7,861 in 2012, a decrease of 12% over the eight-year period. In Poland, the number of credit institutions declined from 774 in 2004 to 695 in 2012, working out to a decrease of 7%. In the EU, the biggest drop in the number of institutions was recorded in Italy, followed by Germany and Spain.

Even though the number of credit institutions declined as a result of mergers throughout the EU, banking sector assets grew rapidly. In 2012, bank assets in the EU27 represented 378% of GDP, an increase of more than 26% over 2004. In the EU15 area, bank assets represented 501% of GDP at the end of 2012.

In the EU10, the level of financial intermediation was considerably lower. In Poland, total bank assets increased from 68% of GDP in 2004 to 93% in 2012 (Figure 1).

Figure 1
Total assets of credit institutions as a percentage of GDP, 2004–2012
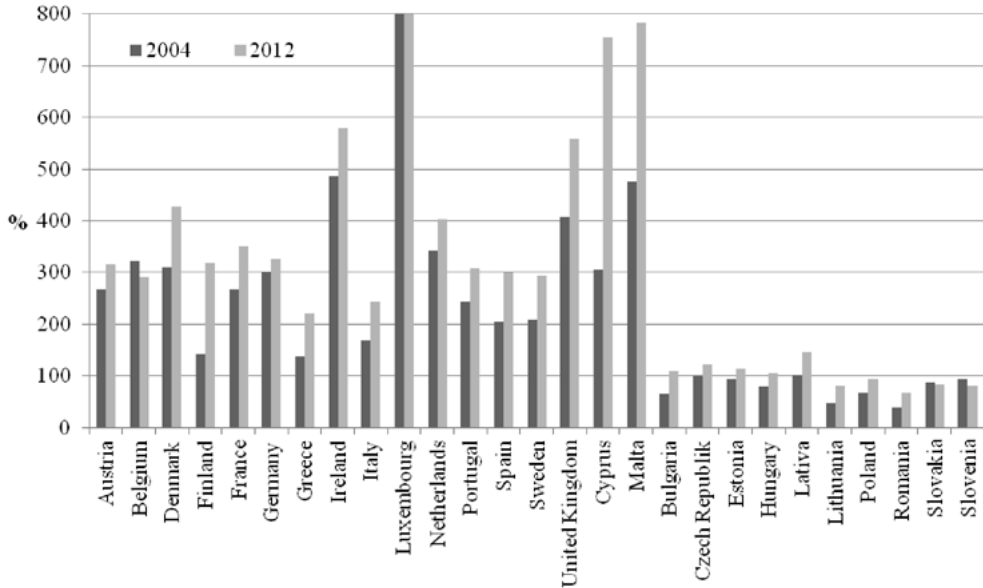
Source: European Banking Federation.

Member states from Central and Eastern Europe are still far behind the EU15 in terms of the bank assets-to-GDP ratio. Luxembourg stands out among all EU members in this respect, producing ratios that are more than 20 times the EU average. However, Luxembourg has witnessed a slow decline in its banking sector in the last decade, in part due to EU financial regulation, which has removed some of the tax advantages that come from investing money in Luxembourg. Among the new member states, only Cyprus and Malta, the two non-transition economies, have relatively high bank assets. These two countries' banking systems have developed significantly in the last decade and display a ratio that is even higher than those in most EU15 countries.

In EU countries from Central and Eastern Europe, despite more than a decade of bank restructuring, this ratio ranges from 90% to 110% of GDP and is considerably lower than in EU15 countries. At the same time, credit institutions in these countries remain the most important intermediaries in the financial system. In this context, Latvia and the Czech Republic stand out as the two economies with the strongest banking systems, with bank assets amounting to 147% and 121% of GDP in 2012 respectively. At the other end of the spectrum is Romania, with bank assets of only around 67% of GDP in 2012, and countries such as Poland and Hungary, with levels between 70% and 80% of GDP that same year.

Figure 2 shows the importance of banks in the economy, providing data on domestic credit granted by credit institutions as a percentage of GDP. Credit is a broad measure

of the financing of non-monetary financial institutions provided by credit institutions. Thus, the ratio is a good proxy for overall credit activity in the banking sector.

Figure 2

Total private credit of credit institutions as a percentage of GDP, 2004–2012
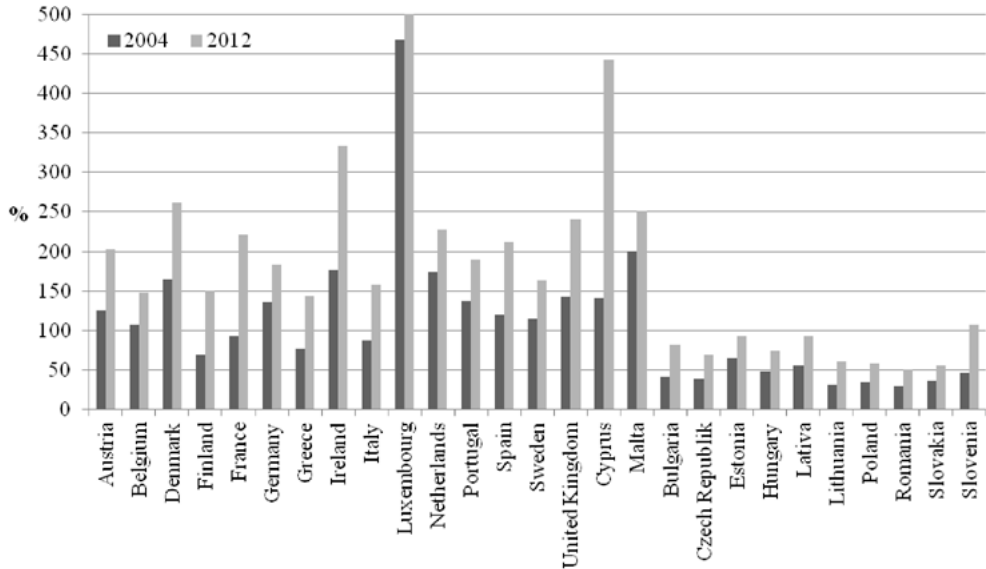
Source: European Banking Federation.

The lending volume in the EU27 as a whole increased by more than 84%, from 109% of GDP in 2004 to 201% of GDP in 2012. Among EU15 countries, the highest level of bank lending was observed in Luxembourg and Ireland in 2012. In the new member states, the total credit granted by credit institutions was one-third the EU15 average. Again, only Cyprus and Malta saw a significant increase in bank lending in the last decade. In these two countries, bank lending is even higher than in some EU15 countries.

In Poland, bank activity remains relatively low. As Table 2 shows, the biggest contribution to loan growth was from bank lending to households for home purchases in Poland, at 19.40% of GDP. Bank loans to nonfinancial corporations in Poland represented 15% of GDP and were at the lowest level among EU member countries. In the EU as a whole, the average ratio of enterprise credit and household credit was 52% of GDP and 56% of GDP respectively.

Table 2

Bank loans to nonfinancial corporations and households as a percentage of GDP in 2012

Loans to	Corporations	Households		
		Total	Mortgage	Consumer
Cyprus	145.61	134.48	71.27	18.98
Luxembourg	124.81	78.19	47.31	4.30
Malta	84.51	61.91	45.34	5.97
Spain	80.28	80.18	61.27	6.57
Portugal	68.36	82.28	66.66	8.79
Ireland	64.52	72.03	51.44	10.63
Netherlands	60.73	69.76	62.13	4.63
Denmark	58.19	132.16	115.58	6.33
Italy	57.27	39.15	23.28	4.04
Slovenia	56.85	26.56	14.51	7.64
Austria	55.09	47.98	27.93	7.94
Greece	53.16	59.31	36.06	15.33
Sweden	52.80	76.84	61.33	4.86
Bulgaria	44.51	25.11	11.70	11.96
France	43.95	53.60	41.27	7.88
Latvia	41.13	37.79	30.03	4.36
Estonia	37.58	43.95	36.74	3.69
Germany	35.27	55.85	38.12	7.25
Finland	33.55	57.43	42.69	6.70
UK	31.31	81.26	70.01	8.26
Belgium	31.09	29.65	22.73	2.47
Lithuania	25.45	24.62	19.33	2.25
Hungary	24.43	27.00	13.42	12.55
Slovakia	23.45	24.89	17.84	4.66
Czech Republic	20.80	27.97	19.69	5.00
Romania	19.57	17.68	5.66	10.51
Poland	15.36	32.80	19.40	7.71
EU27	51.47	55.57	39.73	7.45

Source: European Banking Federation.

The data in Table 2 confirm that the level of debt for both nonfinancial corporations and households in Poland is significantly lower than in other EU member states. The low level of debt may be one reason Poland was able to avoid an economic recession during the financial crisis of 2008. In addition, in recent years Poland has reported

the strongest growth in the deposit base among EU27 countries. In 2013, deposits in Poland increased by 17%, a growth that was mainly fueled by deposits from the real economy. The increase in deposits resulted in a lower leverage and thus greater stability of the banking sector.

Since 2007 the ratio of loans to deposits in the EU banking sector has gradually fallen, reaching 113% in 2012. Since the financial crisis, the nonfinancial sector has consequently reduced its balance-sheet leverage. On the one hand, the reduction was caused by limited access to credit by the nonfinancial sector. On the other, it reflects lower consumption and higher saving rates in most EU countries.

To conclude, the European financial system is mainly bank-based, yet there are significant cross-country differences. The banking sectors in the post-transition countries have grown significantly in the last decade, but remain less developed than in the EU15. However, the lower level of development and especially the relatively low debt level may be among the reasons Poland was able to avoid a financial crisis in 2008.
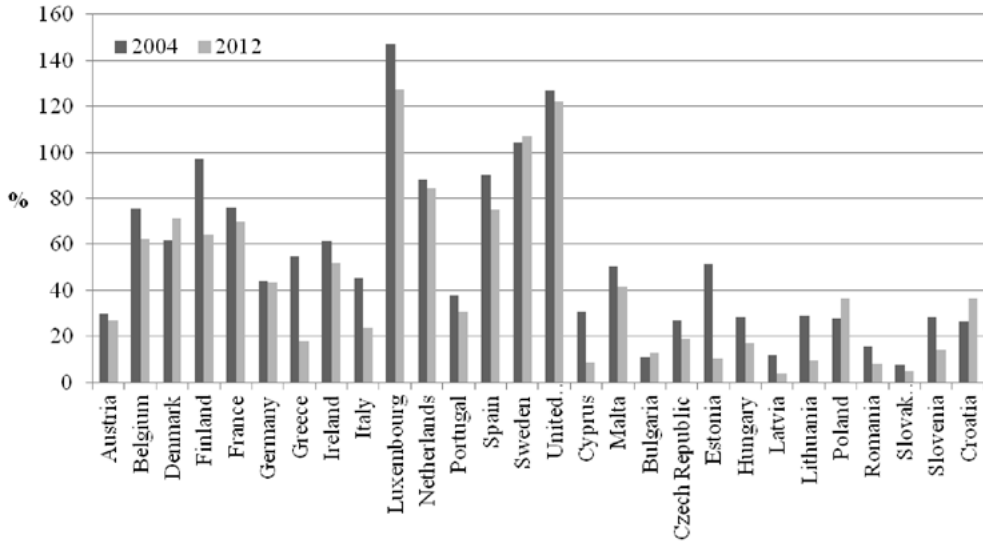
Capital markets

In 2013, a total of 450 companies, including 47 foreign-owned, were listed on the Warsaw Stock Exchange (WSE). At the end of 2013, the WSE listed the largest number of companies among all exchanges in the CEE region. The WSE also had the greatest capitalization and the highest turnover in shares in 2013 among the CEE exchanges. The Polish stock market competes with other regulated and alternative markets in Europe in attracting foreign issuers. Most of the foreign-owned companies listed on the WSE are from neighboring countries. In 2013, of the 47 foreign companies listed on the WSE's markets, 15 were from Ukraine.

As Figure 3 shows, the WSE remains relatively small in comparison with stock exchanges in EU15 member states. However, the ratio of market capitalization to GDP in post-transition countries has increased markedly during the last decade. In 2012, Europe's largest stock exchange markets were still in Luxembourg and the United Kingdom. The London Stock Exchange (LSE) is the largest in Europe in absolute terms. Among the new member states, only Malta and Poland have markets comparable in size to those in other EU members. Moreover, in some member countries, such as Cyprus and Estonia, a significant decline in market capitalization has taken place during the last decade.

Size alone is not the only criterion to judge the role of a stock market in an economy. It is important to analyze the activity of the stock exchange, which is usually measured as the ratio between the value of shares traded and GDP, as shown in Figure 5. On average the most active stock markets in the last decade have been those in Britain, Spain and Sweden. Despite its large size, Luxembourg is an idle market, less active than the WSE. The markets in EU countries from CEE have small trading volumes; Poland is the only exception. However, even though the trading volume on the WSE has increased in the last decade, it remains relatively small.

Figure 3
Market capitalization of listed companies as a percentage of GDP

Source: WDI World Bank.

Figure 4
Stocks traded as a percentage of GDP
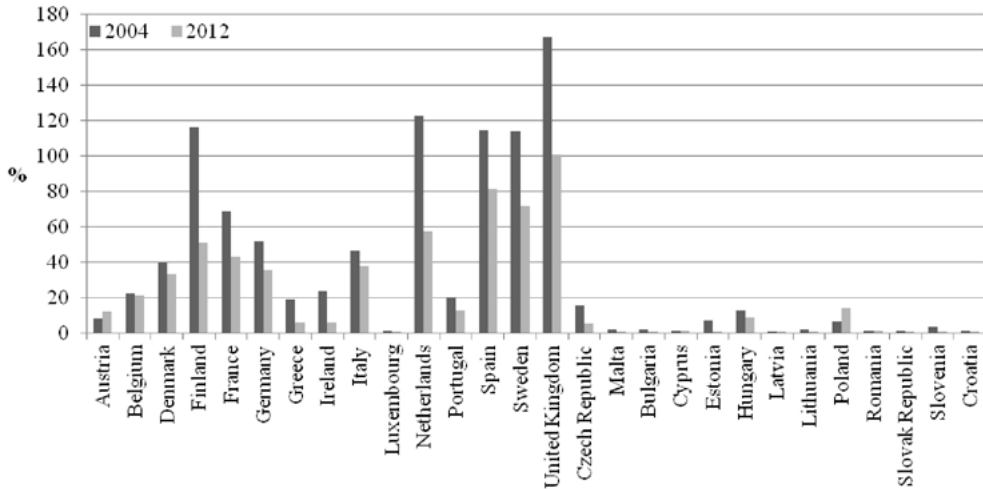
Source: WDI World Bank.

There has been a growing trend toward consolidation among stock exchanges on European capital markets during the last decade. The consolidation process has

resulted in the emergence of large stock exchanges such as Euronext, which comprises the stock exchanges in Amsterdam, Paris, Brussels and Lisbon. Another large network is the NASDAQ OMX Nordic Exchange, which combines the markets of Sweden, Finland, Estonia, Latvia, Lithuania, and Denmark. Stock exchange networks satisfy the needs of companies seeking to broaden their shareholders' base and raise capital beyond local markets. Other than the need to set up a new or renewed stock exchange, this is probably what has encouraged the small countries of Estonia, Latvia, and Lithuania to join the Nordic and Baltic alliance. Table 3 presents the number of listed companies and bonds on stock exchanges in EU countries.

Table 3
Number of listed companies and bonds

	Listed companies			Listed bonds		
	2004	2013	Δ in %	2004	2013	Δ in %
Athens Exchange	321	251	–22	126	28	–78
BME Spanish Exchanges	3,015	3,245	8	3,285	3,824	16
Borsa Italiana	278	295	6	443	861	94
Bratislava Stock Exchange	8	90	1,025	–	–	–
Bucharest Stock Exchange	55	74	35	–	–	–
Budapest Stock Exchange	48	50	4	84	201	139
Bulgarian Stock Exchange	332	n.a.	–100	–	–	–
Cyprus Stock Exchange	130	95	–27	74	56	–24
Deutsche Börse	819	720	–12	8,240	22,785	177
Irish Stock Exchange	65	50	–23	6,206	21,700	250
Ljubljana Stock Exchange	140	55	–61	101	49	–51
London Stock Exchange	2,837	2,736	–4	10,243	21,486	110
Luxembourg Stock Exchange	234	274	17	24,292	26,684	10
Malta Stock Exchange	13	24	85	72	113	57
NASDAQ OMX Nordic Exchange	678	755	11	4,318	7,086	64
NYSE Euronext	1,333	1,062	–20	3,503	4,417	26
Warsaw Stock Exchange	216	895	314	81	442	446
Wiener Börse	121	102	–16	2,846	3,418	20

Source: World Federation of Exchanges; n.a. – data not available.

Among new member states, Poland and Slovakia displayed a significant increase in the number of new listed companies. In fact, the number of listed companies in Poland is now comparable to that in many EU15 countries. The WSE's growth is the result of a large number of new listings on its New Connect alternative market. That market opened in 2007 to offer an alternative trading system. The New Connect market allows early-stage, growing companies, especially those in the high-tech

sector, to tap the capital markets. Additionally, in 2009 the Catalyst bond market was launched, which now operates on the transaction platforms of the WSE and BondSpot. As a consequence, three different segments of the capital market have been created for companies wanting to go public in Poland.

The opening of the Catalyst market has led to a significant increase in the debt securities market, which amounted to some 41% of GDP in 2013. The bond market, however, is 90% made up of government bonds, while corporate bonds account for only about 4%. Nevertheless, the Catalyst debt instrument trading system is an important driver of growth for the market of non-Treasury debt instruments in Poland. The nominal value of non-Treasury debt instruments listed on Catalyst at the end of 2013 was 25% higher than at the end of 2012.

One weakness of the WSE is that it has not yet joined the stock market consolidation process in Europe. The WSE attempted to take over some exchanges in the region, so far unsuccessfully. In order to remain independent and competitive with other stock exchanges in Central Europe, especially Austria's Wiener Stock Exchange, the WSE needs to acquire another stock exchange in the region or enter into a strategic alliance. Consequently, the coming years may bring some important moves on the CEE stock market.

Insurance sector

At the end of 2013, 27 life insurance companies and 31 non-life companies were operating in Poland. Most are owned by universal insurance companies that offer products in both market segments. As in the case of the banking sector, the country's economic growth and large market potential encouraged many foreign insurers to enter the Polish market. As a result, 21 life insurers and 20 non-life insurers are foreign-owned, mainly by companies from other European countries.

Table 4 shows that the total investment by insurance companies in the EU represented 48% of the bloc's GDP in 2012. This marked an increase of more than 90% over 2004. In Poland, insurance company assets have increased by more than 50% during the last decade. However, they remain significantly lower as a percentage of GDP than in the EU on average. The EU27 average in 2012 was 59%, while the indicator for Poland was a mere 11%.

The existing differences among EU countries and the potential of the insurance market in the post-transformation countries are presented in Table 5, which shows the value of insurance premiums as a percentage of GDP. The premiums-to-GDP ratio reflects the penetration of the insurance market and testifies to the significance of the insurance sector in the economy. Although there are significant variations in insurance spending among member states, the insurance market has grown and strengthened in most EU10 countries, including Poland, in the last decade. By contrast, in EU15 countries insurance premiums as a percentage of GDP have declined.

Table 4

Total assets under management by insurance corporations as a percentage of GDP

	2004	2012		2004	2012
Austria	28.8	39.9	Latvia	2.0	3.8
Belgium	57.7	79.8	Lithuania	2.3	3.9
Bulgaria	1.6	9.5	Luxembourg	130.3	419.0
Cyprus	27.9	81.8	Malta	13.9	34.9
Czech Republic	9.3	14.4	Netherlands	65.8	85.5
Denmark	63.3	115.9	Poland	7.1	10.7
Estonia	3.4	6.7	Portugal	24.6	34.9
Finland	25.5	33.5	Romania	1.0	4.0
France	59.9	114.6	Slovakia	7.2	13.5
Germany	49.3	48.0	Slovenia	8.9	20.9
Greece	7.2	9.2	Spain	24.3	31.4
Hungary	4.4	8.8	Sweden	31.3	105.8
Ireland	58.2	138.2	United Kingdom	95.0	94.6
Italy	29.4	38.5			

Source: European Central Bank.

Table 5

Insurance premiums as a percentage of GDP

Countries	Total		Life		Non-life	
	2004	2012	2004	2012	2004	2012
Austria	5.95	5.33	2.63	2.12	3.21	3.32
Belgium	9.62	8.33	6.73	5.57	2.76	2.89
Bulgaria	1.92	2.00	0.26	0.31	1.69	1.65
Cyprus	4.39	4.51	2.31	1.90	2.61	2.08
Czech Republic	4.15	3.73	1.63	1.75	1.98	2.53
Denmark	8.07	9.67	5.15	6.80	2.87	2.92
Estonia	2.29	n.a.	0.58	n.a.	n.a.	1.71
Finland	8.77	10.42	6.89	8.39	2.03	1.88
France	9.52	8.78	6.38	5.56	3.21	3.14
Germany	6.97	6.68	3.11	3.10	3.58	3.86
Greece	2.1	2.36	0.93	1.00	1.36	1.17
Hungary	2.83	2.51	1.15	1.34	1.17	1.67
Ireland	8.97	7.98	5.74	5.96	2.03	3.23
Italy	7.6	6.71	4.86	4.45	2.26	2.74

Countries	Total		Life		Non-life	
	2004	2012	2004	2012	2004	2012
Latvia	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Lithuania	1.48	n.a.	0.38	n.a.	n.a.	1.1
Luxembourg	3.64	4.66	1.43	2.74	1.92	2.21
Malta	5.61	4.06	2.84	2.46	1.60	2.78
Netherlands	10.1	12.38	5.43	3.16	9.22	4.67
Poland	3.07	3.80	1.17	1.94	1.86	1.90
Portugal	7.85	6.60	4.66	4.19	2.41	3.19
Romania	1.51	1.48	0.35	0.31	1.17	1.15
Slovakia	3.61	2.73	1.46	1.29	1.44	2.15
Slovenia	5.61	5.60	1.65	1.62	3.98	3.96
Spain	5.63	5.46	2.38	2.55	2.91	3.25
Sweden	6.96	7.05	4.56	5.18	1.86	2.39
United Kingdom	12.6	11.89	8.92	9.02	9.22	3.68
EU27	8.32	7.76	5.04	4.64	3.12	3.28

Source: SwissRe, (2005, 2014). n.a. – data not available.

Poland's insurance sector, however, remains underdeveloped compared with its counterparts in EU15 member states. In 2012, insurance penetration, in the form of premiums as a percentage of GDP, was still considerably lower than the EU27 average. In Poland, insurance penetration was at 3.80%, while the EU27 average was 7.76%. Non-life business penetration in Poland was at 1.94%, while the European average was 4.64%. Penetration in the life business was at 1.90%, while the European average was 3.28% in 2012 (SwissRe, 2014).

The low insurance market penetration rate means that the Polish insurance sector has high growth potential. New health and medical insurance as well as pension products are still underdeveloped in Poland, which means there is still plenty of room for further growth on the insurance market in the near future.

Investment funds

At the end of 2013, assets managed by Poland's mutual fund firms (TFIs) reached an all-time high of ZL188.9 billion (€45.6 billion). The industry's assets increased by ZL42.7 billion in 2013, or 29.2% compared with 2012. This increase was driven by low bank deposit yields and favorable changes in the prices of financial instruments. High net inflows were recorded by domestic debt and equity securities funds. Non-public asset funds again accounted for the biggest chunk of the market in 2013 (Analizy Online, 2014)

Table 6 presents the development of investment funds in Poland in comparison with other EU countries over the last decade. Again, the data show that the Polish investment fund sector is small in comparison with EU15 member states. In 2004–2013, total investment fund assets in the EU as a whole increased by more than 110%, while in Poland they grew by 219%. However, in absolute terms, Poland's investment fund assets are still far below the EU27 average. In Poland, total investment fund assets amounted to 15% of GDP, while the EU27 average was 413% of GDP at the end of 2013.

Table 6

Total investment fund assets as a percentage of GDP

	2004	2013		2004	2013
Austria	51.7	55.3	Latvia	0.5	2.2
Belgium	33.4	31.6	Lithuania	n.a.	1.0
Bulgaria	n.a.	n.a.	Luxembourg	3,797.9	8,120.7
Cyprus	n.a.	20.6	Malta	23.5	149.8
Czech Republic	4.3	7.5	Netherlands	20.1	118.6
Denmark	39.2	n.a.	Poland	4.7	15.1
Estonia	3.5	4.7	Portugal	21.9	18.2
Finland	14.4	45.8	Romania	n.a.	8.9
France	48.5	61.7	Slovakia	5.0	15.1
Germany	38.9	58.9	Slovenia	8.0	3.6
Greece	9.5	3.6	Spain	24.8	20.0
Hungary	5.3	12.8	Sweden	42.1	n.a.
Ireland	292.5	698.7	United Kingdom	24.8	n.a.
Italy	20.8	17.3			

Source: European Central Bank. n.a. – data not available.

Pension funds

The increase in pension fund assets during the last decade was mainly the result of capital inflows to mandatory, privately managed open pension funds (OFE). These funds are a component of the country's part-private- and part-government-managed social security system, which has been in place since 1999. Apart from OFEs, the system comprises government-managed virtual accounts and is supplemented by voluntary employee pension plans. However, voluntary employee pension plans still play a minor role in the economy.

Moreover, during the recent financial crisis, the Polish government started to blame the private pension system for being inefficient and responsible for an increase in public

debt. In 2011, the government reduced transfers to private pension funds from 7.3% to 2.3% of gross salary. In 2013, the government decided to introduce new regulations to force pension funds to transfer all government debt securities in their possession to the public system. Debt securities accounted for 60% of total pension fund assets. As a result, the role of pension funds in the Polish economy declined significantly. As pension funds were significant institutional investors lately, the pension reform is likely to have a negative long-term impact on the Polish capital market.

In the EU27 as a whole, total assets under management by private pension funds declined by more than 7% over the past decade. The decline was largely due to reforms similar to those in Poland. In Hungary, for example, the government in 2010 decided that citizens could either remit their individual private retirement savings to the state or lose the right to the basic state pension.

In 2012, Poland's pension funds managed assets that represented 19% of the country's GDP, 150% more than in 2004. That level was higher than in EU27 countries, where pension fund assets amounted to 18% of GDP in 2012. However, as a result of the reform, pension fund assets will decline significantly and fall below the EU27 average in the future.

Table 7

Total assets under management by pension funds as a percentage of GDP

	2004	2012		2004	2012
Austria	4.3	6.0	Latvia	0.4	1.5
Belgium	4.1	4.9	Lithuania	0.1	5.7
Bulgaria	n.a.	10.7	Luxembourg	n.a.	3.2
Cyprus	3.2	0.0	Malta	0.0	0.0
Czech Republic	3.7	9.0	Netherlands	106.9	183.9
Denmark	192.8	39.5	Poland	7.9	19.8
Estonia	1.9	12.4	Portugal	10.7	9.7
Finland	0.0	3.7	Romania	n.a.	2.5
France	0.0	0.0	Slovakia	0.6	13.4
Germany	11.7	0.1	Slovenia	2.0	5.2
Greece	0.0	0.0	Spain	7.7	9.5
Hungary	6.6	4.8	Sweden	0.0	11.5
Ireland	42.0	39.6	United Kingdom	64.5	92.8
Italy	0.9	2.5			

Source: European Central Bank. n.a. – data not available.

Conclusion

The key characteristics of the financial system in both Poland and other EU countries have remained unchanged since the bloc's enlargement in 2004. This analysis also shows that differences in financial structures across EU countries have not disappeared in the last decade. Financial systems in individual EU countries continue to differ considerably. Especially visible are disparities between EU15 countries and new member states from Central and Eastern Europe.

As with most other EU countries, Poland's financial system continues to be bank-based. Financial systems in all member states have reported major increases in banking assets and capital market capitalization since 2004. In fact, this rapid growth of bank assets was among the key causes of the global financial crisis that began in 2008. Poland weathered the crisis with the best-performing economy in Europe. One explanation for Poland's resilience to the crisis is its underdeveloped financial system. All financial indicators show that the Polish financial system and its individual components have improved considerably during the last decade, but are still underdeveloped by EU standards. The level of financial intermediation, measured by the total assets of credit institutions as a percentage of GDP, as well as market capitalization are significantly lower in Poland than in the EU15. Furthermore, Poland lags behind countries such as the Czech Republic and Estonia in financial system development. As a result, much remains to be done because the imperfections of financial system development may constrain future economic growth and Poland's competitive position, even though there is still plenty of room for further growth.

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PART III

POLAND IN THE EUROPEAN UNION: SELECTED ISSUES

Chapter 5
The Impact of EU Membership
on Poland's Competitiveness

This chapter evaluates the impact of Poland's EU membership on changes in the competitiveness of the Polish economy. We focus on several selected areas where the EU's influence on the Polish economy is especially visible. Individual sections discuss issues such as changes in Poland's position in European value chains, the evolution of innovation policy, the importance of EU funds to Poland's competitiveness, and adjustments on the Polish energy market resulting from EU policies.

5.1. Poland in European Value Chains

Mariusz-Jan Radło

This chapter examines the role of the Polish economy in European value chains. In this analysis we will use input-output data to present connections between economies and sectors, and we will analyze trade in intermediate goods between Poland and the EU. We will also show forward and backward vertical integration between the Polish economy and other EU economies. Finally, we will focus on the structure of Poland's exports to certain EU countries as well as in different sectors, broken down into categories of value added. These include direct domestic industry value added by exporting companies, indirect domestic value added originating from domestic intermediates supplying exporting entities, re-imported domestic value added, and foreign value added originating from foreign suppliers.

The development of global value chains

The development of global value chains is a major trend in the globalizing economy, and is strictly connected to the growing fragmentation of international production. This trend, as shown by Feenstra (1998) and Krugman *et al.* (1995), has led to a significant

deepening of integration in the global economy. But it has also resulted in a disintegration of global production processes related to a diversification and expansion of international production chains. This last process, as shown by De Backer and Yamano (2007), has been connected with a tremendous increase in the global stocks of foreign direct investment and an increase in global trade flows. In both cases the increase was much faster than global GDP growth.

These processes also involved changes in enterprises and were reflected by a growing tendency to outsource or offshore the production of goods and services. As a result, firm boundaries expanded and became blurred. This has contributed to the development of cross-sector links and has expanded the size and scope of the market as well as the range of goods and services traded through market transactions. In this perspective, international economic relations and the positions of individual countries in the global economy cannot be explained without examining the nature of international production chains and the position of the Polish economy in these chains. This would include an analysis of international trade in value added.

All these processes have influenced the Polish economy's links with other EU economies, and they have also had an impact on European economic integration. To a large extent, this integration means that Poland has become part of European production chains.

Trade in intermediate goods and value chains

Trade in intermediate goods is an important and relatively accurate measure describing the functioning of international production chains. The importance of this trade was first described by Grubel and Lloyd (1975) in the context of growing intra-industry trade in the 1970s. They highlighted the increasing role of intra-industry trade in the global economy, including the so-called vertical intra-industry trade related to trade in goods produced by the same industries, but at different stages of the production chain. Initially, however, intra-industry trade theories focused on trade in final goods, which is predominantly horizontal. The existence of this trade was explained by the existence of economies of scale and differences in consumer tastes (Krugman, 1981) or differences in comparative advantages (Davis, 1995), resulting in a diversification of products. In recent decades, the role of intra-industry trade in intermediate goods related to vertical linkages between firms increased substantially, both forward (or downstream) and backward (or upstream) of the value chain (Hummels, Ishii and Yi, 2001, Koopman *et al.*, 2010; Yoshida, 2013). This increase, as indicated by Ando (2006), was a result of fragmentation of international production and the development international production chains.
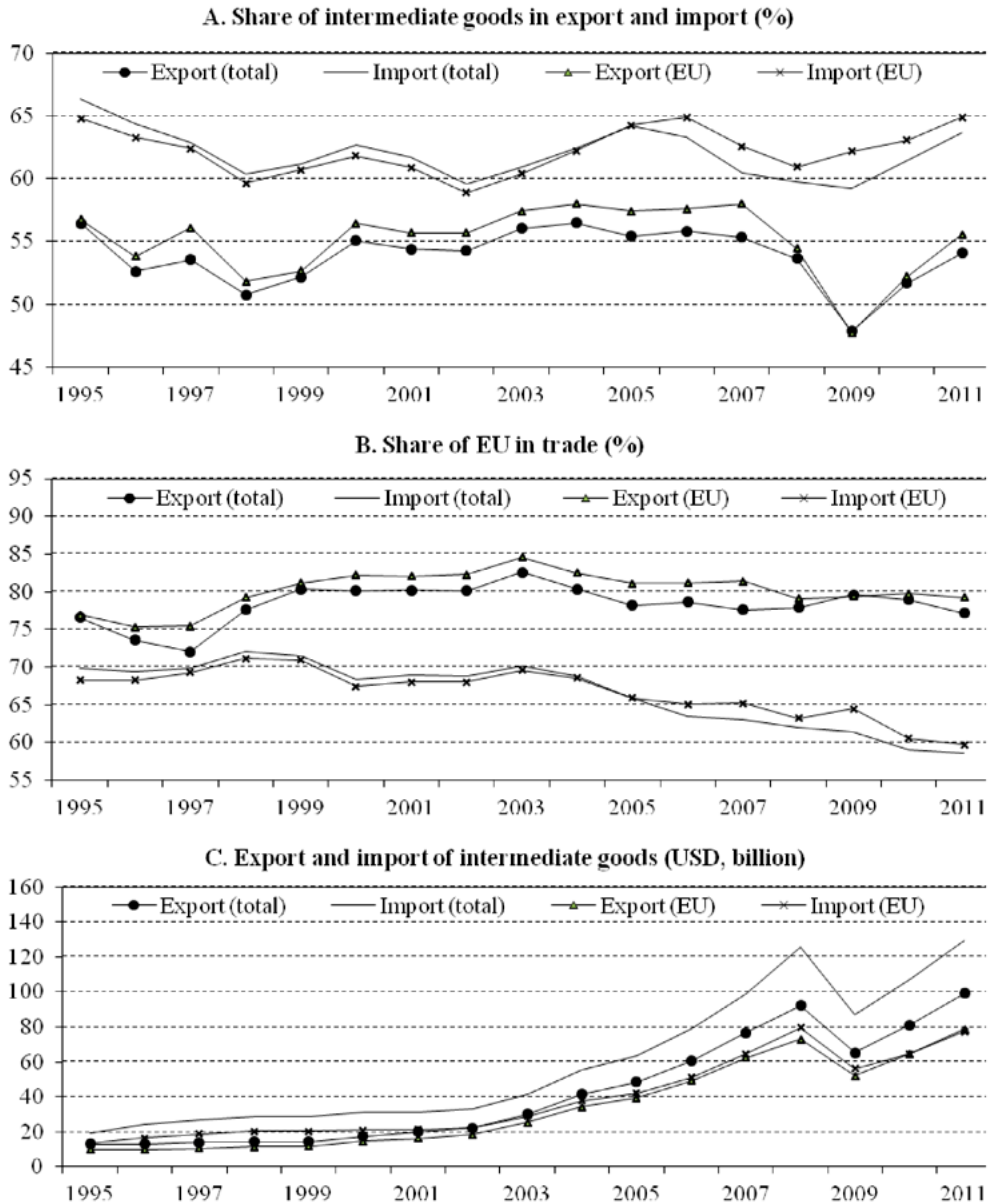
As shown in Figure 1A, trade in intermediate goods between Poland and other European Union countries, both before and after Poland's EU accession, accounted for more than half of Poland's total exports, including exports to the European Union as a whole. The share of intermediate goods in imports to Poland was even higher, at more than 60%, in both total imports and imports from the EU. This means that

vertical backward linkages were stronger in the Polish economy than forward linkages. In both cases, however, these linkages were responsible for more than half of Poland's foreign trade. Moreover, while before accession the share of intermediate goods in total imports was higher than their share in imports from the EU, after 2004 the share of intermediate goods in imports from the EU was higher than their share in total imports. In the case of exports, both before and after accession the share of intermediate goods in trade with the EU was higher than their share in total exports.

Such a situation means that vertical links in international value chains substantially influence the development of Poland's foreign trade. In addition, as shown in Figure 1B, these links are stronger in the case of trade with EU countries than with non-EU countries. As a result, the EU as a whole is now Poland's main export market, accounting for about three-quarters of the country's trade in both intermediate and all goods. In the case of imports, including intermediate goods imports, the position of EU markets is less important, and it decreased after Poland's accession to the EU. This was reflected by a declining share of the EU in Poland's imports. The share of the EU in Poland's total imports as well as in intermediate goods imports declined from about 70% before 2004 to less than 60% in 2011. This also means that forward vertical links between Poland and other EU economies are stronger than backward linkages with these economies. The backward vertical linkages of the Polish economy extend beyond the EU and include larger shares of intermediate goods imports from other countries including Russia (imports of energy resources) and China (imports of other intermediate goods). Moreover, while the EU's position in the forward vertical linkages of the Polish economy is relatively stable, backward vertical linkages between Poland and the EU are systematically weakening.

An analysis of the evolution of trade in intermediate goods—presented in Figures 1A and 1C—shows that both the value of trade in intermediate goods and their share in Poland's total trade decreased significantly during the crisis after 2007, especially in 2009, when global trade collapsed. This, as indicated by Drauz (2013) and Sturgeon and Memedovic (2011), is a consequence of the fact that, during a crisis, companies are more likely to reduce inventory levels and their procurement of raw materials and components in order to cut costs and production. Moreover, many multinationals try to ensure the survival of the parent company at the expense of foreign subsidiaries. This causes a fall in imports from foreign affiliates and independent foreign suppliers. However, in periods of economic recovery, trade in intermediate goods generally grows faster than trade in final goods. This is due to growing demand for intermediate goods needed to increase production and the fact that the crisis may strengthen risk aversion and reduce investment in fixed capital. Therefore, in the medium term, the crisis may result in greater propensity to outsource. This strategy makes economies specializing in producing and exporting intermediate goods more vulnerable to a transmission of shocks in the global economy. These economies can also mitigate these shocks by a simultaneous reduction of intermediate goods imports from other countries, but this leads to a transmission of shocks to other economies.

Figure 1

Poland's trade in intermediate goods with the EU and the world

A. Share of intermediate goods in export and import (%)

B. Share of EU in trade (%)

C. Export and import of intermediate goods (USD, billion)

Source: Author's elaboration based on: OECD (2012).

While the European Union is crucial for Poland's participation in international value chains, the role of individual member states varies widely. As shown in Figure 2, the strongest vertical links, in terms of trade in intermediate goods, are between Poland

and Germany. In 2011, trade in intermediate goods with Germany accounted for 40.5% of Poland's intermediate goods imports from the EU and for 36.3% of Poland's exports of intermediate goods to the EU. Other important Polish trade partners, in terms of trade in intermediate goods, were Italy, the Czech Republic, France, the United Kingdom, and the Netherlands. Moreover, relatively important trade connections were also in place between Poland and Belgium (including Luxembourg), Slovakia, Sweden, Hungary, Spain, and Finland.

Figure 2

Poland's trade in intermediate goods with key trading partners in the EU (% of total imports or exports from or to the EU)
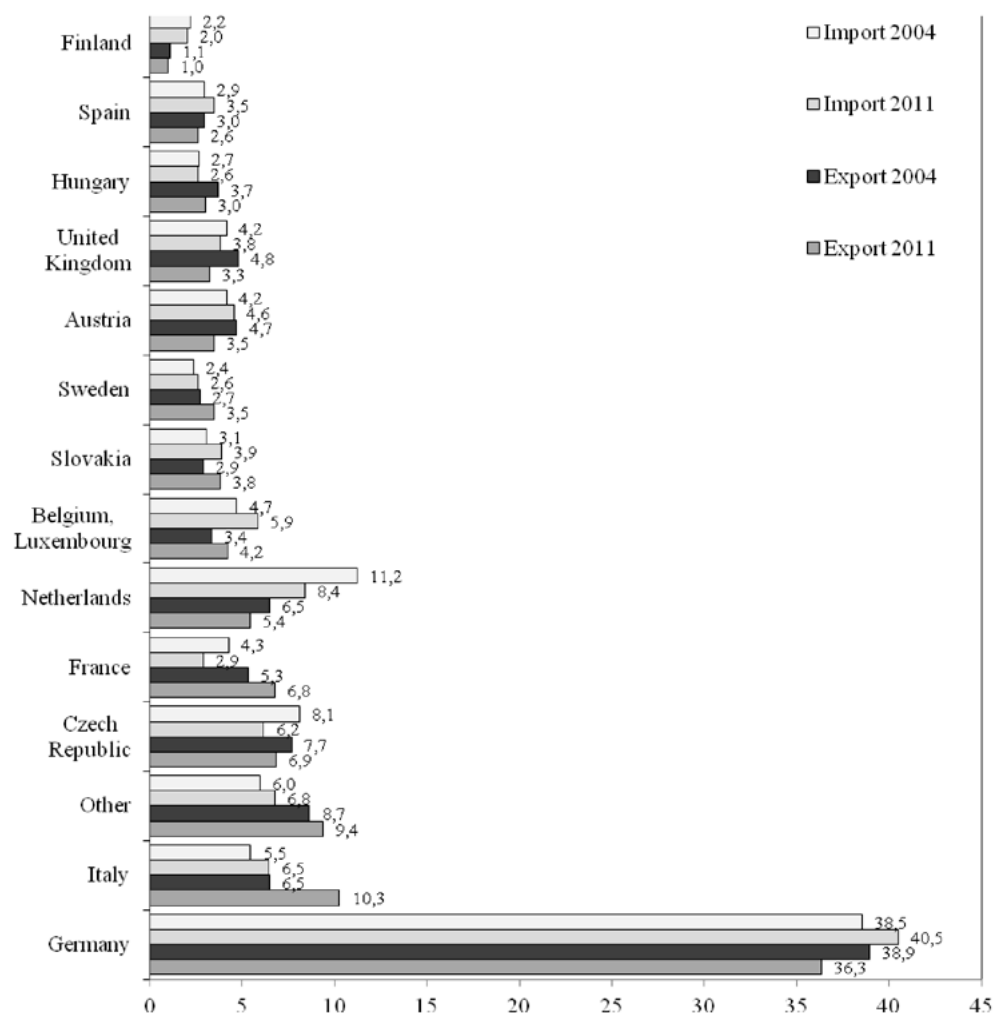
Source: Author's elaboration based on: OECD (2012).

Figure 3

Changes in the intensity of Poland's trade of intermediate goods with other EU member countries (% of total imports or exports by country)

A. 2004

B. 2011
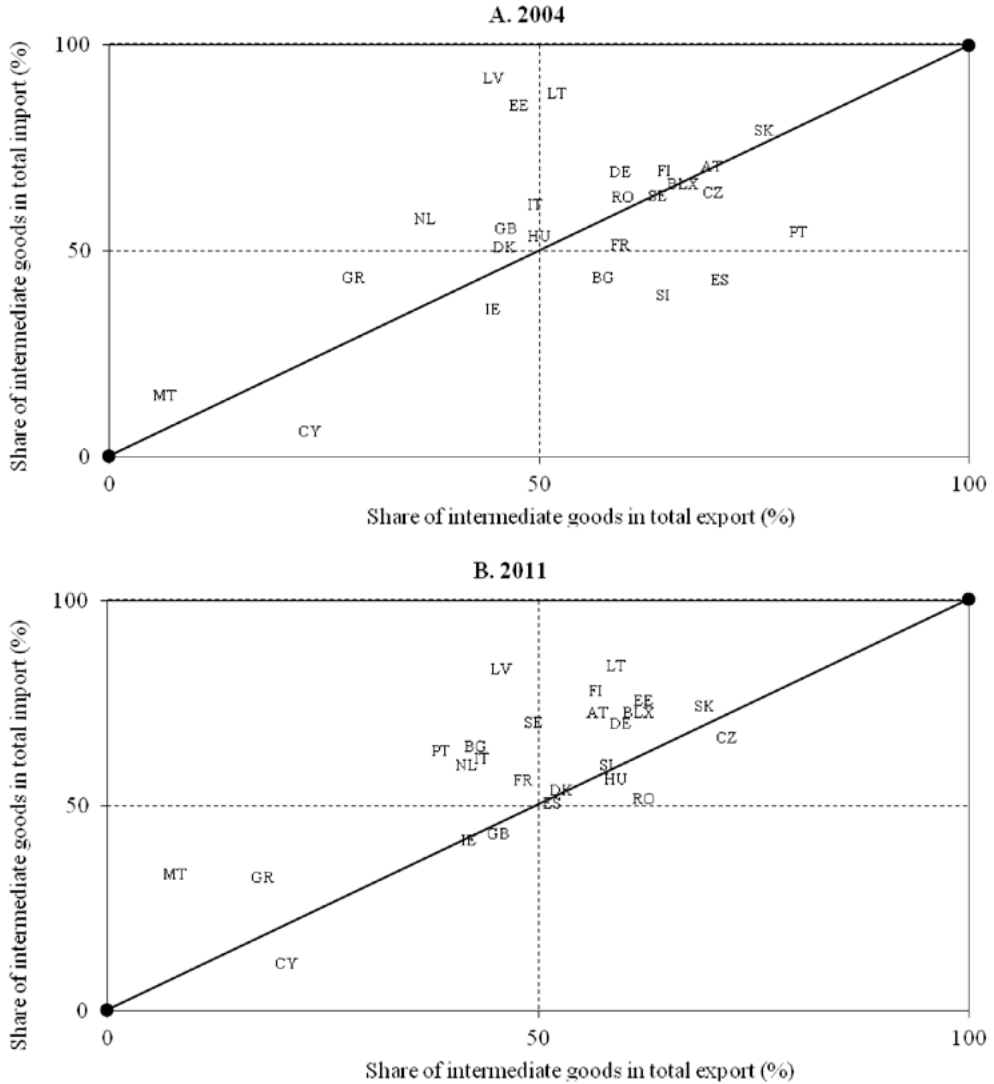
Source: Author's elaboration based on: OECD (2012).

As shown in Figure 3A and 3B, in 2004–2011 there were significant changes in the intensity of trade in intermediate goods as measured by the share of intermediate goods in Poland's total imports and exports from/to EU member states. The vertical axis in the figures indicates the share of intermediate goods in imports from a specific country, while the horizontal axis reflects the share of intermediate goods in exports to

that country. The points above the diagonal line correspond to a situation in which the share of intermediate goods in imports is higher than the share of intermediate goods in exports. In addition, the dotted lines denote a 50% share of intermediate goods in imports and exports respectively. A comparison of data for 2004 and 2011 shows that most EU economies moved above the diagonal line during this period, which means that the intensity of Poland's backward vertical linkages with these economies was strengthened. At the same time, the number of member states in which the share of intermediate goods in imports exceeded 50% increased from 18 in 2011 to 20 in 2004, while the number of countries with a share of intermediate goods in exports exceeding 50% decreased from 14 in 2004 to 13 in 2011. Significantly, the differences between member states in terms of the intensity of trade in intermediate goods decreased in 2011 compared with 2004. This was confirmed by a decline in the standard deviation of intermediate goods' share in exports (from 17.3 in 2004 to 15.5 in 2011) and imports (from 20.3 in 2004 to 17.3 in 2011).

Decomposition of Polish trade on value added with the EU

The development of international value chains and the increasing share of foreign value added in gross exports result in a situation in which the role and position of various economies in the world economy can only be explained by analyzing the structure of value added in their exports. Such an analysis can be based on international input-output tables, and the disaggregation of the value added in exports into items such as direct domestic industry value added content of gross exports (DDVA), indirect domestic content of gross exports originating from domestic intermediates (IDVA), re-imported domestic value added content of gross exports (RDVA), and foreign value added content of gross exports (FVA).

Figure 4 presents changes in the structure of value added in Poland's exports to the EU. It indicates that from 2005 to 2008 there were slight changes in the share of domestic direct and indirect value added in exports. In 2009, the share of domestic value added increased by 2 percentage points. This was probably related to a general reduction in trade in intermediate goods in 2009, as described earlier, which accompanied the collapse in world trade and the crisis. Regardless of these changes in the period after EU accession, the share of domestic value added in Poland's exports was 70%. Domestic value added accounted for more than half of direct value added generated by Polish exporters, while domestic suppliers were responsible for the remaining part. Moreover, the share of domestic re-imported value added in Polish exports was marginal and did not exceed 0.2%. At the same time, the share of foreign value added in Poland's exports was over 30%. This proportion, however, decreased slightly in 2009 because of the rapid decline in the trade of intermediate goods. Unfortunately, there is no input-output data for the period after 2009, but, given the revival of trade in intermediate goods after 2009, it is expected that the share of foreign value added in Poland's exports has increased in recent years.

Figure 4

The breakdown of value added in Poland's exports to the EU and in the country's overall exports (1995, 2000, 2005 and 2009, % of export value)
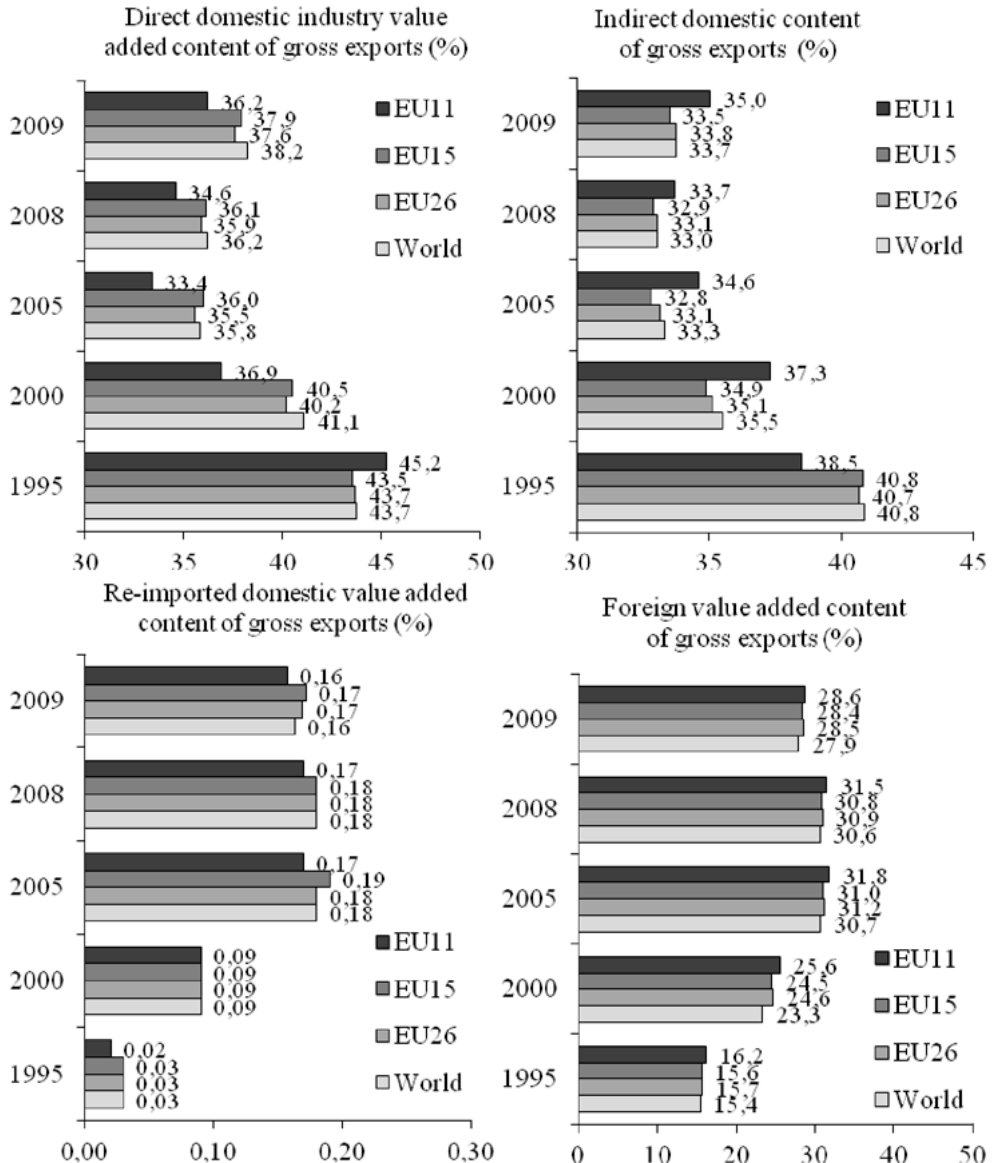
Notes: EU26—European Union without Croatia and Poland; EU11—countries that joined the EU in 2004 or 2007 without Poland.

Source: Author's elaboration based on: OECD (2012).

While in the period after accession there were no major changes in the structure of value added in Poland's exports, such changes were recorded in the longer term, since 1995. These changes involved a significant decline in the share of domestic value added in Polish exports: from about 85% in 1995, to 75% in 2000, and to around 70% after 2004. At the same time, the share of domestic re-imported value added increased slightly from 0.02% in 1995, to 0.09% in 2000 and less than 0.2% after accession. During the same period, the share of foreign value added in Poland's exports to the EU increased from around 15% in 1995, to about 24% in 2000, more than 30% in 2005 and 2008, and about 28% in 2009. Despite the decline in the share of domestic value added in exports, domestic value added exported by Poland increased significantly thanks to a huge increase in total exports. These trends confirm a deepening of the international ties of the Polish economy, including in particular the development of backward vertical linkages.

Value added in Poland's exports to the EU by sector

After analyzing changes in the structure of value added in Poland's exports, we shall now analyze the structure of exported value added by sector. This analysis will show how various sectors of the Polish economy contribute to the export of domestic and foreign value added.

The analysis of the direct and indirect domestic value added in gross exports (Table 1) shows that after EU accession, there have been only minor changes in the structure of value added in Poland's exports. In 2011, the share of direct domestic value added in exports was the highest in transport equipment (13.8%), chemical products and other mineral products (13.6%), electrical and optical equipment (9.9%), metals and metal products (7.7%), food products, beverages, and tobacco (6.8%), and machinery and equipment (6.2%), as well as in service sectors such as financial services, business and other services (6.9%), and transport, postal services, and telecommunications (6.8%). Moreover, since 1995 and 2000, the direct domestic value added share of manufacturing sectors producing more processed goods increased. At the same time, the share of sectors producing less-processed goods (textiles, textile products, leather and footwear, wood, paper, paper products, printing and publishing, and base metals and fabricated metal products) decreased.

Changes in the share of domestic value added in total exports to the EU were similar to those described above. They consisted of an increasing share of sectors producing more processed goods and services in total exports and a decreasing share of sectors producing less-processed goods. At the same time, the highest share in the export of value added in this category was noted by domestic suppliers of transport equipment (17.9%), chemical products and other mineral products (13.9%), food products, beverages and tobacco (12.6%), electrical and optical equipment (9.3%), metals and metal products (8.7%), wood, paper, paper products, printing and publishing (5.8%), and machinery and equipment (5.5%). The share of service sectors'

suppliers in exported domestic intermediate value added was relatively small. The above data also indicate that the mentioned manufacturing sectors with a high share of indirect value added in total exports create additional domestic backward vertical linkages contributing to the development of their suppliers in related industries.

Table 1

Share of various sectors in different categories of value added exported from Poland to the EU (1995, 2000, 2005, 2008 and 2009, % of total value added exported to the EU, by category of value added)

Year	DDVA	IDVA	RDVA	FVA	DDVA	IDVA	RDVA	FVA
	Agriculture, hunting, forestry and fishing				Mining and quarrying			
1995	5.4	6.1	4.2	4.3	13.7	8.0	8.3	10.2
2000	2.8	3.7	1.0	1.2	7.5	3.7	2.4	2.4
2005	2.6	1.8	0.5	0.6	8.0	2.7	1.9	1.9
2008	1.7	1.5	0.6	0.8	5.3	1.8	1.4	1.6
2009	2.1	1.8	0.8	1.0	3.8	1.5	1.2	1.3
	Food products, beverages and tobacco				Textiles, textile products, leather and footwear			
1995	4.1	9.7	4.2	5.9	10.5	8.8	8.3	9.1
2000	3.2	8.2	2.1	3.1	9.0	7.4	9.0	10.5
2005	4.9	11.4	3.2	4.6	4.2	3.1	3.2	4.0
2008	5.5	10.8	3.5	4.4	4.8	3.4	3.1	4.2
2009	6.8	12.6	4.4	5.7	4.8	3.1	2.9	4.3
	Wood, paper, paper products, printing				Chemicals and non-metallic mineral products			
1995	6.5	7.6	6.3	6.2	9.5	10.8	12.5	14.0
2000	7.2	8.3	6.9	7.5	11.0	11.2	11.8	15.4
2005	6.0	7.5	4.9	5.6	13.6	13.7	12.1	17.2
2008	4.2	5.5	3.1	3.4	13.6	13.6	11.1	17.6
2009	4.9	5.8	3.5	4.0	13.6	13.9	10.9	16.5
	Basic metals and fabricated metal products				Machinery and equipment, n.e.c.			
1995	10.8	12.5	16.7	15.4	2.7	2.4	4.2	2.9
2000	8.7	10.8	14.9	11.6	3.8	3.5	4.5	3.6
2005	9.0	11.8	13.8	12.0	5.3	5.5	6.2	5.3
2008	8.8	9.4	14.6	12.4	6.6	6.3	7.4	6.7
2009	7.7	8.7	12.2	10.0	6.2	5.5	6.5	6.1
	Electrical and optical equipment				Transport equipment			
1995	3.8	4.2	4.2	3.7	7.9	9.5	12.5	11.4
2000	6.2	8.6	10.1	11.8	12.7	11.7	25.0	19.0
2005	7.2	7.5	9.9	12.3	10.6	14.3	33.3	24.0
2008	10.1	10.1	10.9	12.6	13.2	17.6	32.6	23.3
2009	9.9	9.3	10.3	12.5	13.8	17.9	35.6	25.3
	Manufacturing n.e.c.; recycling				Construction			
1995	5.8	5.0	6.3	4.7	1.6	1.6	2.1	1.5

Year	DDVA	IDVA	RDVA	FVA	DDVA	IDVA	RDVA	FVA
2000	5.0	6.7	6.3	6.0	0.8	0.9	0.7	0.6
2005	4.9	6.4	5.7	5.4	0.6	0.6	0.3	0.4
2008	5.4	6.8	5.5	5.3	1.2	1.2	0.7	0.8
2009	5.4	6.5	5.4	5.3	1.6	1.6	1.0	1.1
	Transport and storage, post and telecommunications				Electricity, gas and water supply			
1995	3.1	2.3	2.1	1.8	1.3	1.2	0.0	1.1
2000	5.3	3.6	1.7	2.1	0.9	1.0	0.4	0.7
2005	5.4	3.5	1.6	1.9	1.9	1.7	0.5	0.9
2008	7.0	5.1	2.9	3.5	0.8	0.6	0.2	0.5
2009	6.7	4.9	2.8	3.4	1.2	1.0	0.4	0.7
	Wholesale and retail trade; Hotels and restaurants				Financial intermediation, business and other services			
1995	9.9	6.2	4.2	4.6	3.3	4.2	4.2	3.4
2000	13.6	9.7	3.1	4.1	2.1	1.1	0.4	0.5
2005	13.6	6.8	2.3	3.3	2.4	1.5	0.4	0.6
2008	4.8	2.4	0.9	1.1	7.3	3.9	1.4	1.8
2009	4.6	2.2	0.9	1.1	6.9	3.7	1.3	1.9

Note: n.e.c. – not classified elsewhere.

Source: Author's elaboration based on: OECD (2012).

Re-imported domestic value added is the least significant category of exported value added. Nonetheless, some sectors contributed to the export of this category of value added more than others, i.e. transport equipment (35.6%), metals and metal products (12.2%), chemical products and other mineral products (10.9%), and electrical and optical equipment (10.3%). Although the category is relatively insignificant, the data indicate that the intensity of international value chains in these sectors is higher than in others.

Foreign value added was the last of the analyzed categories of exported value added. It is related to the intermediate goods and services imported by Polish exporters, that is, to their backward vertical international linkages. The following sectors had the highest shares in total foreign value added exported from Poland: transport equipment (25.3%), chemical products and other mineral products (16.5%), electrical and optical equipment (12.5%), and metals and metal products (10%). These sectors are most strongly associated with their foreign suppliers of raw materials or intermediates.

After analyzing the structure of total value added exported from Poland to the EU by sector, we should take a look at the structure of exported value added in each sector separately. This will make it possible to more precisely identify sectors with more intensive backward national and international vertical linkages. Table 2 shows that service sectors have much higher shares of domestic value added, both direct and indirect, in total exports than manufacturing sectors. On the other hand,

manufacturing sectors have higher shares of foreign value added in exports. In 2011, the highest shares of foreign value added in exports were in the sectors of transport equipment (38.9%), electrical and optical equipment (34.1%), metals and metal products (32.7%), chemical products and other mineral products (32.3%), products not elsewhere classified (26.1%), and wood and paper (23.1%). Since Poland's EU entry, there have been few changes in the structure of exported value added in any of these sectors. However, compared with 1995 and 2000, there was a substantial increase in the share of foreign value added in total value exported by the analyzed sectors.

Significantly, the share of service sectors in total exports in traditional international trade statistics, including those presented in Table 1, is underestimated. Considering that service companies are subcontractors of companies from other sectors, including manufacturing, it turns out that the share of services in value added exports is much higher than could be expected. Figure 5 shows that the share of service value added (both domestic and foreign) in total value added exported from Poland reached 42.4% in 2009. The share of services in exports from other EU economies, especially better developed ones, is even higher. This means that catching up with better developed EU economies may result in a further increase in the role of service sectors in value added exports from Poland.

The relatively high share of services in value added exported by various sectors is largely due to the growing fragmentation of service production that is taking place in many companies. This trend was explained by researchers including Dietrich (1999), who studied the restructuring of European manufacturing sectors from 1970 to 1991. On the basis of input-output tables, he pointed out that a key trend in the European manufacturing industry was restructuring based on vertical externalization and outsourcing of back-office services to independent vendors or affiliated companies, both domestic and foreign. This production fragmentation resulted in a decline of manufacturing industries in the economy, in terms of value added and employment. McCarthy and Anagnostou (2004) observed a similar effect in the UK economy.
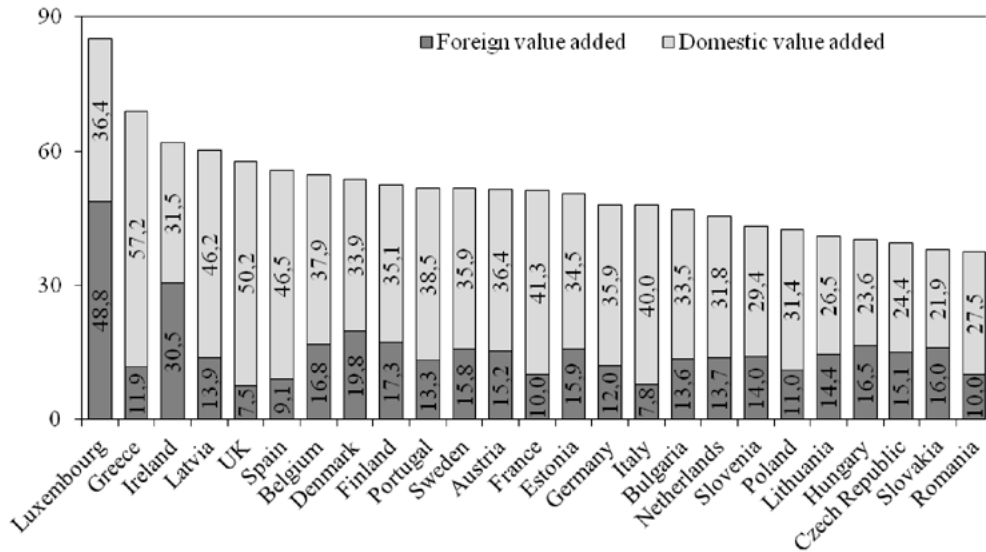
Table 2

Structure of value added exported from Poland to the EU by sector (1995, 2000, 2005, 2008 and 2009, % of total value added exported to the EU by each sector)

Year	DDVA	IDVA	RDVA	FVA	DDVA	IDVA	RDVA	FVA
	Agriculture, hunting, forestry and fishing				Mining and quarrying			
1995	42.8	45.0	0.02	12.2	55.3	29.9	0.02	14.8
2000	41.1	47.6	0.04	11.3	61.5	26.6	0.05	11.8
2005	53.6	35.1	0.05	11.3	65.6	21.0	0.08	13.4
2008	45.6	36.7	0.08	17.6	63.5	20.2	0.08	16.2
2009	47.5	35.8	0.08	16.6	62.0	22.1	0.08	15.9
	Food products, beverages and tobacco				Textiles, textile products, leather and footwear			
1995	27.0	59.2	0.02	13.8	47.7	37.5	0.02	14.8

2000	26.1	58.2	0.04	15.6	41.0	29.5	0.09	29.5
2005	25.0	54.3	0.08	20.6	39.5	27.6	0.16	32.8
2008	28.3	51.7	0.09	19.8	41.2	27.5	0.13	31.1
2009	30.3	50.5	0.09	19.2	44.0	26.0	0.12	29.8
	Wood, paper, paper products, printing				Chemicals and non-metallic mineral products			
1995	41.3	44.7	0.02	14.0	38.7	40.9	0.03	20.4
2000	37.6	38.3	0.08	24.0	36.4	32.4	0.09	31.1
2005	33.3	38.9	0.14	27.6	32.8	30.7	0.15	36.3
2008	34.4	41.4	0.13	24.1	32.8	30.4	0.13	36.7
2009	37.3	39.6	0.12	23.1	35.3	32.4	0.13	32.3
	Base metals and fabricated metal products				Machinery and equipment, n.e.c.			
1995	38.7	41.6	0.04	19.7	45.3	37.4	0.04	17.2
2000	34.5	37.4	0.13	28.0	42.1	33.6	0.11	24.1
2005	29.4	36.0	0.23	34.4	35.0	34.0	0.21	30.8
2008	31.2	30.6	0.26	37.9	36.3	31.8	0.20	31.6
2009	33.2	33.9	0.24	32.7	39.2	31.2	0.19	29.4
	Electrical and optical equipment				Transport equipment			
1995	42.0	43.4	0.03	14.6	37.9	42.4	0.04	19.7
2000	29.7	35.6	0.11	34.6	36.6	29.5	0.17	33.7
2005	28.9	27.9	0.20	43.0	23.5	29.5	0.38	46.6
2008	33.2	30.7	0.18	35.9	26.5	32.6	0.33	40.5
2009	35.6	30.1	0.17	34.1	28.1	32.7	0.33	38.9
	Manufacturing n.e.c.; recycling				Construction			
1995	48.1	38.1	0.03	13.8	44.1	41.1	0.04	14.7
2000	34.6	40.1	0.10	25.1	40.1	40.7	0.08	19.1
2005	31.2	38.5	0.19	30.1	39.7	38.7	0.12	21.5
2008	33.2	38.5	0.17	28.2	39.7	36.5	0.12	23.7
2009	35.4	38.3	0.16	26.1	41.1	37.3	0.11	21.5
	Transport and storage, post and telecommunications				Electricity, gas and water supply			
1995	52.9	36.3	0.02	10.8	46.2	39.6	0.00	14.2
2000	54.8	32.0	0.04	13.2	40.9	39.6	0.04	19.5
2005	52.3	31.4	0.08	16.2	43.7	37.5	0.06	18.7
2008	47.7	32.0	0.10	20.2	43.1	33.7	0.07	23.1
2009	49.2	32.1	0.09	18.7	46.2	34.4	0.06	19.3
	Wholesale and retail trade; Hotels and restaurants				Financial intermediation, business and other services			
1995	57.2	33.2	0.01	9.5	39.0	46.5	0.03	14.5
2000	55.3	34.4	0.03	10.3	63.2	28.4	0.02	8.4
2005	59.4	27.8	0.05	12.7	55.9	31.7	0.05	12.4
2008	60.0	27.6	0.06	12.3	58.4	28.9	0.06	12.6
2009	61.9	26.5	0.06	11.5	59.2	28.3	0.05	12.5

Source: Author's elaboration based on: OECD (2012)

Figure 5
Services value added in total exports (2009, %)

Source: Author's elaboration based on: OECD (2012).

The share of services in value added exported by various sectors of the Polish economy, as shown in Table 3, is very diverse. The highest share of services in value added occurred in service sectors, including trade, hotels and restaurants, transport, post, telecommunications, financial intermediation, business services, other services, and construction. Moreover, the share of service sectors in the exported value added exceeded 30% in manufacturing sectors in 2009. The highest shares of services in value added exported by manufacturing industries was observed in transport equip-ment (38.8%). In other manufacturing sectors, these shares were also significant: elec-trical and optical equipment (34.7%), manufacturing not elsewhere classified (34.2%), wood, paper, paper products and printing (33.4%), food products, beverages and tobacco (33.3%), chemicals and non-metallic mineral products (32.3%), machinery and equipment not elsewhere classified (32.1%), metals and metal products (31.4%) and tannins, textiles, leather and footwear (31.3%). After EU accession the shares of services in exported value added increased slightly in seven of nine manufacturing industries. A much larger increase in the share of services in exported value added was observed in the long-term perspective. In 1995, the share of services in exported value added was well below 30% in all manufacturing industries (excluding manufacturers of chemicals and non-metallic mineral products), whereas in 2009 this share exceeded 30% in all of these sectors.

Table 3

Service value added share in total exports, by sector (1995, 2000, 2005 and 2009, % of total exports by sector)

NACE	1995	2000	2005	2008	2009
Total	40.8	42.7	40.0	42.1	42.4
Agriculture, hunting, forestry and fishing	21.4	23.5	18.2	24.2	24.0
Mining and quarrying	17.3	19.4	17.7	19.4	20.6
Food products, beverages and tobacco	27.2	32.4	33.8	33.1	33.3
Textiles, textile products, leather and footwear	24.2	29.9	30.6	32.6	31.3
Wood, paper, paper products, printing and publishing	22.7	30.1	34.7	33.4	33.4
Chemicals and non-metallic mineral products	30.3	30.5	29.7	32.6	32.3
Base metals and fabricated metal products	23.4	27.3	30.3	31.4	31.4
Machinery and equipment, nec	22.2	27.5	31.9	32.5	32.1
Electrical and optical equipment	26.4	34.0	34.0	34.7	34.7
Transport equipment	26.3	30.8	36.4	37.8	38.8
Manufacturing n.e.c.; recycling	22.4	30.9	33.9	34.2	34.2
Electricity, gas and water supply	19.8	26.6	28.4	29.1	29.1
Construction	68.0	73.7	74.4	74.4	76.4
Wholesale and retail trade; Hotels and restaurants	81.1	85.8	88.0	86.6	88.0
Transport and storage, post and telecommunications	79.6	86.7	84.2	82.3	83.5
Financial intermediation	83.5	91.7	94.2	91.6	90.6
Business services	77.5	89.0	88.3	87.8	89.3
Other services	88.1	87.0	88.4	84.0	85.1

Source: Author's elaboration based on: OECD (2012).

Additional information on key trends in Poland's gross exports to the European Union and in the export of domestic value added to the EU is given in Table 4. The data show that the greatest increases in the value of gross exports in 1995–2005 and 2005–2009 were recorded in the industries of transport equipment and electrical and optical equipment; transport and storage, postal services and telecommunications; machinery and equipment; and food products, beverages and tobacco. The increased role of all these industries in Poland's overall exports was accompanied by their increased shares in the export of domestic value added, both direct and indirect. As a result, the total contribution of these five industries to Poland's overall exports increased from 24.8% in 1995 to 40.9% in 2005 and 48.4% in 2009. In turn, their share in the export of domestic value added increased from 21.6% in 1995 to 33.4% in 2005 and 43.4% in 2009, while their share in the export of indirect domestic value added increased from 28% in 1995 to 42.2% in 2005 and 50.1% in 2009.

Table 4

Share of various sectors in gross exports from Poland to the EU, and in the export of domestic direct and indirect value added in 1995, 2005 and 2009 (%)

NACE	Export			DDVA			IDVA		
	1995	2005	2009	1995	2005	2009	1995	2005	2009
Total	100	100	100	100	100	100	100	100	100
Agriculture, hunting, forestry and fishing	5.6	1.7	1.7	5.4	2.6	2.1	6.1	1.8	1.8
Mining and quarrying	10.8	4.3	2.3	13.7	8.0	3.8	8.0	2.7	1.5
Food products, beverages and tobacco	6.6	7.0	8.4	4.1	4.9	6.8	9.7	11.4	12.6
Textiles, textile products, leather and footwear	9.6	3.8	4.1	10.5	4.2	4.8	8.8	3.1	3.1
Wood, paper, paper products, printing and publishing	6.9	6.4	4.9	6.5	6.0	4.9	7.6	7.5	5.8
Chemicals and non-metallic mineral products	10.7	14.8	14.6	9.5	13.6	13.6	10.8	13.7	13.9
Basic metals and fabricated metal products	12.2	10.9	8.7	10.8	9.0	7.7	12.5	11.8	8.7
Machinery and equipment, n.e.c.	2.6	5.4	5.9	2.7	5.3	6.2	2.4	5.5	5.5
Electrical and optical equipment	3.9	8.9	10.5	3.8	7.2	9.9	4.2	7.5	9.3
Transport equipment	9.1	16.0	18.5	7.9	10.6	13.8	9.5	14.3	17.9
Manufacturing n.e.c.; recycling	5.3	5.5	5.8	5.8	4.9	5.4	5.0	6.4	6.5
Electricity, gas and water supply	1.2	1.5	1.0	1.3	1.9	1.2	1.2	1.7	1.0
Construction	1.6	0.5	1.4	1.6	0.6	1.6	1.6	0.6	1.6
Wholesale and retail trade; Hotels and restaurants	7.5	8.1	2.8	9.9	13.6	4.6	6.1	6.8	2.2
Transport and storage, post and telecommunications	2.6	3.6	5.1	3.1	5.4	6.7	2.3	3.5	4.9
Financial intermediation	1.2	0.0	0.3	0.8	0.1	0.4	1.4	0.0	0.3
Business services	2.2	1.3	3.1	2.0	2.0	5.0	2.6	1.3	2.5
Other services	0.3	0.2	1.0	0.4	0.3	1.5	0.2	0.1	0.9

Source: Author's elaboration based on: OECD (2012)

Value added in Polish exports to the EU by country

As shown in Table 5, the share of various EU member states in domestic and foreign value added exported from Poland to the EU is uneven. Logically, the distribution of value added exports from Poland mirrors the geographical structure of intermediate goods exports to these countries, as shown in Figure 2. The five most important export markets in the EU for Polish domestic value added were Germany (25.9%), Italy (7.5%), the United Kingdom (7.1%), France (6.9%), and the Czech Republic (5.1%). The largest recipients of foreign value added exported from Poland to the EU were Germany (7.7%), Italy (2.8%), France (1.98%), the UK (1.47%), and the Netherlands (1.1%).

Table 5

The share of domestic (indirect, direct and re-imported) value added exports in gross exports to the European Union by country (1995, 2000, 2005, 2008, 2009, % of gross exports)

Country	Foreign value added					Domestic value added				
	1995	2000	2005	2008	2011	1995	2000	2005	2008	2011
Germany	5.30	6.18	8.46	7.69	7.26	43.7	37.1	26.9	23.9	25.9
Italy	1.78	2.40	2.88	2.84	2.83	6.1	7.0	7.2	7.2	7.5
France	1.30	1.85	2.38	1.98	1.89	5.3	5.1	6.3	6.8	6.9
UK	1.58	1.77	1.71	1.47	1.35	5.5	5.0	5.8	6.2	7.1
Netherlands	0.78	0.90	1.09	1.09	1.09	4.5	3.7	2.0	2.1	2.4
Czech Republic	0.55	0.73	1.09	1.10	1.05	2.7	3.3	4.7	4.7	5.1
Spain	0.38	0.66	0.84	0.79	0.82	1.3	1.5	2.1	2.8	2.9
Belgium	0.53	0.63	0.75	0.69	0.76	1.8	1.8	1.5	1.8	1.8
Austria	0.71	0.67	0.75	0.76	0.72	2.1	2.3	2.3	2.1	1.8
Sweden	0.68	0.88	0.95	0.80	0.70	2.7	3.3	3.8	4.0	3.2
Slovakia	0.22	0.38	0.64	0.65	0.57	0.8	1.0	1.9	1.8	1.9
Denmark	0.38	0.48	0.49	0.45	0.43	3.3	2.7	1.8	2.2	1.8
Hungary	0.18	0.23	0.41	0.48	0.42	0.9	1.8	3.2	3.0	2.7
Finland	0.37	0.50	0.49	0.47	0.41	1.3	0.6	0.6	0.8	0.8
Ireland	0.08	0.15	0.23	0.27	0.29	0.5	0.7	0.4	0.6	0.4
Romania	0.02	0.09	0.18	0.20	0.20	0.2	0.6	1.5	1.9	1.6
Lithuania	0.01	0.10	0.15	0.19	0.14	0.4	0.6	1.6	1.9	1.4
Greece	0.04	0.14	0.14	0.19	0.14	0.5	1.1	0.3	0.6	0.8
Portugal	0.04	0.10	0.09	0.13	0.13	0.1	0.6	0.4	0.3	0.3
Slovenia	0.06	0.09	0.11	0.12	0.12	0.1	0.3	0.4	0.4	0.4
Luxembourg	0.13	0.09	0.07	0.10	0.09	0.6	0.0	0.1	0.4	0.2
Latvia	0.01	0.02	0.08	0.06	0.05	0.1	0.3	0.6	0.7	0.6
Bulgaria	0.02	0.02	0.04	0.07	0.05	0.3	0.3	0.3	0.5	0.5
Estonia	0.01	0.02	0.03	0.05	0.04	0.0	0.2	0.4	0.4	0.3
Cyprus	0.00	0.01	0.01	0.01	0.01	0.0	0.0	0.0	0.0	0.0
Malta	0.00	0.00	0.00	0.01	0.01	0.0	0.0	0.0	0.0	0.0

Source: Author's elaboration based on: OECD (2012).

The export of domestic value added substantially exceeded the amount of foreign value added exported to all EU countries. Nonetheless, there were some important differences in domestic value added patterns between various EU members. As shown in Table 6, the share of domestic value in 2009 exceeded 85% in exports to less well-developed EU member states, including Latvia, Lithuania, Bulgaria, Estonia, Romania,

and Hungary. This share was lower than 70% in exports to better developed EU members such as Belgium, Netherlands, Cyprus, Finland, Luxembourg, Malta, and Ireland. In addition, the direction of changes in the structure of value added (domestic versus foreign) exported from Poland to various EU members varied considerably. The 1995–2005 period was dominated by a growing share of foreign value added in exports and a declining share of domestic value added, while in the period after 2005, these trends were somewhat reversed and there was an increase in domestic value added in exports. However, the increase was not high enough to bring the shares of domestic value added to levels characteristic of the mid-1990s.

Table 6

Share of domestic and foreign value added in gross exports, by country (1995, 2000, 2005, 2008, 2009, %)

Country	Foreign value added					Domestic value added					Change in p.p.	
	1995	2000	2005	2008	2009	1995	2000	2005	2008	2009	1995–2005	2005–2009
Latvia	8.0	5.5	12.2	7.5	7.9	92.0	94.5	87.8	92.5	92.1	–4.2	4.3
Lithuania	3.0	14.8	8.7	8.7	9.0	97.0	85.2	91.3	91.3	91.0	–5.7	–0.3
Bulgaria	5.9	4.4	10.9	11.1	10.0	94.1	95.6	89.1	88.9	90.0	–5.0	0.9
Estonia	20.4	7.7	8.1	11.0	11.3	79.6	92.3	91.9	89.0	88.7	12.3	–3.2
Romania	9.1	13.3	10.5	9.6	11.4	90.9	86.7	89.5	90.4	88.6	–1.4	–0.9
Hungary	16.2	11.2	11.4	14.0	13.5	83.8	88.8	88.6	86.0	86.5	4.8	–2.1
Greece	6.8	11.0	34.7	22.8	14.7	93.2	89.0	65.3	77.2	85.3	–27.9	20.0
UK	22.3	26.1	22.9	19.1	15.9	77.7	73.9	77.1	80.9	84.1	–0.6	7.0
Czech Rep.	17.3	18.2	18.8	18.8	17.0	82.7	81.8	81.2	81.2	83.0	–1.5	1.8
Sweden	19.8	21.2	19.9	16.7	17.7	80.2	78.8	80.1	83.3	82.3	–0.1	2.2
Denmark	10.2	15.1	21.9	17.1	19.0	89.8	84.9	78.1	82.9	81.0	–11.7	2.9
France	19.8	26.6	27.4	22.6	21.5	80.2	73.4	72.6	77.4	78.5	–7.6	5.9
Germany	10.8	14.3	24.0	24.3	21.9	89.2	85.7	76.0	75.7	78.1	–13.2	2.1
Spain	22.3	30.6	28.4	22.2	21.9	77.7	69.4	71.6	77.8	78.1	–6.1	6.5
Slovenia	33.7	20.1	23.1	22.2	22.6	66.3	79.9	76.9	77.8	77.4	10.6	0.5
Slovakia	22.0	28.6	25.7	26.3	23.2	78.0	71.4	74.3	73.7	76.8	–3.7	2.5
Italy	22.5	25.5	28.5	28.2	27.4	77.5	74.5	71.5	71.8	72.6	–6.0	1.1
Austria	25.7	22.8	24.7	26.2	29.0	74.3	77.2	75.3	73.8	71.0	1.0	–4.3
Portugal	23.3	14.5	16.5	33.4	29.0	76.7	85.5	83.5	66.6	71.0	6.8	–12.5
Belgium	22.9	26.1	33.9	27.2	29.3	77.1	73.9	66.1	72.8	70.7	–11.0	4.6
Netherlands	14.7	19.8	35.8	34.3	31.1	85.3	80.2	64.2	65.7	68.9	–21.1	4.7
Cyprus	30.0	65.6	44.4	26.5	33.0	70.0	34.4	55.6	73.5	67.0	–14.4	11.4

Country	Foreign value added					Domestic value added					Change in p.p.	
	1995	2000	2005	2008	2009	1995	2000	2005	2008	2009	1995–2005	2005-2009
Finland	22.5	44.0	43.5	38.5	33.2	77.5	56.0	56.5	61.5	66.8	–21.0	10.3
Luxembourg	18.7	76.7	41.9	20.8	33.7	81.3	23.3	58.1	79.2	66.3	–23.2	8.2
Malta	22.2	20.0	70.9	42.4	39.4	77.8	80.0	29.1	57.6	60.6	–48.7	31.5
Ireland	14.1	18.7	36.5	29.7	39.8	85.9	81.3	63.5	70.3	60.2	–22.4	–3.3

Source: Author's elaboration based on: OECD (2012).

Conclusion

To summarize, it should be noted that the actual integration of the Polish economy with European value chains took place before the country's entry into the EU. Major structural changes related to the integration of the Polish economy into European value chains took place in the 1990s and from 2000 to 2004.

Vertical integration or the development of global value chains is a key factor influencing the development of Poland's foreign trade. Moreover, trade relations between Poland and other EU member states are more strongly associated with value chain development than trade with countries outside the EU. The European Union is a major export market for Poland, accounting for about three–quarters of Poland's exports, both in the case of total exports and intermediate goods exports. In the case of imports, including the import of intermediate goods, the position of EU countries is less significant, and it decreased in the period after accession to the EU.

While the European Union is crucial for Poland's participation in international value chains, the role of individual member states varies widely. The strongest vertical links, in terms of trade in intermediate goods, are between Poland and Germany, followed by Italy, the Czech Republic, France, the United Kingdom, and the Netherlands.

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5.2. A New Approach to Innovation Policy in Poland as a Result of EU Entry

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This chapter aims to discuss the impact of European integration on innovation policy in Poland, with an additional focus on the level of innovation in the Polish economy. Although accession to the European Union initiated changes in Polish innovation policy, it did not translate into a significant improvement in the level of innovation in the country compared with other member states.

This chapter discusses the key changes in innovation policy in Poland that have taken place since 2004. These include a more comprehensive approach to innovation policy; an expansion in Polish programs to include EU research, development and innovation policy tools; greater attention to regional issues; support for the development of business clusters; and the promotion of new forms of innovation, including user-driven innovation (UDI). Most of these have been launched as a result of

imitating the experience of highly developed countries acting as innovation leaders. Institutional delays in innovation policy making and other weaknesses of Poland's national innovation system—such as a low level of collaboration among businesses and between the business and science sectors, and insufficient access to funding, including seed capital and venture capital—are the chief causes of the low innovativeness of the Polish economy and the country's weak position in international league tables (European Commission, 2014).

A comprehensive approach to innovation policy as a result of EU entry

The country's EU entry had a huge impact on Polish innovation policy, as well as on the country's overall economic policy, because it led to a more comprehensive approach to development management. Since the Delors reform of 1988, the European Union has programmed its policies and budget in the long term, for a period no shorter than five years. After the programming periods 1989–1993 (five years), 1994–1999 (six years), 2000–2006 (seven years) and 2007–2013 (seven years), the EU's fifth seven-year Financial Perspective is in operation, covering the 2014–2020 period. After joining the European Union, Poland began working on a comprehensive approach to programming its own strategic development, and innovation policy is an important part of this approach. Individual Operational Programmes and financial resources are planned and allocated in the long-term time frame to guarantee a successful development strategy.

In 2007–2013, the National Strategic Reference Framework (NSRF) was the key document that outlined the country's development priorities and defined the amount of financial support available for Poland as part of EU structural funds (i.e. the European Regional Development Fund and the European Social Fund). The National Strategic Reference Framework was implemented through five National and 16 Regional Operational Programmes (ROP) as well as the European Territorial Cooperation Programme. In the structural funds system, innovation policy was pursued primarily through the national Innovative Economy Operational Programme, 2007–2013 (IE OP) as well as ROP, in which individual instruments for supporting innovation were tied to the priorities set out in Regional Innovation Strategies (RIS).

The system of Polish strategic documents refers to the development priorities set out in the Europe 2020 strategy, the single most important long-term program of the EU's socioeconomic development, which replaced the Lisbon Strategy. The Europe 2020 strategy has three basic, mutually reinforcing priorities: smart growth, which means growth based on knowledge and innovation; sustainable growth; and inclusive growth. At the national level, this European strategy inspired Poland's "Innovativeness and Efficiency of the Economy – Strategy for 2012–2020. Dynamic Poland" (Ministry of Economy, 2013), a key document in the context of programming innovation policy in Poland in the EU's new programming period. The main objective of the Polish strategy is to bring about a highly competitive economy based on knowledge and cooperation.

It places an emphasis on supporting cooperation between local community partners (which is an important factor in modern innovation processes) and on indentifying and strengthening smart specializations in individual regions.

The above analysis shows that the strategic programming of Poland's development policy in the wake of the country's EU entry—including measures designed to foster innovation in the economy—means that individual measures are not being implemented at random, but as a result of the adoption of well-thought-out medium- and long-term concepts at the Community, national and regional levels. Increased effectiveness of structural funds and other innovation policy tools is ensured by the comprehensive nature of the planning documents, with appropriately identified development priorities and strategic objectives, as well as tasks for their implementation.

European cooperation in the promotion and development of innovation

Poland's accession to the European Union has significantly increased the possibilities for financially supporting the Polish research, development and innovation system from external sources. Of note here—in addition to structural funds spent at the national and regional levels—are EU programs contributing to the emergence of the European Research Area (ERA), with the free movement of researchers, scientific knowledge and technology. ERA is a platform that makes it possible to regroup and intensify research activities at the European level and coordinate these with national and international initiatives. ERA is a central part of the Europe 2020 strategy and its flagship initiative is Innovation Union, which aims to ensure that innovative ideas are translated into new products and services and that Europe's creative potential is put to use.

The broad range of instruments for supporting measures aimed at improving innovation at the EU level primarily includes the European Framework Programme for Research, Technological Development and Demonstration Activities. To an extent, Polish companies could take part in the Fourth Framework Programme (1994–1998), and then, on equal footing, in the Fifth Framework Programme (FP5) for 1999–2002, aimed at the economic development of the Community and associated countries. When Poland joined the EU in 2004, the European Union's Sixth Framework Programme for research and technological development for 2002–2006 was under way. Its aim was to define the research and scientific activities and technological development of European regions, work toward wider implementation of R&D results in the innovative activities of businesses, and work to develop a more coherent and innovation-friendly Community policy.

The Seventh Framework Programme for Research and Technological Development (FP7) for 2007–2013 was designed to meet the needs of the European economy in fields such as information technology, health, biotechnology, advanced materials, energy, environmental protection, transport, and socioeconomic issues by consolidating the European Research Area. The greatest activity of Polish research teams in FP7 was observed in information and communication technology (ICT) as well as in nanoscience, nanotechnology, new materials, and production technology (under the

Cooperation program). Moreover, Polish scientists actively participate in a FP7 initiative called REGPOT, which aims to strengthen research potential in convergence and peripheral regions, and in the Ideas and People programs, in which scholarship projects are carried out (National Contact Point for Research Programmes of the European Union, 2013, p. 21). Other measures designed to support research as part of FP7 include the Competitiveness and Innovation Framework Programme (CIP), which aims to support innovation (including eco-innovation), improve access to financing, and upgrade business services in regions, with a special focus on the needs of small and medium-sized businesses.

The 10th year of Poland's EU membership coincides with the launch of the EU's Horizon 2020 program for research and innovation (2014–2020). The program is intended to finance activities through which the guidelines of Innovation Union, one of the flagship initiatives of the Europe 2020 strategy, are implemented. The basic premise of Horizon 2020 is to adopt a strategic approach to research and innovation, based on three key priorities: excellence in science, industrial leadership, and societal challenges. The program also focuses on strengthening cooperation between the best universities, research centers, and businesses in areas such as training businesspeople. In addition, the program provides increased support for the European Institute of Innovation and Technology (EIT). One of the institute's knowledge and innovation nodes in the area of sustainable energy—CC Poland Plus—is located in the southern Polish city of Cracow.

Focus on the regional dimension of innovation policy after EU accession

In recent decades, there has been a growing link between innovation policy and regional policy in the European Union. This is a response to the modern paradigm in economics, according to which activities designed to support innovation are the most effective not at the central level, but primarily at the regional level. Innovation policy regionalization makes it possible to achieve synergy effects contributing to an adequate level of developing, using, and commercializing innovations. Of special importance in the analysis of the role of space in the innovation activity of businesses is the paradigm of proximity, which attempts to explain how and in which dimension proximity is involved in shaping the relationships between different actors. Proximity cannot be reduced only to the geographical factor because it also includes other dimensions such as cognitive, organizational, geographic, social, and institutional (Boschma, 2005) as well as epistemic (Bahlmann, Elfring, Groenewegen, Huysman, 2010), defined as a similarity between the worldviews of cooperating actors.

Regional Innovation Strategies (RIS) adopted in individual regions are the key tool used in the implementation of the regional dimension of innovation policy in Poland. The emergence of these strategies is closely related to EU accession, because even those strategies that were developed earlier, i.e. in 2002–2003, were financed from funds available under the European Union's Fifth Framework Programme. Regional innovation strategies are aimed at developing an effective system for supporting innovation in

regions and are the basis for spending EU funds for supporting innovation, particularly as part of Regional Operational Programmes. These strategies are based on an analysis of the technological needs and of the potential and needs of the research sector and businesses. They define the directions of innovation policy in provinces and the ways of optimizing regional infrastructure designed to support innovation. The efficiency of regional innovation strategies assumes that local authorities can best identify the opportunities and needs of their region, and, when EU structural funds are available, they can best develop an environment conducive to innovation. In addition, due to closer interactions between individual actors at the regional level than at the central level, it is possible to pursue the principle of user-driven innovation, which is described in detail later in this chapter.

Supporting the development of clusters in Poland

One of the results of Poland's EU entry is an increased interest in clusters, both as a business model and for the development of economic policy tools. Cluster policy is a horizontal principle whose individual elements can be classed among different types of policies, in particular innovation, industrial and regional policy, as well as labor market, social, educational and science policies. Due to the significant impact of clusters on innovation in the economy, support for clusters is usually treated as an element of innovation policy. Prior to 2004, the concept of clusters was not used in Poland, but during the past decade there has been a rapid increase in the number of various cluster initiatives and public programs designed to support them, at both the central and regional levels. This is in response to the successful establishment of clusters in many developed countries—such as Nordic countries—as well as the cluster-oriented approach of the European Commission, which in its Communication of 2008 (European Commission, 2008) laid down a policy framework for supporting clusters in the European Union, in order to ensure complementarity and synergy between cluster efforts undertaken at the local, regional, national and Community levels. Cluster policy is a very good tool for carrying out the concept of smart specialization in regions, which is an important part of the Europe 2020 strategy (European Commission, 2010a).

Programs and efforts designed to support clusters are part of a territorial-based policy, a very important policy in the European Union (European Commission, 1999), under which all development actions, both sectoral and horizontal, should have a tangible impact at the local and regional levels. The concentration of public activities on clusters is also important in the context of the evolution of the paradigm of a common regional policy, which has been in the center of Poland's interests since the country's EU entry. Regional policy formerly served as a tool for the redistribution of funds from better developed to weaker regions and for reducing development disparities among regions. The primary goal of regional policy is to ensure the use of the endogenous potential of individual regions and the development of their strengths. In many cases, these include clusters and the relationships they build between the most competitive

businesses and research centers in a given area. In the context of innovation policy, clusters are an effective tool for stimulating cooperation between universities and industry, and they are also more directly oriented toward innovation, technology transfer and the commercial use of knowledge.

Since Poland joined the EU in 2004, many cluster initiatives have emerged across the country, but their origin, objectives and structure vary considerably. A study conducted in 2013 identified 179 measures and projects that in terms of their morphology are the closest to the general understanding of the cluster concept (Kowalski, 2013). Due to the continuous increase in the number of cluster initiatives in various industries, regardless of their technological level, this list is still open and subject to dynamic modifications. At the same time, many of the cluster initiatives that have emerged do not meet the theoretical assumptions of the cluster model, in particular those involving geographic and sector concentration. However, survey findings (Kowalski, 2013) show that, if a cluster initiative emerges in a given location, it tends to stimulate cooperation and have a positive impact on trust and the intensity of communication between partners; it thus helps build social capital. In this context, clusters are an effective mechanism that influences the development of the innovation environment in Poland in the broad sense. At the same time, studies show that efforts to encourage the emergence of clusters in Poland are an effective method for overcoming one of the biggest barriers to innovation in the economy—a low level of collaboration and linkages between different components of the innovation system, in particular between businesses and research centers.

Cluster policy in Poland is inextricably linked with the country's accession to the European Union in 2004. Strategies, programs and public activities involving support for clusters are part of the Community's economic policy, and most of the funds spent in this area come from the EU budget. In the initial stage of membership, from 2004 to 2006, cluster initiatives were not yet widespread, but even then these initiatives could benefit from structural funds. The most important role in this context he was played by the Sectoral Operational Programme: Improvement of the Competitiveness of Enterprises, 2004–2006 (SOP ICE), primarily Priority 1: "Enhancement of a knowledge-based economy business environment," specifically Measure 1.1 "Strengthening of institutions supporting operations of enterprises," and Measure 1.4 "Strengthening of cooperation between the R&D sphere and the economy." In the discussed programming period, clusters were also supported from the Sectoral Operational Programme: Human Resources Development, 2004–2006 (SOP HRD). This was primarily served by Measure 2.3 "Development of personnel of modern economy," in particular Scheme B "Promotion of system solutions in the field of development of adaptability and knowledge-based economy;" this last was the source of funding for projects including a training program carried out by the Polish Agency for Enterprise Development (PARP) to promote clustering.

As the cluster concept grew popular in Poland, the 2007–2013 programming period saw a more all-around approach to cluster policy. Strategic-level cluster support was included among the priorities listed in a government document called "Strategy for

Increasing the Innovativeness of the Economy in 2007–2013." The document recommends five basic ways of shaping government innovation policy. One of these is "infrastructure for innovation," including support for joint business activities aimed at implementing innovative projects (Ministry of Economy, 2006). At the operational level, cluster policy is pursued at two levels:

- central level, mainly as part of the Innovative Economy Operational Programme, 2007–2013 (IE OP) through Measure 5.1 "Support for development of supra-regional cooperative relations";
- regional level, through Regional Operational Programmes (ROP) carried out by local authorities.

Of special importance to the new programming period is the "Innovativeness and Efficiency of the Economy – Strategy for 2012–2020. Dynamic Poland," which contains some key assumptions of Polish cluster policy, in particular: the adoption of a bottom-up approach to the development of clusters as proposed by the European Commission; strengthening of cooperation between clusters and science and technology parks, in order to make sure that research results better translate into the development of an innovative and cost-effective industry; the establishment of technology centers, business incubators; the development of technical infrastructure for clusters; and inclusion of regional authorities in efforts to adapt the education system to the needs of clusters, while taking into account the need for cooperation among several regions in the case of cross-regional clusters.

Another important document that ties Polish cluster policy to the EU's Europe 2020 strategy is the National Reform Programme for the implementation of the Europe 2020 strategy (Republic of Poland, 2011). This document recommends that a mechanism is developed for selecting the strongest cluster initiatives—including technology clusters with the greatest innovation potential—and concentrating public funds, including EU structural funds, in these clusters. Also important to innovation in the economy are programs designed to promote cross-border cooperation of cluster initiatives (for example those undertaken as part of the European Cluster Alliance) operating in different EU member states and regions. This helps open the national innovation system to global technological achievements.

Promotion of new forms of innovation

One of the innovation policy priorities in the European Union is an increasingly stronger focus on user-driven innovation (UDI), based on maintaining constant contact with the end user at each stage of developing and implementing new solutions. The idea of user-driven innovation effectively meets the assumptions of the modern model of innovation processes, under which innovation is treated as a product of interaction between people and organizations on the one hand, and their environment on the other. Under this approach, the key driver of innovation should be not R&D, which is a source of the so-called technological push, but mainly the market,

which determines research, development and innovation trends and is a source of innovation pull, or innovation driven by demand. This concept fits into an open innovation strategy based on looking for inspiration for new products and services outside a given enterprise. These approaches can include finding and combining ideas that are complementary to existing R&D projects, and establishing collaboration with other market players. The effectiveness of this approach is determined by the dispersion of knowledge and capital observed now, as a result of which the most important aspect of innovation is to combine the intellectual resources and activities of various organizations.

According to the European Commission, clusters play an important role in taking advantage of the knowledge of users in order to develop new products, services and concepts (European Commission, 2009) because they act as a neutral intermediary between cluster-based companies, consumers and supporting institutions. By ensuring a better-coordinated approach, clusters can bring about a greater degree of collaboration between different communities, thus contributing to the development of new products and services. Clusters also play an important supporting role in innovation by facilitating contacts with companies specialized in areas such as intellectual property rights, innovation financing, international networking and design (Kowalski, 2010, p. 254). The end user potential in innovation was also highlighted by the TACTICS Reflection Group, which operated from 2009 to 2011, and particularly by the Fostering User-Driven Innovation Through Clusters task force, which saw user-driven innovation as a process and promoted various kinds of activities involving clusters (European Commission, 2012).

The concept of user-driven innovation is widespread in Nordic countries, which have been a source of good practices in this area for Poland since its EU entry. One source of interesting experience was the Proposed Joint Programme in Support of User Driven Innovation, a product of work by the Northern Dimension Learning Forum on User Driven Innovation (NDLF-UDI) working group formed under the auspices of the Nordic Council of Ministers. Poland, as a country of the Baltic Sea Region, took part in this program, which consisted of two pillars:

1. efforts to raise awareness of user-driven innovation among businesses through holding conferences, preparing materials, case studies, textbooks, training courses, and establishing a platform for the exchange of experience and knowledge,
2. activities in the area of research and education, including mapping out institutions dealing with user-driven innovation, supporting research projects, adapting educational programs and the establishment of an interdisciplinary network of research institutes, universities and educational institutions in the field of user-driven innovation.

Nordic experience shows that user-driven innovation significantly triggers the activity of young people, who are familiar with modern information and communication technologies, as well as of older users, who have extensive knowledge, experience and social contacts. User-driven innovation can be useful in solving many problems

affecting contemporary society, such as population aging, healthcare, security and the search for alternative energy sources. Poland still needs to pay more attention to user-driven innovation, but, significantly, the "Innovativeness and Efficiency of the Economy – Strategy for 2012–2020. Dynamic Poland" uses a broad definition of innovation, with the aim of using public funds to finance projects in various sectors and industries and involving all kinds of innovation: product, process, organizational, marketing, technological and non-technological innovation, eco-innovation, social innovation, and user-driven innovation (Ministry of Economy, 2013, p. 42).

The public sector is a major buyer of goods and services, because one of the instruments of user-driven innovation is the use of public orders to boost demand for innovative solutions. This concept is being promoted by the European Commission, according to which the public sector, acting as a smart customer, plays a key role in promoting the idea of public procurement supporting innovation. Public procurement accounts for 17% of the EU's GDP and represents a significant market, especially in areas such as health, transport and energy. Europe has vast, untapped opportunities for supporting innovation through public procurement (European Commission, 2010b, p. 16). The Polish government embraced the European Commission's guidelines in a publication produced by the Economy Ministry together with the Public Procurement Office (2008). The publication states that demand for innovative solutions can be increased, for example, by formulating tender requirements in such a way that they give companies as much room for maneuver as possible in coming up with innovative solutions. In addition, price should not be the only criterion when awarding tenders, but other selection criteria should also be used, such as the total cost at which a product or service is purchased combined with the maintenance costs. This is designed to promote the selection of innovative and modern products and services offered by companies.

The innovativeness of the Polish economy in international comparative terms

One of the most important sources of information about the innovativeness of EU economies is the Innovation Union Scoreboard (IUS) compiled annually for the European Commission. The scoreboard uses a Summary Innovation Index (SII) that consists of 24 indicators. The SII methodology covers all three stages of the innovation process by classifying the indicators into three groups: enablers, firm activities, and outputs. The scoreboard is an important tool used in shaping innovation policy. On its basis, the European Commission evaluates the level of innovation in individual member states and the effectiveness of their actions and monitors how the objectives of the Europe 2020 strategy are carried out in terms of innovation.

Depending on the level of innovation in the economy, individual countries are classified into four groups: innovation leaders, innovation followers, moderate innovators, and modest innovators, as shown in Table 7.

Table 7

Classification of EU economies in terms of innovation

Group	Country	*Sumary Innovation Index (SII) 2013*	Increase of Summary Innovation Index – SII) in 2006–2013
Innovation leaders	Sweden	0.750	0.35%
	Denmark	0.728	0.89%
	Germany	0.709	1.34%
	Finland	0.684	1.17%
Innovation followers	Luxembourg	0.646	1.81%
	Netherlands	0.629	1.64%
	Belgium	0.627	0.92%
	United Kingdom	0.613	0.54%
	Ireland	0.606	0.96%
	Austria	0.599	2.17%
	France	0.571	1.43%
Moderate innovators	Slovenia	0.513	2.66%
	Estonia	0.502	3.74%
	Cyprus	0.501	2.74%
	Italy	0.443	2.22%
	Czech Republic	0.422	1.72%
	Spain	0.414	1.43%
	Portugal	0.410	3.86%
	Greece	0.384	1.24%
	Hungary	0.306	0.77%
	Slovakia	0.328	1.49%
	Malta	0.319	1.97%
	Croatia	0.306	0.77%
	Lithuania	0.289	2.58%
	Poland	**0.279**	**0.88%**
Modest innovators	Romania	0.237	1.90%
	Latvia	0.221	3.51%
	Bulgaria	0.188	2.49%

Source: European Commission (2014), p. 92.

In the 2014 scoreboard, Poland, with an SII of 0.279 (compared with the EU average of 0.554), was ranked last among moderate innovators. This means a small improvement in the country's position because in 2013 the Polish economy, with an SII of 0.27 (compared with the EU average of 0.544), was classed among modest

innovators. However, the SII index is a summary index that includes various indicators of different aspects of the innovation process. A more detailed analysis of the various dimensions of the SII in the Polish economy is therefore needed to identify the strengths and weaknesses of innovation in the country. Some important conclusions are yielded by a summary of SII indicators in the eight IUS dimensions for Poland against the EU average, as shown in Table 8.

Table 8

Values of individual dimensions of the 2012 Summary Innovation Index (SII) for Poland and the European Union

Groups of SII	Dimensions of SII	Poland	EU27	Relationship between the values for Poland and the EU in %
Enablers	Human resources	0.567	0.583	97%
	Research systems	0.128	0.539	24%
	Finance and support	0.418	0.558	75%
Firm activities	Firm investments	0.343	0.417	82%
	Linkages and entrepreneurship	0.126	0.550	23%
	Intellectual assets	0.274	0.564	49%
Outputs	Innovators	0.127	0.549	23%
	Economic effects	0.305	0.595	51%

Source: European Commission (2014).

As shown in Table 8, the values of all the dimensions of the SII for Poland are lower than the EU average. The smallest difference is in the case of human resources, where the Polish index (0.567) is only slightly different from the EU average (0.583). According to T. Baczko and E. Krzywina (2008), more intense education and efforts to release social capital are crucial for innovation in Poland. Other dimensions in which Poland has the smallest delay with regard to other countries are: firm investments (0.343 for Poland, compared with the EU average of 0.417), finance and support (0.418 and 0.558 respectively), and economic effects (0.305 and 0.595 respectively). The dimensions in which Poland differs the most from the EU average are: innovators, among them innovating small and medium-sized enterprises (0.127 for Poland, with the EU average at 0.549) and linkages and entrepreneurship (0.126 and 0.549 respectively). A more detailed assessment of Poland's innovativeness against the background of the EU average can be made by analyzing individual SII indicators (Figure 6).

Figure 6

The values of individual indicators making up the 2013 Summary Innovation Index (SII) for the Polish economy in relation to the EU27=100
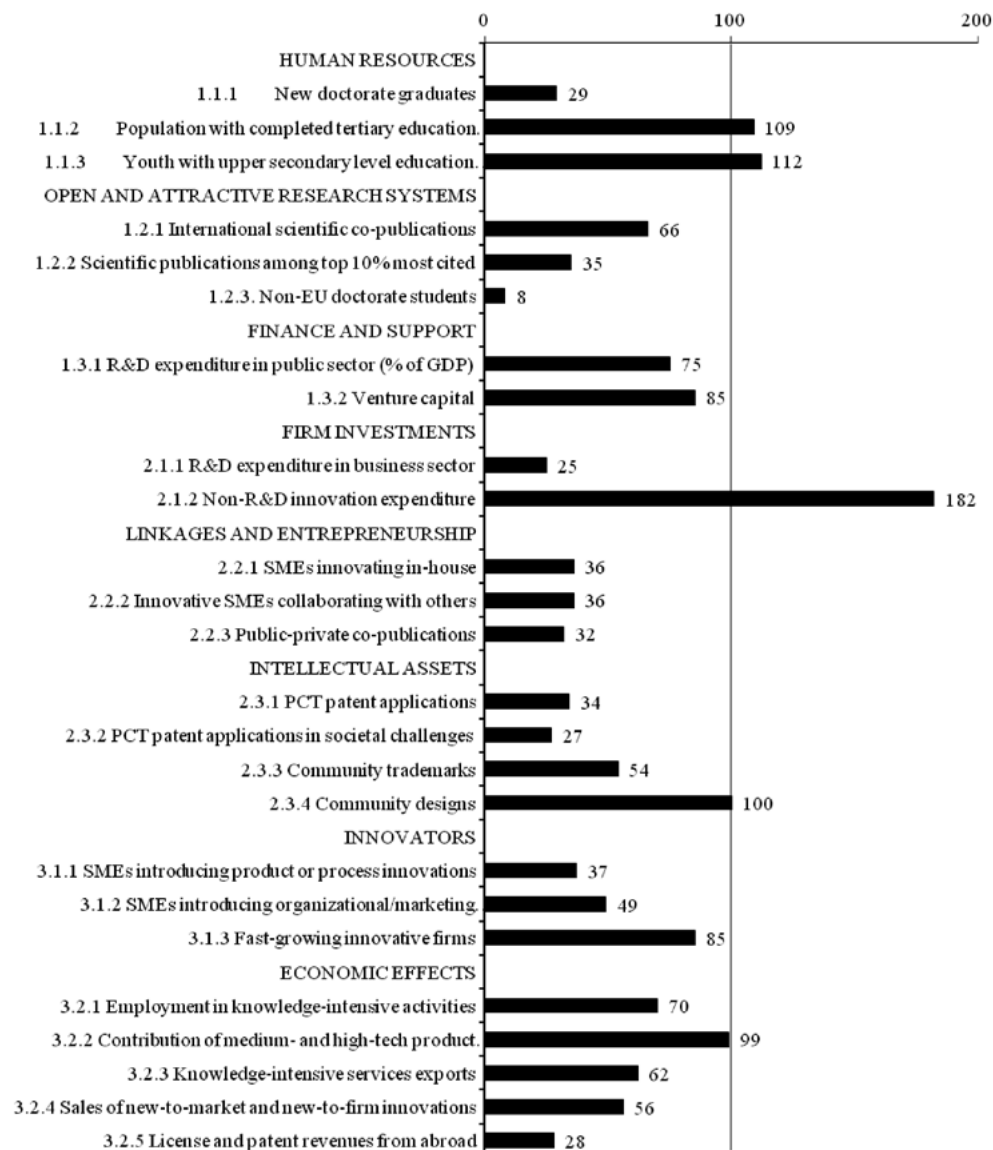
Based on: European Commission (2014), p. 63.

The data in Figure 6 show that Poland has a relative advantage in relation to the EU average in terms of the percentage of people with higher education in the 30–34 age group (109% of the EU average), and the percentage of those in the 20–24 age

group who have at least a secondary-level education (112% of the EU average). The high values of these two indicators meant that Poland achieved the best results for the human resources dimension (as shown in Table 8). However, Poland has the biggest advantage over the EU average in non-R&D innovation expenditure as a percentage of sales (182% of the EU average), as part of the "firm investments" dimension. Non-R&D innovation expenditure includes investment in equipment and machinery and the acquisition of patents and licenses, which means this indicator is a measure of the diffusion of new production technologies and ideas (Hollanders, Tarantola, 2011, p. 9). The high level of this measure reflects the nature of Poland's National Innovation System (NIS), which is classified among so-called catching-up NISs, which, in turn, are part of the bigger group of developing innovation systems (Weresa, 2012). This system is largely based on technological imitation, and the absorption of knowledge and innovation from external sources—rather than reliance on the results of domestic R&D—is still the basis of innovation.

Conclusion

This chapter has traced the evolution of innovation policy in Poland after the country's entry to the European Union. It has also offered the most recent statistics to assess the level of innovation in the economy. The analysis has made it possible to confirm the hypothesis adopted at the beginning of this chapter, that EU accession led to positive changes in Polish innovation policy. However, this has not translated into a significant improvement in the level of innovation in this country compared with other member states. European integration has had an impact on various aspects of Poland's innovation policy, including:

- an all-round approach to innovation policy, which has become an integral part of a new approach to development management, based on Operational Programmes and long-term financial support;
- entry into the European Research Area (ERA) of the future and financial support for the Polish research, development and innovation (RDI) system from external sources, in particular from the budget of Framework Programmes;
- inclusion of the regional dimension of innovation policy, chiefly on the basis on regional innovation strategies and efforts to identify and reinforce smart specializations of regional economies;
- initiation and dynamic development of activities aimed at launching and developing clusters. These are an important part of innovation systems and help foster interactions among enterprises and collaboration between universities and industry. Clusters also make this collaboration more oriented toward innovation, technology transfer and the commercial use of knowledge – designing programs promoting cross-border cooperation among cluster initiatives. This facilitates an opening of the national innovation system and encourages the use of global technological achievements;

- promoting new forms of innovation, including user-driven innovation, making it possible to adapt innovative activities to the needs of consumers, and thus increasing the chances of success in putting knowledge to commercial use; boosting demand for innovation through the use of a public procurement system giving preference to innovative and modern products and services through an appropriate formulation of tender requirements and criteria for the selection of contractors.

All these changes in Polish innovation policy have not led to a significant improvement in the country's innovativeness compared with the EU average. This is shown by the 2014 Innovation Union Scoreboard, in which Poland was ranked last among moderate innovators. However, the classification of countries based on the Summary Innovation Index (SII) is a relative measure that depends on the performance of other economies. Moreover, the above new elements have become part of Polish innovation policy as a result of implementing solutions originally designed in countries with well-developed national innovation systems, including institutional arrangements in the public sector. These countries have a comparative advantage over Poland because they have more experience in various legal and political instruments and solutions as well as in the quality of the innovation environment, and available financial resources. Poland is trying to implement best international practices in many areas, and cooperation as part of EU programs is a good opportunity to improve its track record. One example is a program aimed at supporting user-driven innovation and being carried out together with Nordic partners. There are also programs designed to promote cross-border cooperation as part of cluster initiatives. Imitation and absorption of technology from the outside play a significant role in both Polish innovation policy and the national innovation system. The country's EU membership is therefore an important factor for upgrading innovation policy and reducing the innovation gap between Poland and countries with well-developed innovation systems. Yet the convergence process in this area has been very slow.

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5.3. The Role of European Funds in Improving the Innovativeness and Competitiveness of the Polish Economy

Iwona Grabowska

After joining the European Union, Poland became one of the biggest beneficiaries of financial support under the EU's Cohesion Policy. Poland's National Development Plan for 2004–2006 became the country's development strategy and the basis for spending nearly €20 billion during this period (MRR, 2010, p. 9). Poland drew up a special document called the National Strategic Reference Framework that defined the priorities and objectives on which EU funds were to be spent under the bloc's 2007–2013 budget. EU funds are a major opportunity for Poland: the country claimed an overwhelming €67 billion of a total €347 billion earmarked for Cohesion Policy under the 2007–2013 budget (19.3% of the total).[1]

One of the main objectives of these national plans has been "to develop a competitive economy based on knowledge and entrepreneurship, capable of sustained and balanced development in order to ensure employment growth and improved social, economic and territorial cohesion with the European Union at the regional and national levels." (MGiP, 2009, p. 66).

The main aim of this section is to analyze the level of absorption of structural funds in the initial period of Poland's EU membership (2004–2006), which was covered by the 2000–2006 Financial Perspective, as well as to assess the use of EU funds spent under regulations in force as part of the 2007–2013 Financial Perspective. This section will also seek to evaluate the significance of the expenditure on improving the competitiveness and innovativeness of the economy. Support in the form of funds is based on non-refundable financial assistance for beneficiaries by reimbursing some of the costs incurred. Part of the costs must be covered by the beneficiaries themselves, according to the so-called co-financing principle.[2] This study analyzes two Operational Programmes: the Innovative Economy Operational Programme and the Human Capital Operational Programme, which had the greatest impact on improving the competitiveness and innovativeness of the Polish economy in the 2007–2013 Financial Perspective.[3]

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[1] The following countries received allocations exceeding 2%: Spain 10%, Italy 8%, the Czech Republic 7.7%, Germany 7.3%, Hungary 7.2%, Portugal 6.2%, Greece 5.8%, Romania 5.5%, France 3.9%, Slovakia 3.3%, and the United Kingdom 2.8%.

[2] In the 2007–2013 Financial Perspective, advance payments were permitted for projects financed from EU funds.

[3] The National Strategic Reference Framework provides funds available under Operational Programmes for improving regional infrastructure. This indirectly contributes to an increase in the competitiveness of regions and countries. In this situation, the analysis should also cover the Cohesion Fund. But the Cohesion Fund is not a structural fund, and this study exclusively focuses on the use of structural funds with a view to improving the competitiveness and innovativeness of the economy.

These two Operational Programmes were allocated 12.4% and 14.6% respectively of the total amount of funds available for Cohesion Policy for the 2007–2013 period.

An important component of the competitiveness of any economy is the competitiveness of its enterprise sector. Previous studies indicate there is a general agreement that innovation, research and development (R&D) and the development of advanced technology are the determinants of the competitive advantages of companies and countries. The ability to create new solutions and put them into business practice makes it possible to increase total factor productivity, which contributes to increased economic growth, which, in turn, results in an improved competitive position of the country. According to M. Porter, economic growth is directly dependent on innovation. A high level of innovation among enterprises, and consequently a high level of competitiveness of the country, directly contributes to a high quality of life for citizens. Likewise, Porter says, achieving and maintaining a country's competitive advantage internationally is strictly dependent on the ability of the economy to innovate (Porter, 2001, p. 191). In any case, one of the most important factors determining the innovativeness of an economy is human capital (Balcerowicz, Wziątek-Kubiak, pp. 2–3).

Improving innovation is a goal enshrined in EU strategic documents such as Europe 2020, a strategy now being implemented for development of the European Union.

Research methodology and basic definitions

According to M. Porter, countries (as well as regions, industries, and companies) are able to secure competitive advantages via innovations that are primarily reflected in an increase in total factor productivity. The result is a higher level of socioeconomic development. M. Porter distinguishes four basic factors that determine competitive advantages. They form a system known as the diamond of competitive advantage. Securing an advantage requires the interaction of the four main groups of factors presented in the form of the vertices of the diamond. These are (Porter, 2001, pp. 191–207):

- factor conditions (human resources, research facilities, technology, the rate at which factors of production are created and the efficiency with which they emerge);
- demand conditions (size and structure of demand, which spurs innovation);
- related and supporting sectors (promoting the exchange of ideas and innovation);
- firm strategy, structure and rivalry.

In this study, two concepts are crucial: competitiveness and innovation. Previous research provides many definitions of these concepts. In this study, the following definitions apply:

- Competitiveness is the ability of a company or a larger business organization to compete. In the long term, increased competition leads to greater productivity,

which allows for better use of competitive advantages and enables an increased scale of business activity, a greater market share etc.[4]

- Innovation is the ability and motivation of enterprises to continually seek and use in practice the results of research and development work, new concepts, ideas and inventions. Innovation also means the improvement and development of existing production, maintenance and service technology; the introduction of new organizational and management solutions; and the improvement and development of infrastructure, especially that related to the collection, processing and sharing of information (MRR, 2007, pp. 68–75).

Table 9 lists measures of innovation. Only some of these measures were used in this study, due to the unavailability of data on specific gauges or due to the lack of statistical data needed to calculate them. However, those measures which we show later, when discussing the implementation of several Operational Programmes, refer to the overall expenditure on innovation rather than exclusively to the impact of structural funds. Based on the available data, it is impossible to isolate this impact. Some measures will only be available after the funds in question are spent, which means after 2015.[5] This means that the measures cited below only indirectly illustrate the impact of structural funds on innovation in the Polish economy.

Table 9

Measures of company innovation

An innovative enterprise is an enterprise that in a specific studied period (usually three years) brings to market at least one technological innovation (new or significantly improved product or a new or significantly improved technological process). Three basic categories of indicators are distinguished among measures of innovation expenditure:
- financial resources (including public R&D expenditure and business R&D expenditure);
- human resources (engineering graduates, the percentage of the population with university degrees);
- innovation support environment.
The following categories of innovation performance measures are distinguished:
- research and innovation results (patents, designs, trademarks),
- employment (percentage of those employed in the production of high-tech goods and services),
- commercialization of knowledge (proportion of new and modernized products in total sales, the percentage of high-tech products in total exports).

Source: Motyka (2011), p. 162, http://www.ptzp.org.pl/files/konferencje/kzz/artyk_pdf_2011/075.pdf.

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[4] The competitiveness of an enterprise is also reflected by increased exports of its products compared with the competition. See: IBS, (2010), *Ocena wpływu polityki spójności na wzrost konkurencyjności i innowacyjności polskich przedsiębiorstw i gospodarki*, Instytut Badań Strukturalnych, Warsaw, pp. 14–17, http://www.ptzp.org.pl/files/konferencje/kzz/artyk_pdf_2011/075.pdf.

[5] Under the so-called n+2 rule, the European Commission "automatically decommits any part of a commitment (with regard to a beneficiary of structural funds) which has not been settled by the payment on account or for which it has not received an acceptable payment application by the end of the second year following the year of commitment." This means that a member state that by the end of year n+2 submitted payment applications, for an amount lower than the annual tranche of funds allocated in year n, irretrievably loses the difference.

The spending of structural funds and their impact on innovation in the economy was assessed by analyzing statistical data and a number of literature sources such as:
- reports published by ministries on the spending of EU funds,
- articles and scientific studies on innovation and the competitiveness of enterprises,
- studies and reports by international organizations,
- publications by statistical offices and ministries, including EU and Polish government documents.

The general objectives of the National Strategic Reference Framework

The National Development Plan for 2004–2006 was the main document regulating the distribution of European Union funds resulting from Poland being an EU member. In this document, support from structural funds was divided into six Operational Programmes, including two involving support for agriculture (Table 10). Under the 2000–2006 Financial Perspective, of a total €213 billion earmarked for Cohesion Policy, Poland was allocated €12.8 billion (or 6% of total Cohesion Policy funds. Structural funds accounted for €8.27 billion of the total allocation (with the rest coming from the Polish budget and private sources). This means that, during its first three years of membership, Poland received about €2.7 billion euros from the EU budget annually on average. During this period, Polish beneficiaries learned the rules of using EU funding.

Table 10

Allocation of funds broken down by Operational Programmes under the National Development Plan for 2004–2006 (in % and in billions of euros)

Operational Programme	Share in total allocation (in %)	Allocation of funds (in billions of euros)	Source of financing
Improvement of the Competitiveness of Enterprises	15.1	1.25	European Regional Development Fund, Cohesion Fund
Human Resources Development	17.8	1.47	European Social Fund
Integrated Regional Operational Programme	35.9	2.97	European Regional Development Fund, European Social Fund
Transport	14.1	1.16	European Regional Development Fund
Restructuring and Modernisation of the Food Sector and Rural Development	14.4	1.19	European Agricultural Guidance and Guarantee Fund
Fishing and Fish Processing	2.4	0.20	Financial Instrument for Fisheries Guidance
Technical Assistance	0.3	0.03	European Regional Development Fund
Total	100.0	8.27	–

Source: MGiP, (2004), p. 150.

Support from the EU budget in the form of structural funds increased significantly during the 2007–2013 Financial Perspective period, reaching an annual average of 1%. The National Strategic Reference Framework for 2007–2013 divided support into five Horizontal Operational Programmes and 16 Regional Operational Programmes (corresponding to the number of regions). The system of Operational Programmes for 2007–2013 and how these were implemented was the result of the experience gained in the 2004–2006 programming period as well as of new EU regulations.

The largest allocation was earmarked for the Infrastructure and Environment Operational Programme, which accounted for 42% of total funds. Funds intended for the 16 Regional Operational Programmes accounted for 25% of the total. Nearly 15% of the funds were allocated for the Human Capital Operational Programme, and just over 12% for the Innovative Economy Operational Programme.

Table 11

Allocation of funds broken down by Operational Programmes under the National Strategic Reference Framework for 2007–2013 (in % and in billions of euros)

Operational Programme	Percentage of total allocation	Allocation of funds (in billions of euros)	Source of financing
Infrastructure and Environment	41.9	27.9	European Regional Development Fund, Cohesion Fund
Regional Programmes	24.9	16.6	European Regional Development Fund
Human capital Programme	14.6	9.7	European Social Fund
Innovative Economy	12.4	8.3	European Regional Development Fund
Development of Eastern Poland	3.4	2.3	European Regional Development Fund) + 992 million euros granted by the European Council
Technical Assistance	0.8	0.5	European Regional Development Fund
National performance reserve	2.0	1.3	European Regional Development Fund, European Social Fund, Cohesion Fund
Total	100.0	66.6	–

Source: MRR, (2007), p. 117.

The implementation of all the programs was subordinated to six strategic objectives (Table 12). Under the NSRF, three objectives (Objectives 2, 3 and 4) concern an improvement in the competitiveness of the Polish economy. They account for about 74% of the total financing under the National Strategic Reference Framework.

Table 12

Estimated allocation of funds earmarked for spending under the NSRF for 2007–2013 on individual horizontal objectives

Horizontal objectives of the National Strategic Reference Framework		Weight (estimated share in total financing under the National Strategic Reference Framework, in %)
Objective 1	Improving the quality of public institutions	4.0
Objective 2	Improving the quality of human capital and increasing social cohesion	10.0
Objective 3	Construction and modernization of technical and social infrastructure crucial for increasing Poland's competitiveness	42.0
Objective 4	Improving the competitiveness and innovativeness of enterprises, especially those in the manufacturing sector with high value added and the development of the service sector	22.0
Objective 5	Increasing the competitiveness of Polish regions and preventing their social, economic and territorial marginalization	22.0
Objective 6	Equalizing development opportunities and supporting structural changes in rural areas	
Total		100.0

Source: MRR, (2007), p. 117.

Improved innovativeness of enterprises, and consequently a more innovative economy, is primarily served by the implementation of Objectives 2 and 4. Objective 4: "Improving the competitiveness and innovativeness of enterprises" is more prominent in terms of funds. Funds earmarked for implementing this objective account for 22% of total financing, while Objective 2: "Improving the quality of human capital and increasing social cohesion" accounts for 10% of total financing.

Objective 2 covers investment in the development of academic centers educating specialists in the area of new technologies as well as investment in improving the quality of education through the use of information and communication technologies.

Funds as part of Objective 4 were earmarked for strengthening innovative enterprises by creating institutional conditions for their development. Support for the development of human resources for an innovative economy comes under the Human Capital Operational Programme, through measures such as lifelong learning, increasing the adaptability of workers to changes in the economy, and efforts to foster entrepreneurship (MRR, 2007, pp. 98–99).

Improvement of the Competitiveness of Enterprises and Innovative Economy Operational Programmes

The 2004–2006 Financial Perspective ushered in the Improvement of the Competitiveness of Enterprises Operational Programme, whose main objective was to improve the competitive position of companies. The program featured three priorities: development of entrepreneurship and an increase in innovativeness; direct support for enterprises; and technical assistance, each of which were divided into measures. Around €1.25 billion was set aside for this Operational Programme for 2004–2006. Funds for different thematic priorities were divided proportionately. Funds for carrying out the program were limited in comparison to the Innovative Economy program for 2007–2013, but this was in preparation for the absorption of more funds for increasing the competitiveness and innovativeness of enterprises under the subsequent budget (MGiP, 2004, pp. 97–101).

The National Strategic Reference Framework for 2007–2013 included a separate Operational Programme called Innovative Economy and intended for the financing of innovative projects. As part of this program, nine priorities were identified, which were divided into individual measures and submeasures. More than €10 billion euros was allocated for this program, as a result of which this was the third-largest program in terms of the amount of funds under the National Strategic Reference Framework. The division of funds for individual priority axes of the program was not proportional. The most funds were earmarked for Priority Axis 4: Investments in innovative undertakings—accounting for 36% of the total allocation for the program (Figure 7). About half the funds are intended for new investment projects with high innovative potential (Table 13). The main reason for such a division of funds was the low innovativeness of the Polish economy (MGiP, 2004, pp. 68–75). The second-biggest priority is Priority Axis 1: Research and development of modern technologies, i.e. expenditure that is expected to contribute to the development of new products and technologies. This priority accounted for around 15% of the total allocation under the Innovative Economy Operational Programme. Under the Europe 2020 strategy, Poland is expected to increase its R&D spending relative to GDP because these funds are the basis for the creation and implementation of innovations; without this support, the country would not be able to compete with other countries.

Closely related to Priority Axis 1 is Priority Axis 2: R&D infrastructure. This accounts for a further 15% of the allocation under the Innovative Economy Operational Programme. Support for the production sector is primarily targeted at SMEs, which claimed about 75% of the total allocation (MGiP, 2004, p. 68). Such a large proportion of funds for small and medium-sized enterprises is due to the fact that they are unable to conduct costly research and development on their own, while innovation requires the creation of a network of linkages between businesses and research centers.

Figure 7

The allocation of funds under the Innovative Economy Operational Programme for 2007–2013 by Priority Axis (in %)

Source: http://www.dotacjeue.org.pl/default.aspx?docId=1734.
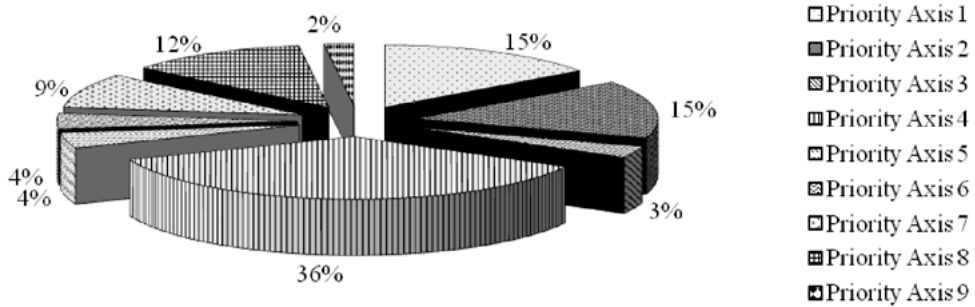
Table 13

The allocation of funds under the Innovative Economy Operational Programme for 2007–2013, broken down into priorities, and measures (in millions of € and ZL) and the value of co-financing agreements signed (% of public funds spent)

Priority/measure	Name	€	ZL	Agreements signed (% of public funds spent)
Total		**10,186. 0**	**42,307. 4**	**99.9**
Priority axis 1	Research and development of new technologies	**1,522. 6**	**6,319. 7**	**107.9**
Measure 1.1	Support for scientific research	485. 3	2,009. 4	100.5
Measure 1.2	Support for the development of human resources	100. 7	418. 5	100.7
Measure 1.3	Support for R&D	384. 4	1,587. 2	101.1
Measure 1.4	Support for specific targeted projects	447. 0	1,868. 1	119.3
Measure 1.5	Support for the National Center for Research and Development	105. 2	436. 5	125.4
Priority axis 2	**R&D infrastructure**	**1,442. 2**	**5,977. 9**	**101.8**
Measure 2.1	Development of research centers	786. 7	3,266. 6	101.0
Measure 2.2	Support for research infrastructure	314. 1	1,298. 3	101.6
Measure 2.3	Support for IT infrastructure in the science sector	341. 4	1,413. 0	103.7
Priority axis 3	Capital for innovation	**309. 3**	**1,311. 0**	**103.2**
Measure 3.1	Initiating innovative activities	193. 6	806. 1	101.4
Measure 3.2	Support for venture capital	70. 7	316. 1	99.9

Priority/measure	Name	€	ZL	Agreements signed (% of public funds spent)
Measure 3.3	Support for SMEs	29. 4	121. 7	98.6
Measure 3.4	Innovation Support Loan Fund	15. 6	67. 1	149.1
Priority axis 4	Investments in innovative undertakings	**3,710. 5**	**15,393. 9**	**98.4**
Measure 4.1	Support for implementation of R&D results	321. 5	1,338. 8	100.5
Measure 4.2	Support of R&D and industrial design	186. 1	769. 4	101.3
Measure 4.3	Technology credit	432. 6	1,808. 4	99.7
Measure 4.4	New investments with high innovative potential	1,653. 7	6,830. 7	98.2
Measure 4.5	Support for investments with considerable importance to the economy	888. 3	3,694. 2	96.0
Pilot programs		228. 3	952. 4	100.5
Priority axis 5	Diffusion of innovation	**444. 9**	**1,848. 0**	**107.8**
Measure 5.1	Support for cooperative ties	105. 4	438. 4	101.9
Measure 5.2	Support of business environment institutions	65. 7	273. 2	98.8
Measure 5.3	Support for innovation centers	248. 6	1,032. 3	117.5
Measure 5.4	Intellectual property management	25. 2	104. 1	60.5
Priority axis 6	Polish economy on the international market	**410. 6**	**1,709. 3**	**87.3**
Measure 6.1	Passport to export	81. 9	341. 2	66.7
Measure 6.2	Development of a network of investor services	45. 6	189. 2	96.1
Measure 6.3	Promotion of tourism	58. 2	241. 5	100.1
Measure 6.4	Investments in tourism	138. 0	575. 6	100.1
Measure 6.5	Promotion of the Polish economy	86. 9	361. 8	73.3
Priority axis 7	Information society – establishment of electronic administration	**940. 8**	**3,902. 3**	**101.4**
Priority axis 8	Information society – increasing innovation in the economy	**1,197. 9**	**4,981. 9**	**96.1**
Measure 8.1	Support for e-business	334. 3	1,383. 9	97.4
Measure 8.2	Support for B2B e-business	359. 2	1,495. 6	96.2
Measure 8.3	Counteracting digital divide	292. 6	1,218. 5	96.5
Measure 8.4	Internet access	211. 8	883. 9	93.2

Priority/measure	Name	€	ZL	Agreements signed (% of public funds spent)
Priority axis 9	**Technical assistance**	**207. 2**	**863. 4**	**79.1**
Measure 9.1	Management support	167. 4	697. 2	76.6
Measure 9.2	Equipment for institutions	17. 7	74. 0	91.6
Measure 9.3	Information and promotion	19. 7	82. 2	86.7
Measure 9.4	Evaluation	2. 4	10. 0	96.9

Source: Own elaboration based on: MRR, (2013), p. 9, and http://www.poig.gov.pl/AnalizyRaportyPodsumowania/Strony/default.aspx?zakladka=3&strona=1#zakladka=1&strona=1.

Evaluation of the Innovative Economy Operational Programme

The allocation for the Innovative Economy Operational Programme was €10.2 billion, including €8.7 billion from the European Regional Development Fund (according to Polish Finance Ministry data, €8.7 billion is equivalent to ZL36 billion). As of Jan. 17, 2014, a total of 15,533 co-financing agreements were signed for a combined ZL42.3 billion, or 99.9% of the total allocation for this program.

At the end of 2013, the highest level of spending was for Priority 1 "Research and development of new technologies" and Priority 5 "Diffusion of innovation," at more than 100.0%.[6] Spending exceeding 100% was also noted in the case of Priority Axis 2 "R&D infrastructure," Priority Axis 3 "Capital for innovation," and Priority Axis 7 "Information society." In the case of Priorities 4 and 8, spending has reached almost 100% of the funds made available on the basis of concluded co-financing agreements. The lowest percentage of agreements signed was recorded for Priority 9, at 79%, and slightly higher for Priority 6, at about 87%. The average indicator of agreements signed for the entire program was 99.9%. These generally high figures offer hope that the funds will be fully spent on the intended purposes.

Let us start this evaluation of the Innovative Economy Operational Programme by comparing the program's priorities against the theoretical assumptions of M. Porter's concept of competitive advantages. The program's priorities directly relate to factor conditions—one of the groups of factors of competitive advantages mentioned by M. Porter in his theory. A key factor that determines competitiveness is capital

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[6] Spending of funds allocated for each measure as part of Priority Axis 2 has exceeded 100%, which in practice means that the contracting process has been completed. The value of all submitted and formally correct applications for co-financing accounted for nearly 350% of the available funds, testifying to strong demand among Polish scientific institutions for funds designed to support the development of their research infrastructure. Measures implemented under this priority axis have contributed to a distinct improvement in Polish research infrastructure (particularly in centers with the highest research potential), thus enabling Polish scientists to conduct research meeting the highest international standards.

because insufficient financial resources are a barrier for most innovating enterprises. The Innovative Economy program supplements the internal resources of companies. Enterprises obtain funds for innovation under Priority 1 "Research and development of new technologies," Priority 3 "Capital for innovation," and Priority 4 "Investments in innovative undertakings." The increased opportunities for financing innovation thus create an opportunity to improve the competitiveness of companies. Another competitive advantage factor contributing to factor conditions is infrastructure, understood by M. Porter as infrastructure necessary to compete in an industry. This includes traditional technical infrastructure, specialized infrastructure needed for innovation in a specific industry, such as fiber optic cables or specialized research laboratories, and so-called innovation infrastructure supporting the development of innovation, including institutions that create knowledge and act as intermediaries in its transfer to enterprises, in addition to helping finance innovative projects. Funds spent on such infrastructure are available under Priority 2 "R&D infrastructure."

Such financing from structural funds is designed to make it easier for enterprises to move from a model based on the imitation of solutions used by other businesses to one based on the creation of innovation in the form of new products and processes. However, the use of these funds is not necessarily reflected in indicators of innovativeness in the Polish economy. In recent years there has been little progress in innovation; the Polish economy is stagnant, as reflected by the country's low rank in the annual Innovation Union Scoreboard (IUS) compiled for the European Commission (European Commission, 2013). The 2012 scoreboard ranked Poland a distant 24th among EU countries in terms of innovation.[7]

An analysis of the innovation potential indicator shows that Poland is among countries at the bottom of the list in all but three dimensions. These dimensions are the quality of human capital (education), research funding and firm investments. In the remaining dimensions: quality of the research system, entrepreneurship and linkages, intellectual resources, economic effects, Poland is among countries at the bottom of the list. It fares the worst in the "innovators" category, where it is next to the last among EU countries.[8] Poland's low position in Europe in the innovation rankings is due to factors including a very low level of R&D spending, even though in the long term R&D spending determines the ability of an economy to create innovations with the highest market value. Under the Europe 2020 strategy, all EU countries are

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[7] In October 2010, the European Commission adopted a Communication on Innovation in the European Union. In this document, the European Innovation Scoreboard (EIS), a well-known and recognized tool for assessing innovation in member states, was replaced with the Innovation Union Scoreboard (IUS) approach. The new approach is used to assess progress in the implementation of the Europe 2020 strategy and aims to compare the level of innovation throughout the European Union.

[8] In terms of SII dimensions, Poland was ranked 16th for the quality of human capital (education), research funding and firm investments; 21st for intellectual resources; 24th for economic effects; 25th for the quality of the research system and entrepreneurship and linkages, and 26th in the innovators category.

expected to boost R&D expenditure to 3% of GDP.[9] Poland sought to achieve a level of 2.2–3% by 2010 (OECD, 2010, p. 89). However, data by Eurostat, the European Union's statistics office, show that in 2012, total R&D expenditure in Poland was 0.90% of GDP (Figure 8), ranking the country sixth among those with the lowest spending in the EU. From 2004 to 2012 Poland increased its R&D spending by 0.34 percentage points. To compare, Hungary increased its R&D spending by about 0.42 p.p. during this period, the Czech Republic by 0.68 p.p., and Slovenia by1.41 p.p. This means that all these countries failed to meet the requirements of the Europe 2020 strategy, but the data also show that Poland's competitors in the region were more committed to meeting these requirements.

Figure 8
R&D expenditure as a percentage of GDP in 2004–2012
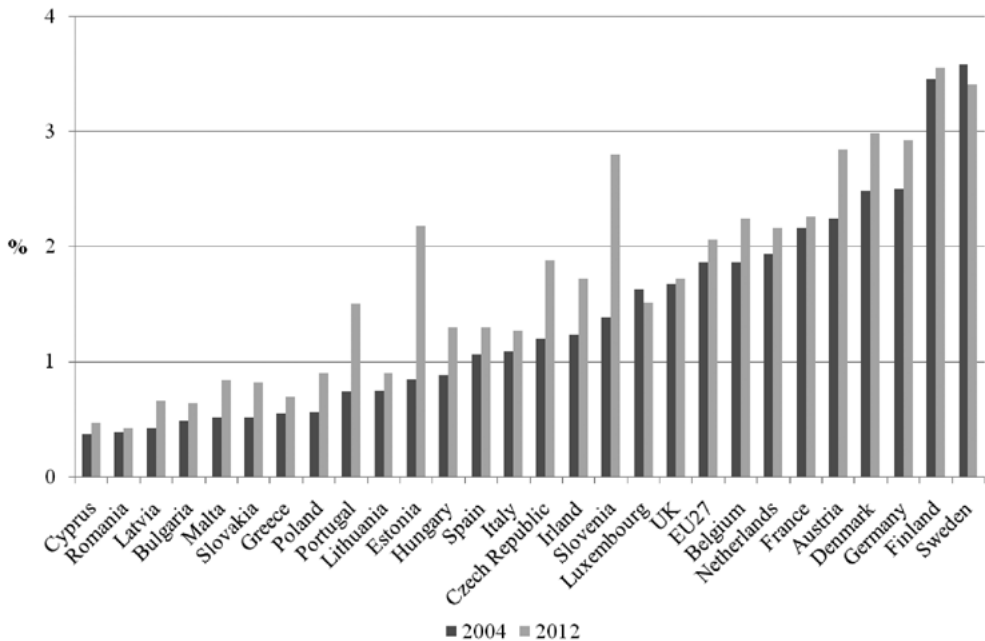
Source: Own elaboration based on Eurostat. The data for Luxembourg are for 2004 and 2010.

It should be noted, however, that the progress made was largely the result of the Cohesion Policy. It is estimated that EU funds accounted for 35% of expenditure on R&D and innovation in the 2008–2010 period (MRR, 2012, p. 33). This means that without support from EU funds, the GDP share of R&D expenditure would stagnate.

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[9] http://kbn.icm.edu.pl/analizy/20040518_tezy.html

In 2012, Deloitte examined companies in the EU in terms of the share of funds earmarked for R&D. The list of 1,500 companies that spent the most funds on R&D did not include a single Polish company. In addition, the percentage of firms investing in innovation is decreasing. According to data by Poland's Central Statistical Office (GUS), in 2009–2011 such companies accounted for 16.9% of all businesses, while in 2008–2010 the figure was 18.1%. Moreover, instead of developing their own technologies, companies tend to use money for innovation to buy equipment and technology, often abroad. In 2011, companies spent ZL21 billion on innovation and capital investment. The purchase of machines and equipment represented 59% of this amount. R&D represented only about 13% of total spending.[10]

The structure of R&D expenditure in Poland differs from that in the EU as a whole on average. R&D spending in Poland is financed mainly by the government sector (51.3% in 2012) rather than the corporate sector (32.3%). The third-largest source of R&D funding is foreign funds (13.3%). The higher education sector and private non-profit institutions play a minor role. The country's strong dependence on the inflow of EU funds may in the future make it difficult to finance research and development from private funds. Businesses will not be ready to spend their own funds on innovation, but will expect public subsidies instead. According to data from Eurostat, in the 2004–2012 period, the share of enterprises in financing R&D increased by 0.12 p.p. (from 0.17% to 0.29%), while the share of public funds in financing of R&D grew by 0.13 p.p. (from 0.35% to 0.48%). This data indicates that there is a crowding-out effect in the case of private funding for R&D. On the other hand, most enterprises would probably be hesitant to conduct research without the support of EU funds in a time of crisis. However, funds are primarily channeled to the end link of the innovation process, which leads to meager innovation results.

Figure 9
Internal expenditure on R&D by financing entity (in %)
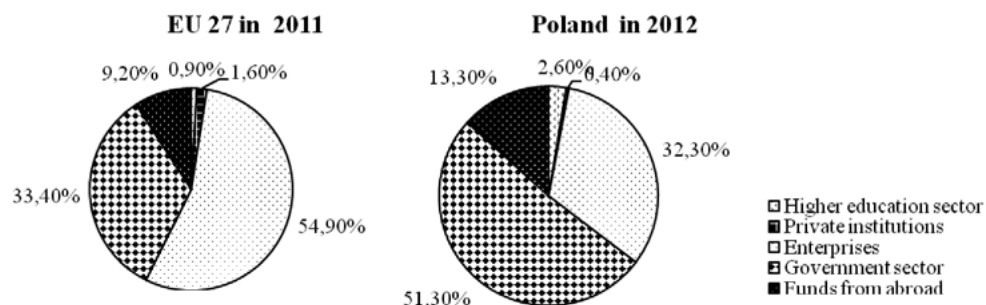
Source: Own calculations based on Eurostat.

Survey findings and research commissioned by the government clearly show that a significant barrier to development is the low level of innovation awareness among businesses, the science sector, and public authorities. This leads to a low level of innovation among enterprises (MRR, 2012, p. 33).

The Human Resources Development and Human Capital Operational Programmes

Under the 2004–2006 Financial Perspective, the Human Resources Development Operational Programme was launched, with the aim of building an open, knowledge-based society by ensuring conditions for the development of human resources through education, training, and work. The program featured three priorities: active labor market and professional and social inclusion policy; development of knowledge-based society; and technical assistance. These were divided into measures. Around €1.47 billion was set aside for the Operational Programme for 2004–2006. The division of funds among individual priorities was proportionate. Funds set aside for the program were limited compared with the Human Capital Operational Programme for the 2007–2013 period, but this was a prelude to greater absorption of funds for an improvement in the quality of human capital under the next Financial Perspective (MGiP, 2004, pp. 102–106).

The Human Capital Operational Programme is financed from the European Social Fund. As part of this program, nongovernmental organizations, businesses, labor market institutions, local governments, and the central government administration carry out projects that contribute to enhanced labor force skills and greater professional activity of the unemployed, increase the level of education, support people in difficult situations (for example, disabled, immigrants), and provide assistance to those planning to start their own business.

The Human Capital Operational Programme consists of 10 priorities, divided into measures and submeasures to be implemented simultaneously at the central and regional levels. About 60% of the funds were allocated for the support of regions (priorities VI to IX), while the remaining 40% was earmarked for spending by selected ministries (priorities I through V). Funds available as part of the regional component were set aside for support to individuals and social groups, while funds as part of the central component were primarily intended for the support of structures and systems.[11]

In 2007–2013, more than €11.8 billion was allocated for this program, making it the second-largest program in terms of financing under the National Strategic Reference Framework. The allocation of funds to individual priority axes is not proportional. The largest amount (23% of the total allocation for the program) was allocated to Priority Axis 6: "A labor market open to all" (Figure 10). At the time of drafting the National

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[11] http://www.efs.gov.pl/WstepDoFunduszyEuropejskich/Strony/Oprogramie.aspx.

Strategic Reference Framework for 2007–2013, the employment rate in Poland was one of the lowest in the EU, at 62.7% in 2007, compared with the EU27 average of 69.9% (MRR, 2007, pp. 56–61).

The most money as part of this priority axis was set aside for Measure 6.1: "Improvement of access to employment and supporting economic activity in the region," representing more than 77% of the total allocation for this priority (Table 14). This distribution of funds resulted from a high unemployment rate in regions, especially those less industrialized. The unemployment rate in Poland in 2007 was 9.6%, ranking the country second, behind Slovakia, in terms of unemployment in the EU; the EU27 average was 7.2%.[12] In addition, under this priority, funds were allocated for Measure 6.2: "Support and promotion of entrepreneurship and self-employment." The purpose of this measure was to fight unemployment by supporting the creation of new jobs, in line with the European Employment Strategy.

Priority 9: "Development of skills and competences in regions" came second in terms of the amount of funds allocated; it accounted for 17% of the total allocation as part of the program. R&D spending is the commonly used measure of innovation in an economy, because this expenditure determines the ability of an economy to create innovations with the highest market value in the long term. Advanced scientific research cannot be conducted without a qualified work force (MRR, 2007, p. 57).

Figure 10

The allocation of funds for the Human Capital Operational Programme for 2007–2013 by priority (in %)

Source: Own elaboration based on: http://www.efs.gov.pl/AnalizyRaportyPodsumowania/Strony/default.aspx.

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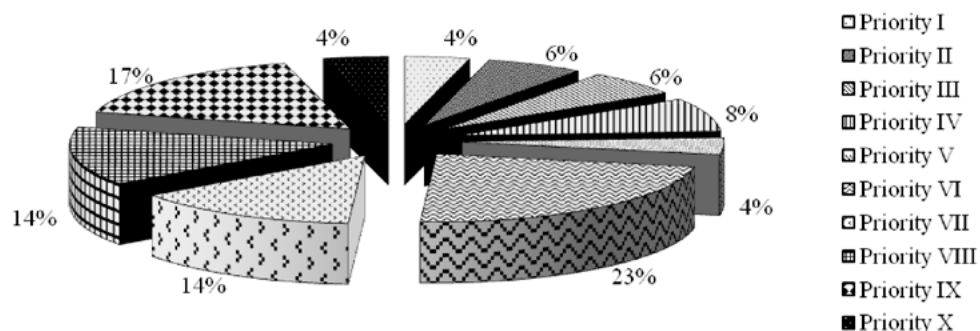
[12] http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=une_rt_a&lang=en.

Table 14

Co-financing agreements concluded under the Human Capital Operational Programme (as of Dec. 31, 2013; in millions of € and ZL)

Priority/ measure	Name	Allocation in €	Allocation in ZL	Agreements signed (% of public funds spent)
Total Human Capital Operational Programme		**11,773.3**	**49,379.9**	**95.2**
Priority I	**Employment and social integration**	**466.2**	**1,955.3**	**96.4**
Measure 1.1	Support for labor market institutions	81.0	339.8	100.1
Measure 1.2	Support of social inclusion	136.9	574.2	91.9
Measure 1.3	Integration and professional activation	190.8	800.1	97.3
Measure 1.4	Support for social economy	7.5	31.4	95.3
Measure 1.5	Supporting for solutions for reconciling work and family life	50.0	209.8	98.8
Priority II	Development of human resources and adaptation potential of enterprises and improving the health condition of working persons	**752.0**	**3,154.1**	**87.7**
Measure 2.1	Development of human resources	527.4	2,212.0	85.9
Measure 2.2	Work force adaptability	106.4	446.3	86.2
Measure 2.3	Improving the health state of working persons	118.2	495.8	97.2
Priority III	High quality of the education system	**743.7**	**3,119.3**	**93.3**
Measure 3.1	Modernization of the education management system	111.5	467.8	95.4
Measure 3.2	Development of the external examination systems	67.6	283.6	99.8
Measure 3.3	Improving the quality of education	383.9	1,609.9	94.8
Measure 3.4	Lifelong learning	130.0	545.3	87.3
Measure 3.5	Comprehensive support for the development of schools	50.7	212.7	83.2
Priority IV	Tertiary education and science	**985.4**	**4,132.8**	**97.9**
Measure 4.1	Commissioned fields of study	887.4	3,721.8	96.8
Measure 4.2	Development of R&D staff	51.0	213.9	102.1
Measure 4.3	Strengthening teaching potential	47.0	197.1	114.4
Priority V	Good governance	**489.2**	**2,051.9**	**85.2**
Measure 5.1	Strengthen central government administration potential	56.1	235.2	89.7

Priority/measure	Name	Allocation in €	Allocation in ZL	Agreements signed (% of public funds spent)
Measure 5.2	Strengthen local government potential	213.1	893.8	82.9
Measure 5.3	Support for the implementation of the Lisbon Strategy	97.9	410.5	93.3
Measure 5.4	Developing the potential of the third sector	100.2	420.4	77.4
Measure 5.5	Development of social dialogue	21.9	92.0	94.6
Priority VI	Labor market open to all	**2,641.9**	**11,080.5**	**101.3**
Measure 6.1	Support for employment	2,048.3	8,590.8	102.2
Measure 6.2	Support for self-employment	578.6	2,426.8	98.2
Measure 6.3	Support for rural employment	15.0	62.9	99.7
Priority VII	Promotion of social integration	**1,621.8**	**6,802.0**	**93.2**
Measure 7.1	Development and dissemination of active inclusion	943.0	3,954.7	93.2
Measure 7.2	Counteracting social exclusion	573.7	2,406.4	94.4
Measure 7.3	Local initiatives for active inclusion	38.3	160.7	99.9
Measure 7.4	Disabled on the labor market – competition projects	66.8	280.2	78.4
Priority VIII	**Regional human resources for the economy**	**1,621.5**	**6,801.0**	**96.1**
Measure 8.1	Development of staff and enterprises in the region	1,350.5	5,664.4	96.4
Measure 8.2	Transfer of knowledge	271.0	1,136.6	94.9
Priority IX	**Development of education and competences in the regions**	**1,996.4**	**8,373.6**	**90.9**
Measure 9.1	Equalization of opportunities in education	1,148.6	4,817.6	89.8
Measure 9.2	Improving the attractiveness and quality of vocational education	476.2	1,997.1	94.1
Measure 9.3	Promotion of lifelong learning in school	88.3	370.5	98.2
Measure 9.4	Highly qualified staff for the education system	124.7	523.2	93.2
Measure 9.5	Bottom-up education initiatives in rural areas	72.1	302.4	94.4
Measure 9.6	Dissemination of adult learning	86.5	362.8	74.3
Priority X	**Technical assistance**	**455.2**	**1,909.4**	**101.5**
Measure 10.1	Technical assistance	455.2	1,909.4	101.5

Source: Own elaboration based on: MRR, (2013), pp. 2–5, and http://www.efs.gov.pl/AnalizyRaportyPodsumowania/Strony/default.aspx.

Implementation of the Human Capital Operational Programme

The Human Capital Operational Programme claimed €11.8 billion (equivalent to ZL49.4 billion, according to Polish Finance Ministry data) from the European Social Fund. By Dec. 31, 2013, just over 43,000 agreements to the tune of ZL47.0 billion had been signed, accounting for 95.2% of the total allocation for the program.

As of the end of 2013, spending was at the highest level in the case of Priority 6 "Labor market open to all," at 101.3%, and Priority 10 "Technical assistance," at 101.5%. An equally high level of spending was noted for Priority 4 "Tertiary education and science," at 97.9%. In the case of five other priorities (1, 3, 7, 8, and 9) spending exceeded 90%. The lowest percentage of co-financing agreements signed was noted for Priority 5, at 85.2%. These generally high figures offer hope that the funds will be fully spent on the intended purposes.

Comparing the priorities of the Human Capital Operational Programme with M. Porter's theoretical concept of competitive advantages, it is possible to see that these priorities directly apply to factors of production. According to M. Porter's concept, enterprises need an educated work force—understood as human capital with skills needed in the process of innovation—in order to be competitive. The development of human capital in businesses can be enhanced by funds allocated under Priority 2 "Development of human resources and adaptation potential of enterprises and improving the health state of working persons," Priority 3 "High quality of the education system," Priority 8 "Regional human resources for the economy," and Priority 9 "Development of education and competences in the regions."

Funds set aside for the Human Resources Operational Programme are primarily intended to increase employment, reduce social exclusion and improve the quality of human capital. The largest pool of funds set aside for regions was earmarked for increasing employment. This allocation of funds seemed to be justified at a time of crisis. The question arises whether the new jobs will prove to be permanent, or whether they will only exist as long as there is financing from the European Social Fund. Data from a 2010 survey show that those benefiting from financial support from the European Social Fund tended to hire new workers and keep jobs. However, it is impossible to say to what extent these jobs are permanent and whether they will continue to exist after the projects are completed. Participation in projects co-financed by the European Social Fund in 2010 significantly influenced the financial performance of companies benefiting from EU funds, yet this influence was chiefly based on an increased revenue from public sources (thanks to financing from the European Social Fund) rather than an expected increase in the ability to use market and business skills (GUS, 2011).

The level of innovation in the economy is also influenced by the quality of human capital. Research and development requires not only an adequate allocation of funds, but also well-educated staff. Figure 11 shows the proportion of researchers and engineers in the total labor force between 2004 and 2012. The data indicate that Poland saw

an increase in the percentage of research and development staff in the total labor force in the 25–64 age group (by 3.5 p.p.). In 2012, the R&D sector accounted for 7.1% of Poland's total labor force, which was the highest figure among EU member countries in Central and Eastern Europe. However, this was accompanied by a relatively low level of R&D spending in Poland (0.90% of GDP in 2012). To compare, in Slovenia, the R&D sector accounted for 7.0% of the total labor force, while the country's R&D expenditure was 2.80% of GDP. In the Czech Republic the figures were 5.4% and 1.88% of GDP respectively. Among EU15 countries, France had 7.7% and 2.26% of GDP respectively, the UK reported 11.3% and 1.72% of GDP, and Finland had 10.8% and 3.55% of GDP. The question is whether Poland's relatively large number of R&D employees is enough to ensure the development of modern technology in a situation where R&D spending in the country is so low (Weresa, ed., 2012, p. 178).

Figure 11

Researchers and engineers as a percentage of the total labor force (25–64 age groups) in 2004 and 2012
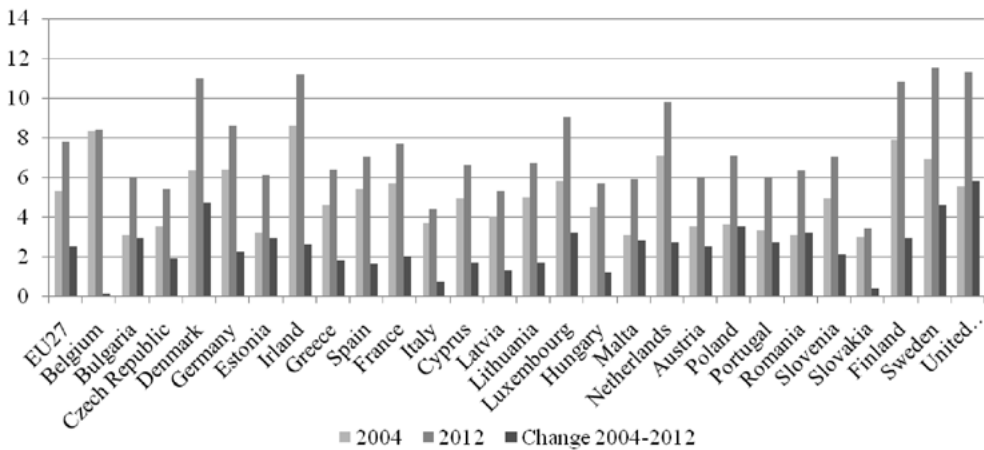
The data for Romania come from 2005 and 2012 respectively, because no data is available for 2004.

Source: Own elaboration based on Eurostat data.

One measure of a country's innovativeness is the number of patents per head of population. In 2012, the number of patent applications in Poland totaled 4,657, but in per 1,000 population terms, the figure was lower than in 2004. Twelve EU countries had higher per 1,000 population statistics in 2012, including Germany (0.76), the UK (0.37), Finland (0.34), Slovenia (0.32), Luxembourg (0.31), Austria (0.30), Denmark (0.29), Sweden (0.26), and France (0.25). The difference in terms of patents between Poland and the top four EU27 countries is significant (Figure 12).

Figure 12

Number of patent applications in EU27 countries per 1,000 population in 2004 and 2011
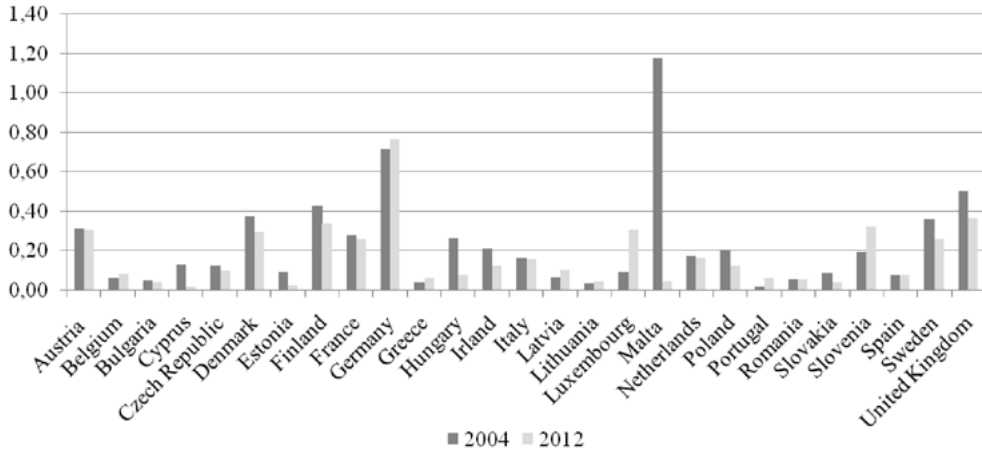
Source: Own elaboration based on data from the World Intellectual Property Organization (WIPO) and Eurostat.

Poland's human capital indicators are positive in comparison with other countries. This is reflected in the Innovation Union Scoreboard and the Global Competitiveness Report.[13] The number of residents with university degrees in Poland has been growing every year. According to GUS,[14] in 2002 the number of those with higher education in Poland accounted for 9.9% of the total population; by 2011 the figure had grown to 16.8%.[15] Quantitative changes, however, have not been accompanied by qualitative changes. In many cases, mass-scale education leads to superficial skills and poor adjustment to the needs of the economy (Geodecki et al., 2012, p. 33). A key component of human capital is competence, and not the formal level of education. According to some experts, certain skills cannot be taught in the course of university studies. This in particular applies to general competence, such as teamwork, creativity, problem-solving skills, diligence and self-organization, fact-finding and synthesis skills (Geodecki et al., p. 34).

Conclusion

Boosting innovation in the economy is one of Poland's strategic goals. The country benefits from an array of EU structural funds designed to help increase the number of innovative products and processes introduced by businesses. Under the EU's 2004–2006 budget, this objective was served by the Improvement of the Competitiveness of

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[13] http://www3.weforum.org/docs/WEF_GlobalCompetitivenessReport_2010-11.pdf.

[14] http://www.stat.gov.pl/cps/rde/xbcr/gus/lu_nps2011_wyniki_nsp2011_22032012.pdf.

[15] Polish people became more educated from 2002 to 2011; the proportion of the population with an at least secondary education increased from 41.4% in 2002 to 48.2% in 2011, i.e. by 6.8 percentage points.

Enterprises Operational Programme and the Human Resources Development Operational Programme. Funds set aside for these two programs were relatively small, mainly due to the short time frame. The EU's 2007–2013 budget earmarked more funds for improving the competitiveness of the economy. A set of new tools was launched, including the Innovative Economy, Human Capital, and Infrastructure and Environment Operational Programmes. Funds available under these Operational Programmes were chiefly intended for innovative projects, support for research and development, increased collaboration between science and business, professional activation of the unemployed, and improved human resource skills. Not all the cash was directly intended for the creation of innovation in the form of new market products and processes. Some measures enabled Polish companies to make better use of modern solutions from abroad, for example, through modernizing their production facilities. It seems that, in a situation where companies had poorly developed research facilities and government spending on R&D was modest, the decision to spend less on innovation as such and more on financing innovation infrastructure was the right move.

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5.4. Support for Polish Agriculture and Rural Areas from the EU Budget

Elżbieta Kawecka-Wyrzykowska

As a member of the European Union, Poland benefits from support under the bloc's Common Agricultural Policy (CAP). This primarily includes income support in the form of (a) direct payments and (b) market support, which covers export subsidies, intervention purchases, and the costs of inventory maintenance.[16] Income support is far greater than market support and both are financed through the first pillar of the Common Agricultural Policy, from the European Agricultural Guarantee Fund (EAGF). In addition, farmers can apply for support for purposes such as farm modernization and development, changes in the production profile, the launch of environmentally friendly production, and joint actions by producer groups. These measures are co-financed through the second pillar of the CAP, from the European Agricultural Fund for Rural Development (EAFRD). The EAFRD also finances projects aimed at the development of rural areas (countryside renewal) and those designed to promote the agri-food industry and crafts as well as agricultural trade and entrepreneurship not related to agricultural production, in addition to projects aiming to improve farmer skills (training programs).

The most funds are absorbed by direct payments, which in 2010 represented 71.6% of the total pool of funds available under the CAP. Funds for market instruments accounted for 7.7% of the CAP budget, and funds for rural development constituted the remaining 20.7% of the EU's agricultural budget.

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[16] Due to the lack of comparable data, this study excludes market intervention funds. These represent only a few percent of total support under the Common Agricultural Policy. Just over €1 billion was allocated for subsidies to exports of selected agri-food products (the main market intervention item) during the 2007–2013 period.

Direct payments

Direct payments are the most important instrument of support to agriculture in both Poland and the EU as a whole. Polish farmers have been receiving direct payments ever since Poland joined the EU in 2004. Direct payments are granted each year to individuals and institutions that conduct farming activity on at least one hectare of farmland, keep their farms in good repair, and run them in accordance with the principles of cross-compliance of environmental protection, animal identification and registration, public health, animal and plant health, and animal welfare laws.

Under the accession treaty, Polish farmers—much as their counterparts in other new EU member states—had to wait 10 years to receive full 100% funding from the EU budget in terms of basic payments due to them. However, the government secured an option whereby these payments could be increased from the national budget.[17] In 2004–2012, the Polish government co-financed direct payments from the national budget in the maximum allowable amount: 30% of the full payments due in 2004–2010, followed by 20% in 2011 and 10% in 2012 (Figure 13). The year 2013 was the first since Poland's EU entry in which the total amount of direct payments received by Polish farmers was financed from the EU budget.

Figure 13

The level of direct payments for Polish farmers under the EU accession treaty in 2004–2013 (% of the full amount of payments)
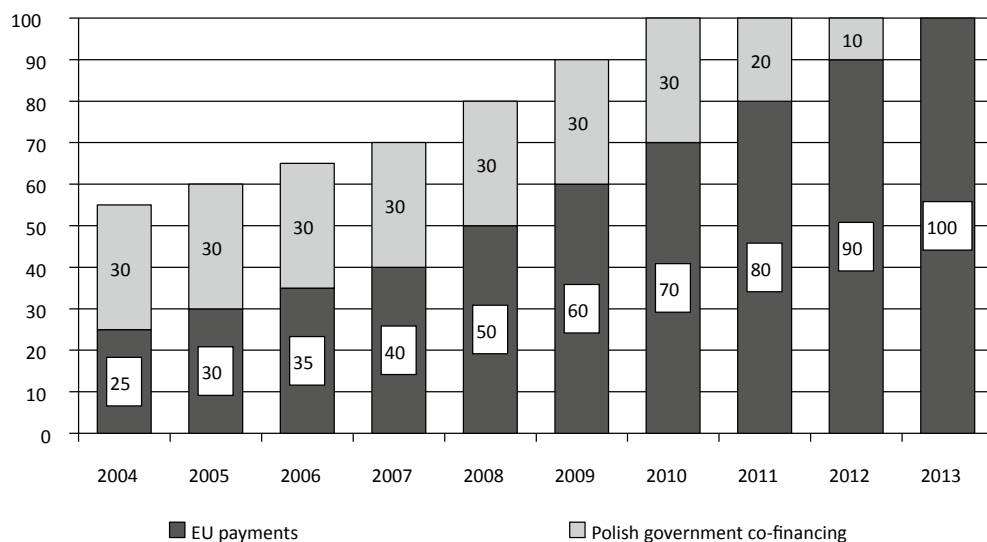
Source: http://www.minrol.gov.pl/pol/Wsparcie-rolnictwa-i-rybolowstwa/Platnosci-bezposrednie

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[17] As a result, Polish farmers received 100% of the payments available to them beginning in 2010.

From the beginning of the country's EU membership, the government has covered national supplementary payments in the following areas: basic crops (such as cereals, oilseeds, and high-protein plants), hops, potato starch, tobacco products, and plants intended for animal feed grown on permanent grassland (animal payments have been available since 2007);[18] see Table 16.

In 2004–2006, around 1.48 million Polish farmers received payments; in 2004 they received ZL6.3 billion, and in 2006 the amount grew to ZL7.8 billion.[19] The increase resulted from a slightly larger number of applications submitted (in the first year of membership, not all eligible farmers managed to submit applications on time), combined with the fact that the level of payments per unit of farmland area grew each year.

In 2007–2013, the number of farmers receiving payments was more or less constant (with applications submitted by almost all those eligible), at 1.4 million, and the total area of farmland held by them was 14 million hectares.[20]

The total amount of direct payments for Polish farmers in 2007–2013 exceeded €15.2 billion, or around ZL61.2 billion. Table 15 shows how these funds were distributed in individual years.

Table 15

Direct payment ceilings, 2007–2013 (in millions of euros)

Year	2007	2008	2009	2010	2011	2012	2013
National ceiling	1,268.0	1,572.6	1,877.1	2,192.3	2,477.3	2,788.3	3,044.5

Source: Council Regulation (EC) No. 552 of 2007 and No. 73 of 2009.

Under the accession treaty, Poland agreed to use a simplified system of direct payments in 2007–2013, based on the so-called Single Area Payment Scheme (SAPS)[21] and complementary payments, most of them granted depending on the structure of production (see Table 16).[22] This means that the actual amount of payments for many farmers was higher than the basic single area payment rate multiplied by the area of farmland.

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[18] In addition, special sugar payments have been offered from the EU budget since 2006, following a sugar market reform; and there are also separate tomato payments and soft fruit payments available since 2008—both introduced as a result of a CAP reform on the fruit and vegetable market in 2007 (see http://www.minrol.gov.pl/pol/Wsparcie-rolnictwa-i-rybolowstwa/Platnosci-bezposrednie).

[19] Data by the Agency for the Restructuring and Modernization of Agriculture (ARiMR).

[20] http://www.arimr.gov.pl/pomoc-unijna/platnosci-bezposrednie.html

[21] The amount of EU support for individual countries was determined on the basis of the area of farmland maintained in good condition and the so-called reference yield level. Because Poland's reference yield level was lower than in most EU15 countries, Polish farmers received payments lower than the EU15 average.

[22] Details are specified in the direct payments law of Dec. 18, 2003.

Table 16
Direct payment rates in 2013

Type of payment	Planned amounts of different types of direct payments in 2013 (in millions of zlotys)	% of total amount	Payment rates in 2013 (in zlotys)
Single Area Payment	11,530.6	81.0	830.30 ZL/hectare
Complementary Area Payment—other plants	972.2	6.8	139.39 ZL/hectare
Complementary Area Payment—animals	346.3	2.4	238.93 ZL/hectare
Complementary Area Payment for hops growers	2.5	0.0	1,263.50 ZL/hectare
De-coupled payments—Virginia tobacco	115.8	0.8	5.75 ZL/kg
De-coupled payments—other tobacco	55.6	0.4	4.02 ZL/kg
Starch payments	36.6	0.3	449.44 ZL/metric ton
Special area payments for growers of leguminous and pea-type plants	148.5	1.0	719.43 ZL/hectare
Cow payments	164.9	1.2	602.60 ZL/head of cattle
Sheep meat and goat meat payments	9.7	0.1	126.86 ZL/head of flock
Separate sugar payments	655.5	4.6	54.10 ZL/metric ton
Fruit and vegetable payments (tomato payments)	27.6	0.2	167.44 ZL/metric ton
Virginia tobacco payments	77.7	0.5	n.a.
Burley tobacco payments	35.0	0.3	n.a.
Dark tobacco payments	8.4	0.1	n.a.
Soft fruit payments	46.1	0.3	1,579.54 ZL/hectare
Total direct payments	14,232.8	100.0	×

Source: http://www.arimr.gov.pl/pomoc-unijna/platnosci-bezposrednie/stawkiplatnoscibezposrednichobowia-zujacewroku2013.html.

Most of the funds reached farmers in the form of the Single Area Payment (SAP) financed from the EU budget and complementary payments financed from the national budget. Together they accounted recently for slightly more than 90% of the total amount that farmers received in the form of direct payments. Figure 14 shows the proportion of each payment in total farmer income support in 2012.

Figure 14

The proportion of individual types of payments in total direct support for Polish farmers in 2012 (%)
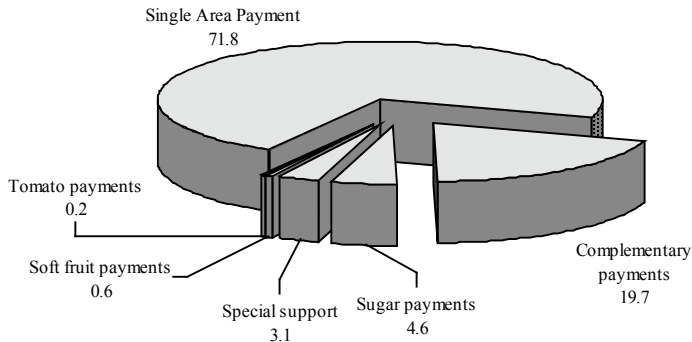
Source: http://www.minrol.gov.pl/pol/Wsparcie-rolnictwa-i-rybolowstwa/Platnosci-bezposrednie.

Evaluation of support for Polish agriculture in the form of direct payments

Direct payments are among the most controversial instruments for supporting agriculture. The obvious benefit for farmers is that these payments increase their incomes. It is estimated that 60% of the income of farmers in EU countries comes from direct payments. In Poland, it is estimated that direct payments account for more than half of farmer incomes (Poślednik, 2009). A no-less-important benefit of the payments is that they stabilize farmer incomes, and their amount (in euros) is known well in advance—because it is guaranteed at a certain level in each subsequent Multiannual Financial Framework, which is the basis of the EU's annual budgets.[23] Because of uncertain production conditions (droughts, floods etc.) as well as uncertain sales (economic slowdowns, changing trends on international markets), the stabilizing function of direct payments is of special importance to agricultural producers.

The amount of support that individual farmers get varies considerably and depends primarily on the size of the farm (a fixed payment rate in a given year multiplied by the area of the farmland), as well as the structure of production (basic payments are

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[23] In order to reduce the risk related to fluctuations in the exchange rates of national currencies against the euro, member states convert into the national currencies the funds for direct payments expressed in euro at the latest exchange rate set by the European Central Bank prior to Oct. 1 of the year for which the payments were granted. Therefore, since 2005 the Single Area Payment rate has been calculated by dividing the financial envelope for a given year by the reference area, with the exchange rate of the euro as at Sept. 30 of a given year. Beginning in 2005, the disbursement of direct payments takes place in the period from Dec. 1 of each year to June 30 of the following calendar year. This period is the same for all EU countries. (Poślednik, 2009). Of course, such a system does not eliminate the exchange rate risk completely, because the rates on the last day prior to Oct. 1 are different each year. Only eurozone countries have a full guarantee of exchange rate stability.

supplemented by several types of additional payments, if the farm's production profile includes specific plant or animal products). In this situation, calculating any average per farm could be very confusing. It is worth noting, however, that in Poland about 70% of the payments go to 20% of the largest farms in terms of area (Poślednik, 2009). This means that this type of support mainly benefits farms that are already competitive and can effectively use the payments to further improve their position on the single European market.

Notably, many farmers, in addition to the aforementioned payments, receive compensatory allowances under the so-called less favored areas (LFA) scheme, which aims to support agricultural producers in areas with unfavorable farming conditions. In addition, the incomes of some farmers (those who have transferred their farm to a successor) are supported by the early retirement scheme. Both of these measures are financed from the Rural Development Programme (discussed in the next part of this chapter), which finances measures designed to promote changes in the structure of agricultural production. In fact, both measures also support farmer incomes. As with direct payments, funds obtained under the LFA and early retirement systems can be used for any purpose, not necessarily only those related to farm development or modernization.

Inasmuch as they are spent on investment projects or day-to-day production expenses, direct payments influence the development of farms. It is difficult to determine how these funds are actually spent. An Agribus survey conducted in 2010 by the Martin & Jacob company revealed that owners of farms of more than 15 hectares tended to spend most direct payments on fertilizers, plant protection products (e.g., pesticides), and materials and equipment for sowing.[24] In small subsistence farms, on the other hand, payments are mainly spent on improving day-to-day consumption. In such farms they also play a social function.

Supporters of direct payments argue that these payments have a moderating effect on food prices, keeping them from growing too fast, despite increasingly expensive fertilizers and other production inputs for farmers. In this way direct payments benefit consumers. In addition, they make Polish agri-food products competitive on foreign markets in terms of price.

Payments, through their income effects, enable some farmers to support themselves and thus rein in unemployment. As a result, payments reduce government spending on social welfare support for the poorest farmers.

Despite all these benefits, direct payments also have disadvantages for the effectiveness of agriculture. The key drawbacks are the following:

a) Payments are offered to farmers (subject to meeting certain requirements, including maintaining farms in good condition), regardless of the condition of the farm. Consequently, in small subsistence farms payments have a social character and can

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[24] http://wyborcza.biz/biznes/1,101562,8752053,Polscy_rolnicy_doplaty_z_UE_wydaja_na_nawozy. html (accessed Dec. 1, 2010).

in no way be used to improve the competitiveness of the farm or to improve the agrarian structure of agriculture. In fact, payments have slowed down the process of enlarging farms in Poland, because beneficiaries do not want to lose their right to what is largely automatic financial support (on account of ownership or lease of farmland).

b) Direct payments can be used to finance any expenditure. So there is no guarantee that they help improve the competitiveness of farms.

Rural Development Programme 2007–2013 (RDP)

Another key mechanism for financing agriculture, food processing and rural development is funds for the development of rural areas (the second pillar of the CAP). In 2004–2006,[25] a rural development program endowed with €3.6 billion in public funds, including €2.9 billion in EU funds, was in operation. During this period, the agri-food sector also received support from the Sectoral Operational Programme: Restructuring and Modernisation of the Food Sector and Rural Development, which was pursued as part of Cohesion Policy. Support from this program totaled €1.2 billion.

From 2007 to 2013—in fact, until the end of 2015[26]—the Rural Development Programme (RDP) was at work, with a budget of around ZL70 billion (€17.4 billion).[27] The program's budget is almost six times as large as in the first few years of Poland's EU membership. The RDP is financed from the European Agricultural Fund for Rural Development (EAFRD)—totaling €13.2 billion, with the contribution of Polish public funds adding €4.2 billion.[28] Some of the measures are co-financed by beneficiaries receiving support. Financial assistance from the RDP 2007–2013 is granted to farmers, businesspeople, local governments and forest owners. It is intended for the implementation of specific measures (there are 23 of these objectives) as part of

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[25] In the pre-accession period, Polish agriculture benefited from funds available under the SAPARD program (which was in operation until mid-2006). The program's budget of €1.1 billion (about ZL4.8 billion) consisted of €708.2 million in EU funds and €235.8 million in national co-financing, as well as €40 million transferred with the consent of the European Commission from the Rural Development Programme budget. See: http://www.arimr.gov.pl/pomoc-unijna-i-krajowa/inne-formy-pomocy/sapard.html.

[26] In the case of most actions financed from the RDP, agreements are concluded until the end of the programming period (i.e. until the end of 2013, and funds are spent over two more years, in line with the so-called n+2 principle). Early retirement is financed along different lines. Farmers receive early retirement benefits until they reach an age making them eligible for a pension along the general rules (later they are moved to the general pension system). If they reach the retirement age in the next budget period, "fixed liabilities" are incurred that must compulsorily be covered from funds under the next program (similar rules are followed in the case of afforestation, producer groups and some agri-environmental programs).

[27] http://www.arimr.gov.pl/pomoc-unijna/efekty-unijnej-pomocy-udzielanej-przez-arimr.html. Rural development is also served by some EU funds under the Cohesion Policy.

[28] http://www.arimr.gov.pl/pomoc-unijna.html or: http://www.arimr.gov.pl/pomoc-unijna/prow-2007-2013-podstawowe-informacje.html

four "axes" (tasks).[29] A detailed list of all the measures is given in Table 17, which shows how much money (in millions of euros) is earmarked for specific purposes, with a breakdown into public funds (financed from the EU budget and the national budget) and private funds.

The largest amount, 43% of the total, was set aside for financing Axis 1, which aimed to improve the competitiveness of the agricultural and forestry sector. Next in terms of importance came Axis 2, in which funds were spent to improve the environment and rural areas—30.6% of the total pool. Slightly less, 20.0%, was set aside for improving the quality of life in rural areas and diversifying the rural economy (Axis 3). The remaining 6% was earmarked for the implementation of local development strategies (Axis 4) and technical assistance (Axis 5).

Table 17

Implementation of the Rural Development Programme for 2007–2013 (in millions of euros)

Code	Name of instrument	Public funds[a]	Private funds	Total allocation	Absorption rate[b] (%)
Axis 1: Improving the competitiveness of the agricultural and forestry sector					
111	Vocational training for persons employed in agriculture and forestry	30.0	0	30.0	68.8
112	Schemes promoting the establishment of young farmers	420.0	0	420.0	92.8
113	Early retirement	2,550.0	0	2,550.0	100.0
114	Advisory services	118.0	30.0	148.0	76.2
121	Modernization of agricultural holdings	1,920.1	2,878.8	4,797.9	87.1
123	Adding value to primary agricultural and forestry production	932.0	2,796.0	3,728.0	75.9
125	Development of agricultural and forestry infrastructure	638.1	0.0	638.1	75.4
126	Restoring agricultural production potential damaged by natural disasters	100.0	11.0	111.0	72.3
132	Participation of farmers in food quality schemes	40.0	0.0	40.0	67.8
133	Information and promotion activities	10.0	4. 7	14.7	17.1
141	Aid for semi-subsistence holdings—RDP 2004–2006 liabilities	560.0	0.0	560.0	99.8
142	Agricultural producer groups	140.0	0.0	140.0	100.0
	Total: Axis 1	7,456.2	5,719.6	13,175.9	×

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[29] These goals are enshrined in the Strategy for Sustainable Rural Development, Agriculture and Fisheries adopted by the Polish government on April 25, 2012, Resolution No. 163, *Monitor Polski*, Nov. 9, 2012, item 839.

Code	Name of instrument	Public funds[a]	Private funds	Total allocation	Absorption rate[b] (%)
Axis 2: Improving the environment and the countryside					
211, 212	Support for farming in mountainous areas and other less favored areas (LFA)	2,449.0	0.0	2,449.0	85.8
214	Agri-environmental program	2,315.1	0.0	2,315.1	94.5
221, 223	Afforestation of farmland	474.5	0.0	474.5	88.8
226	Restoring forestry production potential damaged by natural disasters	100.0	0.0	100.0	80.1
	Total: Axis 2	5,337.6	0.0	5,337.6	×
Axis 3: Quality of life in rural areas and diversification of the rural economy					
311	Diversification towards non-agricultural activities	345.0	346.0	691.0	92.5
312	Establishment of micro-businesses	1,024.6	1,024. 6	2,047.2	50.3
321	Basic services for the rural economy and population	1,614.2	0.0	1,614.2	100.0
313, 322, 323	Renovation and development of villages	590.0	0.0	590.0	100.0
	Total: Axis 3	3,573.8	1,369.6	4,942.4	×
Axis 4: LEADER—Implementation of local development strategies					
413	Implementation of local development strategies	621.0	403.4	1,024.4	69.6
421	Implementation of cooperation projects	15.0	0.0	15.0	35.6
431	Functioning of local action groups	152.0	0.0	152.0	83.6
	Total: Axis 4	788.0	403.4	1,191.4	×
Axis 5: Technical assistance		267.0	0.0	267.0	54.9
RDP Total		**17,420.7**	**7,491.6**	**24,911.3**	×

[a] EU funds and national public funds combined.
[b] absorption rate based on contracts signed with beneficiaries or decisions on financing projects as of Sept. 20, 2013.

Source: Agency for the Restructuring and Modernization of Agriculture.

Funds were distributed relatively evenly among the first three axes, but a closer look at the distribution of funds reveals that evaluating their purpose may be misleading. For example, the "support for farming in mountainous areas and other less favored areas (LFA)"[30] measure was hardly conducive to an improvement in the environment

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[30] While drafting its Rural Development Programme 2004–2006, Poland tried to secure permission to cover the largest possible area of farmland with support for farming in "less favored areas." Under this program, early retirement covered 53,400 farmers for a period of 10 years. In 2007–2013, the amount of

and rural areas, even though it was part of the "Improving the environment and the countryside" Axis. Another example: "early retirement" was classified into Axis 1, "Improving the competitiveness of the agricultural and forestry sector." Nor could it be claimed that "aid for semi-subsistence holdings" served as an improvement in competitiveness. Axis 1 also included the "restoring agricultural production potential damaged by natural disasters" instrument, which could have meant restoring agricultural production potential regardless of whether it was competitive or not.

In the case of the "LFA" measure, the key criterion for allocating funds was not a good business plan—unlike in the case of most other Rural Development Programme measures—but possession (or lease) of land classified as located "in less favored areas" (56.5% of the land in Poland fits this definition). The same was true of the "early retirement" measure, where the main criterion was whether or not a farmer has reached the age of 55—though not the retirement age (65 years for men, and 60 years for women)[31]—and transferred the farm to a successor or sold it. In the case of both these measures, farmers were free to spend the funds in any way they chose, be it investment or day-to-day consumption. Early retirement was intended to improve the agrarian structure and expedite the process of generational replacement among farmers. While this measure could help improve the profitability and competitiveness of farms, this did not have to be the case, especially as only farmers who transferred a small farm to a successor were eligible for early retirement. As a result, slightly larger farms lost their competitive edge. Overall, the "LFA" and "early retirement" measures provided social support and income support respectively, while not necessarily serving "rural development," despite the name of the program.

Income and social support accounted for a combined €5.5 billion[32] slated for spending in the 2007–2013 period, or almost 32% of the total pool of funds available under the Rural Development Programme. This means that the actual amounts of money for improving the competitiveness of the agri-food sector and for rural development were smaller than the amount allocated from the EU budget. Notably, both of these objectives can be considered fixed liabilities, i.e. liabilities that must be compulsorily covered in the next programming period.[33] The decision to grant funds for these purposes was made for the first time when the structure of expenditure was

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pension under the early retirement system was reduced, the criteria for granting early retirement were tightened and a decision was made that pensions would be granted only to 20,400 more farmers. After that ceiling was reached, no new applications were reviewed, regardless of how well-founded they were (MRiRW, 2007, p. 191).

[31] In 2013, the base monthly pension for farmers covered by early retirement was ZL1,013, with an option for a certain rise.

[32] This amount includes ZL500 million to "support semi-subsistence farms—RDP 2004–2006 liabilities."

[33] Theoretically, fixed liabilities can also include other measures in the sense that most of them follow up on programs in operation in the previous planning period. The nature of the problems addressed by these programs requires long-term efforts. The rationale for the existence of these measures is therefore a desire to improve the structure of agricultural production and increase its productivity. In contrast,

being determined just after accession (as part of the RDP 2004–2006, under the EU's 2004–2006 Multiannual Financial Perspective). Both measures were maintained when the decision on the distribution of funds for the 2007–2013 period was being made, because a government could hardly refuse to follow up on measures designed to provide income and social support. Leaving out such measures would cause the opposition of a large section of the rural population that would undoubtedly influence the outcome of the subsequent parliamentary elections (Rowiński, 2008, pp. 509–572). It should be expected that these measures will also absorb significant funds under the RDP 2014–2020—largely at the expense of funds for the modernization of farms, as is the case now (Rowiński, 2008). According to the Polish Ministry of Agriculture and Rural Development (MRiRW), projects started in 2007–2013 and continued in the 2014–2020 period should claim almost €1.4 billion.

Among the remaining measures, the largest amount, €2.3 billion, was set aside for the "agri-environmental program" followed by the "modernization of agricultural holdings," with €1.9 billion. This means that modernization claimed less than each of the two measures designed to support farmer incomes: €2.5 billion for early retirement and €2.45 billion to support "less favored areas."

The outcomes of RDP 2007–2013[34]

When assessing how EU funds are spent, it is only possible to determine whether or not their objectives have been achieved. Undoubtedly, in the case of most of the discussed measures, this is precisely what happened. The use of EU funds in keeping with the objectives set, however, says nothing about the effectiveness of these funds. To assess the effectiveness of spending, we should compare the obtained results (benefits) with the costs incurred, which means determine whether the best possible results have been achieved. Such an assessment is difficult, and even impossible, due to a lack of appropriate measurement tools. This produces many divergent opinions about the effects of EU support. For the same reason, below we focus on discussing the absorption of EU funds and their outcomes and not on their effectiveness.

Until the beginning of 2014, the Polish Agency for the Restructuring and Modernization of Agriculture (ARiMR), which disburses funds under the RDP and manages most measures, paid out or set aside for its long-term liabilities about 90% of the Rural Development Programme's total budget for 2007–2013 (see Table 17).[35] Such a high level of fund disbursement offers hope that the whole amount will be spent as

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early retirement and the LFA arrangement do not serve such purposes; just the reverse, they contribute to the preservation of an uncompetitive structure of agricultural production in Poland.

[34] http://www.arimr.gov.pl/pomoc-unijna/efekty-unijnej-pomocy-udzielanej-przez-arimr.html.

[35] Some of the money is destined for purposes such as the payment of early retirement benefits granted in previous years or annual afforestation payments, http://www.arimr.gov.pl/pomoc-unijna/prow-2007-2013/ponad-247-miliarda-zlotych-wyplacila-arimr-z-prow-2007-13-polska-jest-liderem-realizacji-programu-w-unii-europejskiej.html.

planned by the end of the programming period. Most funds have been distributed in accordance with the planned objectives, so the absorption of funds under the RDP 2007–2013 is at a high level.

The program has had many beneficiaries. Farmers, businesspeople from the agri-food sector and other beneficiaries, including Local Action Groups, submitted more than 439,000 applications for support to the Agency for the Restructuring and Modernization of Agriculture by the beginning of 2014. Moreover, every year more than 700,000 farmers submit applications for LFA payments, and about100,000 applicants annually seek agri-environmental payments.[36]

The results vary, of course, depending on the measure. According to the Polish Ministry of Agriculture and Rural Development (MRiRW), funds for the modernization of farms have made it possible to modernize about 60,000 farms and hundreds of food processing companies. About 36,000 new jobs unrelated to agriculture have been created in rural areas. Subsidies from the RDP 2007–2013 have helped keep the profitability of economic activity in mountainous and less favored areas (LFA). According to the Ministry of Agriculture and Rural Development, if these payments were not available, 7.3 million hectares, or roughly half of all farmland area in Poland, would no longer be used for food production purposes. Support from the RDP 2007–2013 also makes it possible to conduct traditional crop cultivation and livestock breeding, and ensures the highest environmental standards in an area of 2.3 million hectares. These funds have also enabled afforestation of about 70,000 hectares of poor-quality land. Without the support from the RDP 2007–2013, farmers would not so actively be producing high-quality food.[37]

Money from the RDP 2007–2013 has also helped revive production in hundreds of farms involved in various disasters such as floods, subzero temperatures, and severe storms. Funds set aside for the "renovation and development of villages" have helped create hundreds of play areas for children and have built or renovated many rural clubs and bought equipment for them. Under other measures, water supply systems, sewerage systems, and waste segregation systems have been built in many rural areas. The living conditions of the rural population have improved substantially. Another important outcome of the implementation of certain measures is an improvement in the incomes of farmers and other people living in the countryside but not supporting themselves from agriculture (Rowiński, 2008).

This positive evaluation of the RDP 2007–2013 by the Ministry of Agriculture and Rural Development indicates that almost all the funds allocated for this period have already been distributed. This assessment, of course, does not say anything about the effectiveness of the completed projects—for example, whether or not they have

[36] http://www.arimr.gov.pl/pomoc-unijna/prow-2007-2013/ponad-247-miliarda-zlotych-wyplacila-arimr-z-prow-2007-13-polska-jest-liderem-realizacji-programu-w-unii-europejskiej.html.
[37] http://www.zielonysztandar.com.pl/2013/03/efekty-wsparcia-udzielanego-przez-arimr-z-unijnych-programow-pomocowych/.

helped increase productivity in agriculture. The question of whether the available EU funds (and national public funds supplementing these) have been divided in the right way also remains open. A partial answer to this question was offered above, describing the controversial distribution of funds between objectives such as farm modernization and early retirement for farmers. Generally, however, there is no good answer. Basic indicators of the development of Polish agriculture and rural areas continue to trail those in countries with the most productive agriculture sectors. The needs in this area are consequently enormous and diverse, while the available resources are limited.

Critics argue that the number of beneficiaries of EU funds relative to the total number of Polish farmers is very low. This argument can be countered by pointing out that, first, there were not enough funds for a larger scale of support, and second, the number of beneficiaries should be compared with the number of commercial farms, which is much smaller, while excluding a large number of farmers who own only small plots, have no contact with the market, and have not applied for any structural support.

Support for the fisheries and fish processing sector

In 2004–2006, Sectoral Operational Programme: Fisheries and Fish Processing 2004–2006 was in operation, based on the National Development Plan 2004–2006. A total of €282 million was earmarked for this program, with the EU contribution at €202 million and the national budget contribution at €80 million (MRIRW, 2004).[38] The most funds have been allocated under this program for either scrapping fishing vessels or transferring these to third countries (after Poland was covered by fishing quotas once it joined the EU), as well as for the protection and development of aquatic resources. For most measures, the level of using the allocation was high, and there was not enough money to carry out all complex projects. Some measures, however, were not popular among fishermen, due to the inadequacy of the support and its poor adaptation to the needs of beneficiaries (Agrotec, 2010).

In subsequent years, the Operational Programme: Sustainable Development of the Fisheries Sector and Coastal Fishing Areas 2007–2013 was at work, which was financed from the European Fisheries Fund (EFF)[39] and was a component of the EU's Common Fisheries Policy. Poland, along with Spain, was the largest beneficiary of the Fund.[40] A total of €734 million was allocated for Poland, with national co-financing at €244.7 million (i.e. 25% of the program's total budget). This adds up to a total of €979 million, or nearly three times as much as in the previous period. The 2007–2013

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[38] An additional €2 million came from applicants' own private funds.

[39] A total of €4.3 billion was allocated for the implementation of the Fund across Europe..

[40] The biggest beneficiaries of the EFF are: Spain with €1.13 billion, followed by Poland with €734.1 million, Italy with 424.3 million, Portugal with €246.5 million, Romania with €230.7 million, and Greece with €207.8 million.

program included five priority axes: see Table 18.[41] Each axis had different objectives, but their common feature was they all focused on promoting sustainable development of the fisheries sector and fisheries areas. Individual measures concerned the development and modernization of the fisheries sector, ensuring its profitability and competitiveness, and stepping up fishing infrastructure, with a view to improving the quality of life of communities in fishing areas. The measures were expected to produce areas that were more attractive not only for residents, but also as tourism destinations. Most of the funds, 32%, were spent on the sustainable development of fisheries areas, and the remaining funds were distributed evenly among the other axes.

Table 18

Budget of the Operational Programme: Sustainable Development of the Fisheries Sector and Coastal Fishing Areas 2007–2013, by priority axis (in millions of euros)

Operational Programme financing by priority axis	Total public contribution	EFF contribution	Structure of EFF contribution (%)	National contribution	EFF co-financing
Axis 1. Measures for the adaptation of the Community fishing fleet	225.1	168.8	23.0	56.3	75%
Axis 2. Measures for investments in aquaculture and processing and marketing of fishery and aquaculture products	195.8	146.8	20.0	48.9	75%
Axis 3. Measures of common interest	195.8	146.8	20.0	48.9	75%
Axis 4. Measures of the sustainable development of fisheries areas	313.2	234.9	32.0	78.3	75%
Axis 5. Technical assistance	48.9	36.7	5.0	12.2	75%
TOTAL	978.8	734.1	100.0	244.7	75%

Source: Operational Programme: Sustainable Development of the Fisheries Sector and Coastal Fishing Areas 2007–2013, http://www.arimr.gov.pl/pomoc-unijna/po-ryby-2007-2013/realizacja-po-zrownowazony-rozwoj-sektora-rybolowstwa-i-nadbrzeznych-obszarow-rybackich-2007-2013.html.

The contracting of funds under the program was slow in the beginning, but gained momentum in 2013. By the autumn of 2013, the rate of fund utilization (in terms of paid invoices and accepted applications for financing) reached 98% under Axis 2 and Axis 3, and 86% under Axis 1. Only slightly lower was the absorption of funds under Axis 4, which accounted for the biggest portion (32%) of the money for the fisheries sector (Table 18).[42]

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[41] http://www.arimr.gov.pl/pomoc-unijna.html.

[42] http://www.arimr.gov.pl/pomoc-unijna/po-ryby-2007-2013/18-miliarda-zlotych-zostalo-zakontraktowane-przez-arimr-w-ramach-po-ryby-2007-2013.html.

Conclusions

This analysis shows that Poland is an efficient spender of EU funds set aside for its agriculture sector and rural areas. Most of the funds allocated to Poland so far have already been spent or agreements have been signed detailing how this money will be spent.

In terms of purpose, the most EU funds were spent in 2007–2013 to support farmer incomes (direct payments, early retirement, LFA, and support for semi-subsistence farms)—about €20.9 billion, or ZL84 billion, in total. This represents 69% of the total pool of funds from the EU budget earmarked for the development of agriculture, rural areas and fisheries.[43]

These funds have significantly increased farmer incomes and enabled some farmers to improve the competitiveness of their farms. Owners of small farms that do not produce for the market have been able to improve their living conditions. Practically speaking, all the support, regardless of what specific purpose these funds have been spent on, has contributed to an increase in market demand and, through multiplier effects, increased production and GDP.[44] Naturally, these effects are likely to disappear with time.

From the point of view of the economy's development, more important are supply-side effects that have a permanent impact on the development potential of Polish agriculture and rural areas. Some of the funds analyzed above have reinforced this potential by improving infrastructure, modernizing farms, strengthening local enterprise, and improving the quality of agri-food products. This does not necessarily mean that the funds could not have been spent more effectively. Nevertheless, Polish agriculture and rural areas would be much worse off without this money.

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[43] EU funds also financed market support, which was not discussed above.

[44] The Ministry of Regional Development says that, thanks to accelerated spending of EU funds, Poland's economy expanded by 1.7 percent in 2009, even though the EU as a whole was hit by the global economic crisis that year. The ministry said EU funds as a whole added from 0.8 to 1.2 percentage points to Poland's GDP growth in 2009, which means the funds were responsible for at least half of the country's GDP growth rate that year, cf. K. Niklewicz, *Ile tej spójności?*, DemosEuropa, Warsaw, March 2012.

Sektorowy Program Operacyjny „Rybołówstwo i przetwórstwo ryb 2004–2006", Załącznik do rozporządzenia Ministra Rolnictwa i Rozwoju Wsi z dnia 11.08.2004 r. (poz. 2027).

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5.5. The Impact of EU Membership on Poland's Energy Market

Grażyna Wojtkowska-Łodej

This chapter tracks the changes that took place in Poland's energy sector during the country's first 10 years in the European Union (EU). We attempt to determine what EU accession has meant for the Polish energy sector and how Poland's energy mix has changed in the first decade of membership: whether there has been a growing convergence between Poland and other EU countries on the energy market and what energy management challenges Poland faces in the near future.

Poland's EU accession and what it meant for the energy sector

After its transition from central planning to a market economy in the early 1990s, Poland embarked on intense cooperation with Western European countries, which eventually resulted in an association agreement and a formal application for membership in the European Union. As a result, political and economic reforms in the country were accompanied by a parallel process of adjustment and preparations for the launch of a free trade zone for manufactured goods, followed by preparations to join the EU as

a full member (Wojtkowska-Łodej, 2012). Efforts to bring Polish regulations in line with the EU's *acquis communautaire* system covered the entire economy, including the energy sector. Under Art. 78 of the Europe Agreement establishing an association between the European Communities and Poland, energy cooperation covered areas such as modernization of infrastructure, improvement and diversification of energy supply, energy policy making, promotion of energy conservation, increased energy efficiency, a greater focus on the impact of manufacturing processes and energy consumption on the environment, a wider opening of the energy market by improving the transmission of electricity and gas, and know-how transfer (Wojtkowska-Łodej, 2002). The agreement also mapped out the rules of cooperation in the nuclear power sector. These were in particular related to adapting Poland's nuclear safety and radiation protection regulations as well as regulations on radioactive waste disposal and storage.

During this period, Poland also joined energy cooperation initiatives inspired and undertaken by the European Community at the regional and international levels. This was reflected by the European Energy Charter, which Poland signed on Dec. 17, 1994. This important energy market agreement sought to provide an international platform for cooperation in the field of fuel and energy, designed to promote competition, foreign investment and the creation of stable conditions for energy sector projects beneficial to participating countries. Poland thus expressed its readiness to make efforts to transform its energy sector along market rules.

In subsequent years, the transformation of Poland's energy sector was based on documents addressed to the Polish government and resulting directly from Poland's formal application for EU membership. These included a White Paper on the Preparation of the Associated Countries of Central and Eastern Europe for Integration into the Internal Market of the Union; a White Paper on the internal market; a White Paper on EU energy policy; an opinion of the European Commission; the so-called Avis report on Poland's ability to join the EU, followed by a decision and the process of EU membership negotiations. These documents were accompanied by financing for the applicant countries, including Poland, as part of pre-accession funds.

In response to these initiatives by the European Community, Poland undertook programming and restructuring activities with regard to its energy sector from 1994 to 2004. These efforts coincided with a package of austere economic measures known as the Balcerowicz program. These included demonopolization, restructuring, privatization, and liberalization, combined with legal and institutional adjustments in the energy sector ahead of EU membership. The adjustments covered market segments such as coal and lignite mining, oil, power generation, gas, and heat.

As a result of these processes, a new energy policy was developed in the 1990s, restructuring programs were drawn up for each market segment, and there was a move away from an enterprise financing model that disregarded business efficiency, accom-

panied by a new government role in sectors traditionally monopolized by the state.[45] The main objectives of the government's energy policy were enshrined in an energy law passed in December 1997. These included creating conditions for sustainable development of the country, ensuring energy security, economical and rational use of fuels and energy, developing consumption, counteracting the negative effects of natural monopolies, and meeting environmental requirements and obligations resulting from international agreements. The new energy law brought Polish regulations in line with EU standards in terms of competition law, state aid to the coal industry, maintenance of crude oil and petroleum product inventories, and licenses for drilling for and extracting hydrocarbons. The energy law also embraced EU regulations on the establishment of an internal market for electricity and gas (Wojtkowska-Łodej, 2002, pp. 173–182). The process of drafting and adapting regulations governing the sector's operations was accompanied by restructuring and ownership and organizational changes in the power and oil industries as well as in coal mining. However, the reforms and adjustments in the energy sector as a whole and in individual market segments varied in terms of dynamics. While restructuring programs were often based on properly formulated objectives and priorities, they failed to ensure financing for individual projects, or some funds were earmarked for dubious purposes such as maintenance of unprofitable mines. In addition, there was often a lack of determination and consistency in carrying out these projects, nor was there public acceptance of them. These processes were particularly difficult to carry out because the coal, energy, gas, and oil industries enjoyed special treatment and privileges in Poland at the time. In the early stage of bringing democratic and market economy rules to the sector, top-down pressure often slowed down the reform process. On the other hand, there was a significant level of awareness among energy sector companies of the need for change, and mushrooming entrepreneurship and economic reforms spurred adjustments in the energy sector (Wojtkowska-Łodej, 1998). The changes made in the Polish energy sector and national legal regulations—with the required level of compliance with Community law in the field of energy— enabled Poland to embark on EU accession negotiations in the late 1990s. The government secured transition periods for further adjustments in the energy sector, in particular in terms of hazardous emissions. As a result, after closing the accession negotiations in other economic areas and after meeting successive formal requirements, Poland eventually got the green light to join the EU in May 2004.

The EU's eastward enlargement, to include countries from the CEE region, was a challenge for Europe; it required a new dimension of cooperation in the energy sector. The enlargement took place at a turbulent time, when oil prices were fluctuating on international markets amid concerns over the supply of energy to member states. The EU was also intensely working at the time to increase the competitiveness of the European economy without harming the environment and to guarantee the security

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[45] Specified in *Poland's Energy Policy Guidelines Until 2010*, drawn up in the mid-1990s, followed by *Poland's Energy Policy Guidelines Until 2020*, drawn up at the end of the 20th century.

of energy supplies in the bloc. Under the circumstances, Brussels' energy management priorities included electricity and gas market liberalization, the security of energy supplies to the internal market, changes in the energy mix taking into account the environmental impact of individual energy sources, and research and development of new energy technology. These objectives coincided with Poland's ambition to transform its energy sector, though some goals such as environmental targets were difficult to meet in the short term because they posed an excessive financial burden. About 50 years after the European Coal and Steel Community (Euratom) treaty was signed, energy management again became an important issue in the process of European integration. Under the new external conditions, this reinforced the need for a common energy policy.[46]

Processes of change in the Polish energy sector. The impact of EU membership

The processes of change in the Polish energy sector after accession have been based on EU programming documents and legal regulations transposed to Polish law and energy policy, while taking into account local conditions. In particular, these documents and regulations have been associated with EU action in the area of energy and climate change designed to reduce the level of greenhouse gas emissions, increase the EU's competitiveness and step up the security of energy supplies as part of the so-called climate and energy package (European Commission, 2007). The EU's energy policy was for the first time specified in detail in Chapter XXI, Art. 194 of the Treaty on the Functioning of the European Union (TFEU). Under this article: "In the context of the establishment and functioning of the internal market and with regard for the need to preserve and improve the environment, Union policy on energy shall aim, in a spirit of solidarity between Member States, to: ensure the functioning of the energy market; ensure security of energy supply in the Union; promote energy efficiency and energy saving and the development of new and renewable forms of energy; and promote the interconnection of energy networks." (European Union, 2010). These objectives are an important part of efforts to enhance the development of the EU economy and increase its competitiveness under the bloc's flagship Europe 2020 program (European Commission, 2010) and a strategy for a transition to a low-carbon economy by 2050 (European Commission, 2011).

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[46] In the mid-1990s, the European Commission released two important documents, the *Green Paper: Towards a European Union Energy Policy*, followed by the *White Paper: Energy Policy of the European Union*, which hand, confirmed the Commission's determination to create an internal market for electricity and, for the first time, detailed specific objectives of common EU action in the area of energy. Activities undertaken at the Community level, with a view to increasing the competitiveness of the EU economy and enhancing the security of energy supply, were accompanied by efforts to meet the third objective related to environmental protection.

All these documents set the direction of the goals within the EU, including green growth and sustainable development priorities, for the next 30 years. Energy and its price as well as the development of innovative energy technologies (including low-carbon technology) are likely to constitute an important factor in the growth of the EU economy and its competitiveness (Binswanger, 2011, p. 199).

Energy plays an important role in the development and competitiveness of the EU economy. In the context of Poland's EU membership and its integration with the European Union, it is worth assessing changes in the demand for energy during Poland's first 10 years in the EU—and looking at changes in the structure of demand and the extent to which this demand is met. Also worth study is the role of the market in shaping energy prices as well as the energy intensity of the economy and trends in the country's dependence on imported energy. Other aspects that bear examination include hazardous emissions and the security of energy supplies, along with assessing whether the trends in the Polish energy sector are consistent with those observed throughout the EU.

The country's economic growth was the key driver of the demand for energy, in terms of fuel and final energy consumption, from 2003 to 2013. Slight fluctuations were recorded in energy use in Poland in the analyzed period, with an increase in consumption from 91.6 million tons of oil equivalents (Mtoe) in 2003 to 95.0 Mtoe in 2012, accompanied by a slight decrease in domestic supply from 80.1 Mtoe to 70.3 Mtoe during 2003–2011 (Table 19). This trend was consistent with changes in the supply of energy sources and growing energy consumption throughout the EU.

On the one hand, this is due to dwindling oil and gas resources, combined with significant coal and lignite deposits, which—because of the significant emissions they generate and the EU's climate and energy policy—are becoming less important in member state energy mixes. On the other hand, GDP growth has boosted the demand for energy. While the trends in energy production and consumption were closely correlated until 1997, since then the supply of domestic energy sources has clearly declined. This has been accompanied by growing demand and consumption. After a short-lived decline in both of these indicators, from 2009 onward both domestic energy production and consumption began to grow again.

The decreased supply of domestic energy was also the result of restructuring combined with the closure of unprofitable mines and industrial plants. Growing demand was in part met with oil and natural gas as well as coal imports. Poland's dependence on primary energy imports increased in the 2003–2010 period. The proportion of imports in energy consumption increased from 13.1% to 31.5%. In the studied period, oil accounted for the largest percentage of imported energy resources (at 55% in 2003 and 49% in 2010), followed by natural gas (23% in 2003 and 19% in 2010). Because of developments in the Polish mining sector and coal extraction costs as well as growing competition on the electricity market, imported coal became more competitive for many businesses and as a result coal imports grew from 1.6 Mtoe in 2003 to 8.2 Mtoe in 2010.

Table 19

Energy in the Polish economy—selected indicators, 2003–2010

Item \ Year	2003	2004	2005	2006	2007	2008	2009	2010
Energy production (Mtoe)	80.1	79.0	78.9	77.9	72.8	71.7	67.9	67.8
Primary energy consumption (Mtoe)[a]	91.6	91.9	93.1	97.9	97.4	99.0	95.3	101.7
Price growth index for electricity, gas and other fuels 1995=100	192.4	197.6	205.8	213.6	220.8	242.2	263.8	275.8
Final energy consumption (Mtoe)	61.5	62.1	63.3	67.1	66.8	69.2	67.0	71.5
CO_2 emissions ($MtCO_2$)	314.7	318.3	319.8	333.6	334.4	329.1	314.4	334.4
CO2 emissions per capita ($kgCO_2$/cal)	7.9	8.2	8.3	8.4	8.8	8.6	8.2	8.8
Energy intensity (toe/M€'05)	409.3	389.6	380.8	377.0	351.4	339.7	321.8	330.5
Energy per capita (kgoe/cap)	2,399.4	2,406.8	2,439.0	2,567.3	2,556.3	2,597.5	2,498.4	2,663.3
Electric power per capita (KWh per capita)	2,649.3	2,741.4	2,762.4	2,912.9	3,004.8	3,086.2	2,954.3	3,102.9
Import intensity index (%)	13.1%	14.6%	17.6%	20.0%	25.6%	30.6%	31.7%	31.5%

Source: Own study based on: *Poland Energy Report*, www.enerdata.net, (accessed Sept. 25, 2013); http://epp.eurostat.ec.europa.eu/postal/page/postal/statistics/search_database (accessed Sept. 20, 2013); Euromonitor International (Passport); accessed Sept. 24, 2013 and Nov. 12, 2013; EC, Energy-Country Factsheets, (2012) V. 1.3, DG ENER-A1, pp. 1–7.

With regard to electricity generation in Poland, there was a small rise in domestic production in the studied period, especially in the initial period after accession and in 2010–2012 (Figure 15).

Coal and lignite are the basic raw materials for the production of electricity in Poland. The steadily growing role of renewable energy sources (RES), including energy resulting from the combustion of biomass, wind power, and hydroelectric power, is the result of Poland implementing the EU development programs, regulations and directives calling for a growing role of RES in member state energy mixes.

Figure 15
Gross electricity generation in Poland in 2003–2012 by fuel (in GWh)
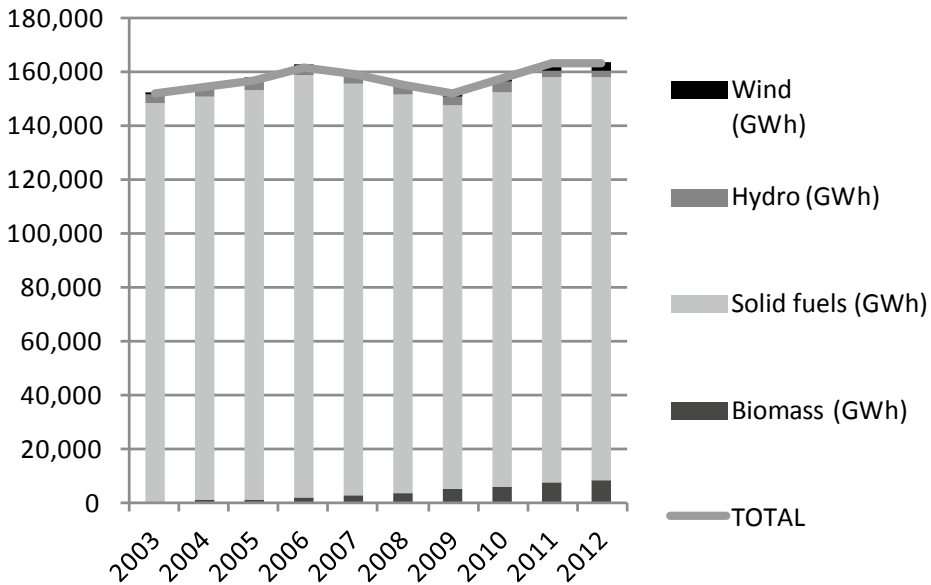
Source: Based on *Euromonitor International* (GMT), accessed Sept. 23, 2013.

The structure of electricity generation in Poland differs considerably from that in the EU27 as a whole. In 2011, electricity production in the EU27 was 27.7% based on nuclear power, while coal accounted for 25%, gas for 22.2%, and renewable energy sources for 20.4%. The role of coal in electricity generation has decreased over the past decade, a trend that has been accompanied by a slightly lower share of nuclear power in favor of a growing share of renewable energy sources (European Commission, p.164).

Electricity production in Poland is 82% based on coal. This is due to the country's considerable coal deposits and extensive coal-based infrastructure, which is the basis for the entire economy. The dominant role of coal in Poland's electricity generation mix contributes to significant pollution.

As a rule, economic growth in developed countries entails increased energy consumption per capita, which is an indicator of a country's economic development. In Poland, energy consumption per capita increased by 11% in 2003–2010, from 2,399.4 kgoe to 2,663.3 kgoe. A similar increase was noted in the consumption of electricity per capita, which rose by 17%, from 2,649.3 kWh per capita in 2003 to 3,102.9 kWh per capita in 2010. Poland's electricity consumption per capita indicator is lower than the EU average. Other member states have higher levels of electricity consumption per capita, reflecting these countries' higher level of development. The average indicator of electric power per capita in the EU dropped by 5% in 2003–2010

but remains about one-third higher than in Poland, while electricity consumption per capita in the EU rose by about 3% in the studied period and is about 50% higher than in Poland (Table 20). This means that energy consumption in Poland has grown faster than the EU average in recent years. These changes have been accompanied by faster real GDP growth in Poland than in the EU as a whole—invariably positive, though with changing growth rates and at 3.8% on average in the 2000–2012 period (*Euromonitor International*, 2013).

The observed changes in energy indicators, supplemented by the changes in GDP growth and energy intensity indicators for Poland (down by 20%) and the EU27 (down by 11%) (Tables 19 and 20), show that positive structural changes have taken place in the Polish economy in this area.

Table 20
Energy in the EU27—selected indicators, 2003–2010

Year Item	2003	2004	2005	2006	2007	2008	2009	2010
Energy production (Mtoe)	934.1	932.4	899.6	880.9	860.4	855.5	819.4	837.2
Primary energy consumption (Mtoe)	1,731.6	1,753.1	1,750.8	1,753.6	1,718.4	1,708.9	1,600.1	1,650.7
Energy intensity (toe/M€'05)	170.2	167.9	164.8	159.6	153.2	151.9	150.2	151.9
Energy per capita (kgoe/cap)	3,690.2	3,716.8	3,707.9	3,695.5	3,644.5	3,610.7	3,405.2	3,506.6
Electricity (KWh per capita)	5,481.2	5,579.1	5,630.0	5,726.8	5,738.7	5,738.9	5,421.9	5,654.9
Electricity (KWh per capita) CO_2 emissions (kgCO_2/ per capita)	9.1	9.2	9.2	9.2	9.1	8.9	8.1	8.3

Source: As in Table 19.

Poland's energy mix shows relatively high emissions of pollutants into the atmosphere. CO2 emissions per capita in Poland in 2010 were 8.8 kg CO2/capita, up from 7.91 kg CO2/capita in 2003 (Table 19). Although this does not differ significantly from the EU average of 8.3 kg CO2/per capita and 9.1 kg CO2/per capita respectively (Table 20), due to the domination of coal in the structure of electricity generation in Poland, a further increase in consumption is bound to lead to increased emissions of harmful substances into the air, unless significant investment is made and expensive projects are carried out. It should also be emphasized that in the long term, i.e. since 1990, there has been a significant decline in emissions by about 1.99 kg CO2/per capita, while emissions in the EU as a whole declined by 1.4 kg CO2/per capita on average from 1990 to 2010.

No significant investment was made in new production facilities in the Polish energy sector in the analyzed period. Due to the advanced age of the installed power units and growing demand for electricity, new projects are planned by 2025, mainly in nuclear power and in coal and gas technology as well as wind power projects on land and at sea.

Of special note is the liberalization of Poland's electricity and gas markets. The transposition of further packages of EU directives and regulations into national law has changed the conditions in which Polish energy companies and consumers function. A number of new market institutions have been introduced, such as the power exchange for the wholesale trade of electricity and, increasingly, gas. Issues related to the functioning of the energy market are a vital research topic today and have been the subject of many interesting analyses and studies (Szablewski, 2012; Motowidlak, 2010).

In the aftermath of the economic crisis and its impact on resource markets, particularly important for Polish companies are new EU regulations on the wholesale trade of energy (Wojtkowska-Łodej *et.al.*, 2013).

The conditions underlying the functioning of enterprises in the Polish energy sector have changed since Poland became a member of the EU. Moreover, a new institutional framework has been created for energy policy, taking into account national conditions compatible with EU solutions. This is reflected by Poland's energy policy objectives until 2030, which include improving energy efficiency; enhancing the security of fuel and energy supply; diversifying the electricity generation structure through the inclusion of nuclear power; increasing the use of renewable energy sources, including biofuels; developing competitive fuel and energy markets; and reducing the environmental impact of the energy sector (Ministry of Economy, 2009).

Challenges ahead

Poland ranks 47th among 93 countries evaluated by the World Energy Council in terms of energy sustainability.[47] In the individual dimensions of the index, Poland ranks 50th for energy security, 38th for energy equity, and 65th for environmental sustainability (WEC, 2012). These broader international comparisons—not only against other EU countries, but also compared with non-EU nations—permit a more objective assessment of Poland's track record so far and suggest what further action is needed, at least in the three evaluated areas.

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[47] The World Energy Council's energy sustainability index ranks countries in terms of their likely ability to provide sustainable energy policies through the three dimensions of the so-called energy trilemma: energy security (i.e. effective management of primary energy supply from domestic and external sources, the reliability of energy infrastructure, and the ability of participating energy companies to meet current and future demand); energy equity, understood as the accessibility and affordability of energy supply across the population; and environmental sustainability, or the achievement of supply- and demand-side efficiencies and the development of energy supply from renewable and other low-carbon sources.

Challenges facing Poland's energy sector are directly related to the country's macroeconomic performance, public finance problems and difficulties encountered by enterprises in obtaining funds for investment. This also applies to funds for modernization in the energy sector, including investment in new generation, transmission and distribution capacity. Another challenge is posed by new EU regulations on climate and energy and changes taking place on energy markets in the EU and beyond, including those related to renewable energy, unconventional sources of oil and gas, and nuclear power. Further challenges include the bloc's growing dependence on energy imports and the need to look for new supply routes at a time of accelerated technological progress and a growing number of new energy producers in Africa and Latin America. All this will have an impact on the costs of energy and the security of its supplies in the EU.

Poland has made some major restructuring efforts in its energy sector in recent years, resulting in tangible structural changes. The country is in the final phase of building an internal market for electricity and gas. The necessary regulations are being introduced via amendments to the energy law as well as through new gas regulations and new legislation on the use of renewable energy sources. This is accompanied by work to develop a new energy policy until 2035 to embrace the new, long-term challenges facing the Polish energy sector and the economy as a whole.

One of the continued fundamental objectives of EU energy policy is to ensure that the energy system contributes to an increased competitiveness of the EU economy through more competitive national and international energy markets. However, the planned and desired development of the economy and the use of energy resources entail environmental costs that threaten to disrupt the desired balance. The ozone layer is being depleted, the air and water are being polluted by hazardous emissions, forests are being degraded by acid rain, and the climate is changing under the influence of greenhouse gases (Binswanger, 2011). The European Union has taken action to protect the environment. Its climate and energy policy is considered to be a driver of demand, job creation and prosperous growth in a low-carbon economy. The desired course of action with a view to protecting the environment, however, should not be an obstacle to a further increase in energy production and should not limit economic growth and the creation of competitive market advantages. The 2009 climate and energy package is a case in point. Considering the significant differences in the energy mixes of individual EU27 countries—accompanied by the different intensity of carbon dioxide emissions and energy consumption, unequal access to renewable energy sources and different social structures—the climate and energy package could have an inhibitory effect on the economic growth, development and competitiveness of some member states, especially those in Central and Eastern Europe, among them Poland. Apart from the different conditions in individual member states, the climate and energy package fails to mention the necessary transmission and distribution infrastructure. Despite the focus on renewable energy sources, EU policy makers have also failed to evaluate the impact of RES support systems on the integration of markets. These systems vary

among countries. Nor did the market offer the necessary incentives for investment in new generation, distribution, transmission, and storage capacity in a system based on a larger role for RES. These problems are reflected in a Green Paper on a 2030 framework for climate and energy policies, which was submitted to interested parties for consultations (World Energy Council, 2013).[48]

However, despite the planned substantial support for climate change and renewable energy policies—in particular as part of the Cohesion Policy, EU research programs, and the Connecting Europe Facility[49] in the future—it seems that as long as renewable energy sources are not competitive in terms of costs, a more sustainable energy system can only be built through the creation of a fully liberalized and integrated energy market capable of effectively allocating capital in modern, environmentally friendly energy technologies. For this reason, while recognizing that the internal energy market is a key tool for stimulating economic growth and employment, and striving to provide affordable and secure energy supplies for businesses and households, the European Commission has vowed to accelerate efforts to create an internal energy market (European Commission, 2012).

In recent years, as a result of electricity and gas market liberalization, there have been price fluctuations on the internal energy market, including even a short-term drop in prices. However, long-term wholesale electricity prices in the EU have increased moderately, and this trend is expected to continue. Meanwhile, developments on international markets and the extraction of hydrocarbons from unconventional deposits may bring about increased price differences in the EU compared with other major industrial economies such as the United States, which makes an increasing use of shale gas. In 2012, the prices of gas for industry in the United States were about one-fourth the prices in Europe. According to the International Energy Agency, electricity prices for industry in OECD countries in Europe increased by 38% on average in real terms from 2005 to 2012, while in the United States they decreased by 4%. In the case of households, prices increased by 21.8% in real terms in European OECD countries in 2005–2012, while in the United States they rose by 8.41% (IEA, 2012). This means that changes in the prices of energy sources, given the currently available, innovative energy technologies, are an important challenge for the European Union and its member states. In the near future energy prices will determine the competitive advantages of individual economies and sectors and will thus influence the structure and further development of the global economy.

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[48] Research shows that most countries favor reducing the package's targets from the current three to one, or possibly two, including a reduction in greenhouse gas emissions and energy efficiency. The development of renewable energy sources tends to be listed as a less preferred target.

[49] Climate targets are expected to claim around 20% of the EU's spending from 2014 to 2020 (following a decision by the European Council at its Feb. 7–8, 2013 meeting focusing on the multiannual financial framework).

Conclusion

The first 10 years of Poland's EU membership is not a long enough period to discern any far-reaching changes in the structure of the Polish energy sector or in the country's energy mix. This is due to factors including the sector's complexity and high market entry costs. However, as a result of legal, institutional and policy adjustments, the structure of energy production has changed, resulting in increased energy efficiency, ever since Poland became an associate member of the EU. Poland's subsequent accession to the EU lent a further impetus to efforts to reduce emissions. It also prompted changes in the functioning of the electricity market, followed by recent significant institutional changes in favor of natural gas.

Energy sector enterprises and other market players operate in a new environment where domestic coal deposits used for electricity production are supplemented by cheaper coal imports, combined with an increased use of renewable energy sources. All this is taking place in a new institutional framework adapted to EU internal market standards. This process is consistent with the overall course of action and measures taken at the EU level.

In the near future, energy prices are bound to be a key factor behind the further development and competitiveness of the Polish economy as well as the EU as a whole. As energy consumption in the Polish economy increases—accompanied by the growing diversity of energy sources, changing resource mobility, and a move away from solid fuels in favor of oil and gas in the 1970s, followed by an increased focus on renewable energy sources today—ways of energy management and the regulatory environment in which the energy sector operates are changing. Today we are dealing with a further move away from coal in the energy mixes of member states in a process known as decarbonization. This is due to factors including the high cost of labor in the mining industry, technological change, liberalization, globalization (high CO_2 emissions and, consequently, the greenhouse effect), and a search for new growth opportunities in the modern economy. The energy sector is an important component of the modern economy, and the price of energy will continue to determine competitiveness in the near future.

Poland plays an active role in EU energy policy making, as reflected by the introduction of the principle of "solidarity" between countries in energy management. As it learns the ropes of membership and finds out about the rules governing the functioning of EU institutions, Poland can be expected to take a constructive position with regard to the challenges ahead. If taken up, these challenges will offer an opportunity to bring innovation into the Polish economy.

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Chapter 6

Poland's Contribution to European Integration

This chapter focuses on the impact that Poland has on the rules governing the functioning of the EU and on EU policies. The analysis covers two sets of issues: the track record of economic achievements during Poland's turn in the rotating presidency of the EU and Poland's role in shaping the European Union's economic cooperation with its eastern neighbors.

6.1. The Track Record of the Polish Presidency of the Council of the European Union (Selected Economic and Financial Issues)

Adam A. Ambroziak

This section of the report aims to examine how Poland's turn at the rotating presidency of the Council of the European Union in the second half of 2011 impacted the ongoing debate on selected economic and financial issues within the European Union. We will look at how the Polish presidency influenced the progress of work on some key EU legislation at different stages of the decision-making process. We will focus on how Poland helped launch and shape negotiations on the EU's Multiannual Financial Framework for the 2014–2020 period and how the Polish presidency contributed to the completion of work to draw up legislation regulating supervision over public finances in member states (the so-called "six pack" of governance measures).

Poland took over the six-month rotating presidency of the Council of the European Union on July 1, 2011 and held it throughout the latter half of the year. It was Poland's the first time at the helm of the EU. The country's main task in this role—as

in the case of all other countries since the Treaty of Lisbon took effect—was to ensure a smooth functioning of the Council and its cooperation with the European Commission and the European Parliament (Ambroziak, 2012). Since the legislative process in EU institutions is time-consuming and often takes far longer than just six months (Ambroziak, 2011), the country holding the rotating presidency of the Council of the European Union is usually expected to focus primarily on managing the Council's work in the right way and on maintaining appropriate relations with other EU institutions and international organizations.

One of the options for those holding the rotating presidency of the Council is to start a pre-scheduled debate on a specific topic as part of the European debate format. Skillfully defining the positions of individual member states, determining the extent to which these positions are relevant to each country, and subsequently identifying potential problems and contentious issues as well as pinpointing advocacy and opposition groups for each proposed solution are key to further action. It needs to be emphasized that the country holding the presidency should not disclose and is not expected to push through its own interests. However, if it defines the problems and identifies those for and against in the right way, it will be able to advance its own position and effectively carry out its plans once its turn at the helm of the EU ends. It seems that is exactly what happened when the talks on the EU's Multiannual Financial Framework for 2014–2020 got under way under the Polish presidency.

A country holding the presidency is also expected to make sure that EU member states and institutions carry on with work on legislation already in the decision-making process. First, the efficiency of the presidency will determine when a piece of legislation is adopted. Member states that are not interested in the new legislation are known to have dramatically slowed down the work of the preparatory bodies of the Council and of the Council itself. Second, the skills of the country holding the presidency, its position in the EU and professionalism will determine the final shape of a piece of legislation. One example under the Polish presidency was the adoption of a set of regulations designed to strengthen supervision over member state public finances (the so-called "six pack").

Negotiations on the EU's Multiannual Financial Framework for 2014–2020

The Multiannual Financial Framework (MFF) for 2014–2020 was one of the priority areas of the Polish presidency. Since the EU's first full financial perspective after the 2004 round of enlargement was ending in 2013, Poland, in an effort to remain a major player in this area, teamed up with Denmark and Cyprus as part of the so-called Presidency Trio program to work together on the Multiannual Financial Framework a year and a half ahead of the planned deadline for regulations implementing the MFF. It was no accident then that the takeover of the Council's presidency by Poland coincided

with the presentation by the Commission of legal regulations related to the Multiannual Financial Framework (COM(2011)500, SEC(2011)867, SEC(2011)868).

The Polish government's draft "Agenda of the Polish Presidency of the Council of the European Union, 1 July 2011–31 December 2011" stated that Poland would seek to hammer out the most favorable option for the EU budget (MSZ, 2011). The document also said that the EU budget should promote investment and significantly contribute to economic growth across the bloc in a time of crisis. Consequently, drawing up the new budget de facto meant defining the shape of the EU for the decade to come. In the process, Poland assumed that the new financial framework, combined with increased cooperation within the EU, was the right answer to the economic crisis and the challenges that European societies would take on in the years ahead. Poland's aim was ensure a thorough debate on the Commission's proposals as well as to identify the positions of all member states and thus pave the way for an agreement at a later stage. This task was all the more important as it determined the positions of individual EU players and offered them an opportunity to determine their tactics in the face of the problems identified.

Negotiation format

The European Commission unveiled its proposals on the Multiannual Financial Framework for 2014–2020 (COM(2011) 398, COM(2011) 500) during a meeting of the General Affairs Council on July 18, 2011 (Doc. No. 13019/11, 2011). On the basis of these documents, on July 28–29, 2011, an Informal Meeting of Ministers for European Affairs was held in Sopot in northern Poland. This format of the talks meant that member state representatives were free to speak their mind; there were no official minutes of the meeting drawn up, and no binding declarations were made. Issues related to the Multiannual Financial Framework for 2014–2020 were primarily dealt with by a Council working group known as the Friends of the Presidency, using the results of the informal meeting in Sopot. This approach should be evaluated very highly in terms of the effectiveness of the goals adopted. Unlike in the case of the 2007–2013 Multiannual Financial Framework negotiations, Poland started work with a debate at the political level to prevent a situation in which the proposal would be rejected by net contributors, as was the case when Ireland was holding the presidency in 2005.

A particularly important achievement of the Polish presidency was that the negotiations revolved around the European Commission's MFF proposals rather than those put forward by individual groups of countries (Dowgielewicz, 2012, p. 18). The course of action in this area was largely based on a report drawn up by Poland (Doc. No. 13127/11, 2011) on the basis of responses to a questionnaire reflecting the Commission's proposal. In this context, it can be considered a success of the Polish presidency that in the end most countries informally agreed that the budget proposal for 2014–2020 presented by the European Commission should be the basis for further

negotiations; only the United Kingdom, Sweden and Hungary opposed. The UK pressed for a freeze on the level of payments from the EU budget. Sweden demanded a reduction in spending on traditional sectors such as agriculture and on the development of poorer regions, in addition to a reallocation of funds in favor of innovation. Hungary's opposition resulted from the fact that the Commission had underestimated that country's GDP growth forecast, which had a negative impact on the amount of funds available for Cohesion Policy in that country.

It should be emphasized that Poland, as the country holding the presidency, could not submit its own proposals, though it was free to formulate and present them at a later date (MSZ, 2012). This is precisely was happened immediately after Denmark took over the presidency. In its official position dated Jan. 2, 2012, Poland stated that the Commission's financial framework proposal was a good basis for further negotiations. Poland also said that it welcomed a move away from the *juste retour* logic and a decision to focus on implementing policies that address the EU's future challenges (MSZ, 2012).

The legal definition of the Multiannual Financial Framework has changed significantly during the last few years. The financial perspective for 2007–2013 was negotiated and adopted on the basis of an inter-institutional agreement from 2006, while the Multiannual Financial Framework for 2014–2020 was for the first time drafted on the basis of Art. 312 of the Treaty on the Functioning of the European Union (TFEU). The treaty states that, in a new arrangement, the Council, acting in line with a special legislative procedure, unanimously approves the regulation laying down the Multiannual Financial Framework after obtaining the consent of the European Parliament. This was the new approach adopted during the Polish presidency with regard to cooperation with other EU institutions, including closer cooperation with the European Parliament. From the procedural point of view, the Parliament is now included in work to formally approve (though not prepare) the Multiannual Financial Framework. During its presidency, in October 2011, Poland organized, together with the Commission as well as the European Parliament, a high-level conference focusing on the Multiannual Financial Framework for 2014–2020. The conference did not discuss the amount and distribution of EU funds, but only selected issues that promised to produce an agreement. These included:
- a clear link between the budget and the Europe 2020 strategy;
- priorities such as the single market, investment in infrastructure and scientific research;
- ways to simplify spending from the EU budget.

The negotiation concept

In its MFF proposal, the Commission proposed a seven-year budget with an overall ceiling for commitments at €1,025 billion, or 1.05% of the EU's gross national income (compared with €993.6 billion and 1.12% of the EU's GNI in 2007–2013), and

payments at €972.2 billion, or 1% of the EU's GNI, marking a 5.1% nominal increase over the 2007–2013 period (when the figures were €942.8 billion and 1.06% respectively) (COM(2011) 500, p. 7). The new budget was seven times the EU's 2013 budget increased by the rate of inflation, with the caveat that spending on Cohesion Policy and the Common Agricultural Policy would not be adjusted for inflation. In addition, the Commission proposed that spending on the European Development Fund (EDF), which was set up under the Convention of Cotonou to benefit African, Caribbean and Pacific (ACP) countries, be excluded from the budget (OJ L 317, 15.12.2000, p. 3, Ambroziak, 2000a, Ambroziak, 2000b). The Commission proposed the same with regard to the International Thermonuclear Experimental Reactor (ITER) project (OJ L 90, 30.3.2007, p. 58); the Global Monitoring for Environment and Security (GMES) system (OJ L 276, 20.10.2010, p. 1); and the European Globalisation Adjustment Fund (OJ L 406, 30.12.2006, p. 1, OJ C 139, 14.06.2006, p. 1). Including these instruments and funds in the budget would mean that it would have to increase by about 0.11 percentage points in relation to the EU's GNI (with commitments at €1,083 billion, or 1.11% of the EU's GNI) (COM (2011) 500).

While assessing the track record of the Polish presidency, it is worth noting two important initiatives by countries opposing a bigger EU budget. First, in December 2010, on the basis of a proposal from the United Kingdom (*The Guardian*, 2010, Reuters, 2010a), five countries that are net contributors to the EU budget (Germany, France, Finland, the Netherlands, and the UK) signed a letter (Letter, 2010) demanding that the size of the budget be maintained and only adjusted for inflation (Euroinside, 2011, Reuters, 2010b). In response, ministers for European affairs from 13 net beneficiary countries (Bulgaria, the Czech Republic, Estonia, Greece, Hungary, Latvia, Lithuania, Portugal, Poland, Romania, Slovakia, Slovenia, and Spain) signed their own letter in May 2011 (EurActive, 2011a, PAP, 2011b) in which they argued that the EU budget should continue to be a major tool for overcoming the economic crisis, increasing the EU's international competitiveness and strengthening its internal cohesion (Mendez C. *et al.*, (2011), p. 16). Poland joined those voicing this view once its presidency ended. It strongly supported a call for excluding the Emergency Aid Reserve and the Solidarity Fund from the EU budget, and it also backed a proposal to exclude ITER and GMES from the limits of the financial perspective (MSZ, 2012, p. 16). In September 2011, still during the Polish presidency, at a meeting of the General Affairs Council, eight countries—Austria, Finland, France, Germany, Italy, the Netherlands, Sweden, and the United Kingdom—signed a declaration opposing the plan to increase the 2014–2020 budget (Gov.uk, 2011, EUBusiness, 2011, PAP, 2011c). The declaration said the financial framework should cover all available instruments to ensure transparency and monitor spending. Otherwise, these countries argued, a reduction in the size of the budget would be illusory in real terms, especially if several funds are excluded from it. Spain, the Czech Republic, and Denmark announced plans to join this group of countries (Węc, 2012, p. 9). Eventually, Spain decided against doing

so, while the Czech Republic delivered on its promise, followed by Denmark once it completed its presidency.

It was unlikely that the detailed budget amounts would be agreed on at the beginning of the MFF negotiations. However, the debates held during the Polish presidency revealed the positions and arguments of both sides. Poland's clear-cut success was that, unlike during most previous negotiations, it managed to focus the talks on policy priorities and EU activities in the 2014–2020 period, instead of the actual size of expenditure.

Selected solutions

Poland's six months at the helm of the EU was too brief a period to get all the talks going, agree on all positions, work out all compromise solutions, and secure political acceptance for these. However, it is worth noting several selected issues that took their preliminary shape during the Polish presidency and were subsequently fine-tuned in February, November and December 2013 by the European Council, the European Parliament and the Council respectively, on the basis of the original, preliminary agreements.

In terms of the Multiannual Financial Framework, the Commission proposed a seven-year period to better articulate the objectives set in the Europe 2020 strategy. All EU member states approved this idea at a General Affairs Council meeting under the Polish presidency in September 2011 (Doc. No. 13587/11, 2011). This was in line with Poland's interests. Once its presidency ended, Poland clearly opted for a seven-year MFF. At the same time, it motioned for putting off the proposed review of the budget beyond 2016 (MSZ, 2012a, p. 14).

Another issue discussed during the Polish presidency was the structure of the MFF. The Commission proposed that the existing subheadings 1a—"Competitiveness for growth and employment"—and 1b—"Cohesion for growth and employment"—be combined into a single heading 1—"Smart and inclusive growth." During the discussion, several member states that are the largest beneficiaries of the Cohesion Policy supported maintaining separate spending on economic, social and territorial cohesion, because the Commission's proposal was seen as a threat to reducing funds available under this policy (Doc. No. 17448/1/11, 2011). Moreover, after Denmark took over the presidency, Poland opposed the plan to merge the existing subheadings 1a and 1b into a single heading, arguing that the unique nature of Cohesion Policy, based on a full reallocation of funds between the cohesion countries, justifies the continued need for a separate subheading (MSZ, 2012a, p. 14). This approach was reflected in the final decisions on the MFF.

With the Polish presidency still in progress, a debate began on the so-called macro-fiscal conditionality, or support for efforts to maintain fiscal discipline and promote more efficient and result-oriented spending of EU funds at both the EU level and in individual member states. These proposals were challenged during meetings organized

under the Polish presidency because they failed to take into account the principles of subsidiarity, fair treatment of all countries, and the effectiveness of Cohesion Policy. Many member states said that meeting the macro-fiscal conditions could lead to an economically unwarranted pro-cyclical effect as well as the imposition of double sanctions (in addition to those resulting from the "six pack"), and penalties on beneficiaries (17448/1/11 REV 1, p. 5). From Poland's perspective, *ax-ante* conditionality guarantees successful support for Cohesion Policy at the beginning of a programming period. As a result, Poland accepted the Commission's proposal that failure to fulfill requirements related to various preliminary conditions should lead to the suspension of some or all indirect payments under a given operational program (MSZ, 2012a, p. 8). Finally, in line with what Poland suggested—originally as the country holding the presidency and then as an ordinary member of the EU—it was agreed that failure to respect the stability of public finances could lead to the suspension of commitments, and subsequently payments, as part of the MFF.

Public finance supervision

Although it took an active part in work on legislation on public finance supervision, Poland was surprised when it turned out that negotiations on regulations related to the 1997 Stability and Growth Pact (SGP) (OJ C, 2.08.1997, p. 1) had to continue even though these regulations had not been cleared between EU institutions and member states. The SGP was ushered in by means of two Regulations: No. 1466/1997 of July 7, 1997 on the strengthening of the supervision of budgetary positions and on the supervision and coordination of economic policies (OJ L 209, 2.08.1997, p. 1)—setting the rules for the content, method of transmission, examination and monitoring of stability and convergence programs; and No. 1467/1997 on speeding up and clarifying the excessive deficit procedure (OJ L 209, 2.08.1997, p. 6)— defining procedures launched by the Commission in connection with an excessive deficit and sanctions imposed by the Council in the form of a non-interest-bearing deposit or penalty.

The first serious test for the SGP was in 2001–2003, when as a result of the crisis and the loosening of fiscal policy, an excessive deficit procedure was launched against Germany (OJ L 34, 11.2.2003, p. 16, OJ L 183, 13.7.2007, p. 23) and France (OJ L 165, 3.07.2003, p. 29, OJ L 68, 8.03.2007, p. 3). In both cases, the Commission found the activities of these countries to be either inappropriate or ineffective, and recommended that the Council go public with its recommendations and call on both countries to take action to reduce the deficit within a specified period. However, the Council (Doc. No. 14492/1/03 REV 1, 2003), instead of adopting the appropriate decisions

required under law,[1] adopted proposals[2] for each of these countries, on the basis of which the excessive deficit procedure was suspended.[3] In subsequent years, instead of taking advantage of the Commission's suggestions for strengthening the impact of the SGP (COM(2002) 668, COM(2004) 581), the regulations were changed (OJ L 174, 7.07.2005, p. 1, OJ L 174, 7.07.2005, p. 5), in line with the recommendations of the European Council of March 2005 (Doc. No. 7619/1/05 REV 1, 2005). All the requirements were relaxed. When checking for the existence of an excessive deficit, the Commission and the Council were obligated to not only look at the annual fall in a country's real GDP (by at least 2%), but also take into account various other frequently immeasurable factors, such as a severe deterioration in economic trends and the extent to which Lisbon Strategy policies have been implemented—in addition to any other developments that, according to the member state involved, are relevant to the correct assessment of the extent to which the reference value has been overstepped. The de facto introduction of these solutions meant dismantling the SGP and accepting unsustainable public finances. Three years later, it turned out that the EU did not have the legal and institutional arrangements needed to prevent a debt crisis.

The "six pack"

In the aftermath of the economic crisis, the Commission presented two Communications, in May (COM(2010) 250) and in June 2010 (COM(2010) 367), to highlight the need to strengthen economic policy coordination. When it turned out that the euro area was in dire straits economically, in June 2010 (EUCO 13/10), the European Council, acting on the basis of the Commission's recommendations, decided that the existing regulations on budgetary discipline should be fully implemented. It also decided to strengthen the preventive and corrective arms of the SGP and recommended that budgetary supervision take into account the debt levels and the overall level of public finance sustainability. In response, the Commission, on Sept. 29, 2010, submitted a set of policies: five regulations and one directive (the so-called "six pack") representing the new architecture of budgetary surveillance in the euro area (see Table 1).

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[1] Belgium, Denmark, Greece, Spain, the Netherlands, Austria, Finland, and Sweden voted for making those decisions public (37 of 87 votes, with the required majority at 58), while Belgium, Greece, Spain, the Netherlands, Austria, and Finland voted in favor of adopting decisions concerning certain measures within the prescribed period (30 of 87 votes, with the required majority at 58).

[2] Motions adopted with the votes of Belgium, Greece, Ireland, Italy, Luxembourg, Portugal, and alternately Germany and France—40 of 77 votes with the required majority at 49.

[3] This decision was declared void by the Court of Justice, Judgment of the Court (Full Court) of July 13, 2004, Case C-27/04.

Table 1

The package of legislation designed to strengthen public finance supervision in EU member states (known as the "six pack")

> - Regulation (EU) No. 1175/2011of the European Parliament and of the Council of 16 November 2011 amending Council Regulation (EC) No. 1466/97 on the strengthening of the surveillance of budgetary positions and the surveillance and coordination of economic policies (OJ L 306, 23.11.2011, p. 12);
> - Council Regulation (EU) No. 1177/2011 of 8 November 2011 amending Regulation (EC) No. 1467/97 on speeding up and clarifying the excessive deficit procedure (OJ L 306, 23.11.2011, p. 33);
> - Regulation (EU) No. 1173 /2011 of the European Parliament and of the Council of 16 November 2011 on the effective enforcement of budgetary surveillance in the euro area (OJ L 306, 23.11.2011, p. 1);
> - Regulation (EU) No. 1176/ 2011 of the European Parliament and of the Council of 16 November 2011 on the prevention of macroeconomic imbalances and their correction (OJ L 306, 23.11.2011, p. 25);
> - Regulation (EU) No. 1174/2011 of the European Parliament and of the Council of 16 November 2011 on enforcement measures to correct excessive macroeconomic imbalances in the euro area (OJ L 306, 23.11.2011, p. 8);
> - Council Directive 2011/85/EU of 8 November 2011 on requirements for budgetary frameworks of the Member States (OJ L 306, 23.11.2011, p. 41).

Work on the package was carried out under enormous political pressure. This included consultations with a special task force on economic governance headed by the President of the European Council, Herman Van Rompuy. In February 2011, the European Council (EUCO 2/11 REV 1) called on the EU Council to reach a general approach on the "six pack" within a month so that a final agreement could be reached with the European Parliament by the end of June. The Council, in accordance with the approved schedule, in February 2013 (Doc. No. 6514/11, 2011) discussed issues related to the "six pack" so that such a general position could be definitively adopted by March 2011 (Doc. No. 7960/11, (2011), eu2011.hu, 2011a).

In the European Parliament, the "six-pack" proposal was reviewed by the Committee on Economic and Monetary Affairs with the support of the Committee on Budgets and the Committee on Employment and Social Affairs. After three consecutive debates, in April 2011, the Committee on Economic and Monetary Affairs adopted a set of Parliament positions (A7-0178/2011, A7-0179/2011, A7-0180/2011, A7-0182/2011, A7-0183/2011, A7-0184/2011). As these were contrary to the documents approved by the Council of the European Union in March 2011, at a meeting of the Economic and Financial Affairs Council in May 2011 (Doc. No. 10191/11, 2011), Hungary, which was holding the rotating presidency of the Council of the European Union at the time, called on all the parties involved to maintain a constructive approach and show enough flexibility to reach an agreement in June 2011. It then turned out that the main problems in the talks with the European Parliament were reinforced financial sanctions, an expanded use of reverse qualified majority voting, the procedure for adopting a scoreboard of indicators on macroeconomic imbalances, inter-institutional dialogue, medium-term solutions for crisis management, and codification of the European Semester (Eu2011.hu, 2011b). However, the document previously approved as part of the so-called trilogue meetings (informal tripartite meetings attended by representatives from the European Parliament, the Council and the Commission)

was revised at a meeting of the European Parliament's Committee on Economic and Monetary Affairs. In response to the amendments made by the parliamentary committee, the Hungarian presidency resubmitted the "six-pack" proposal to the Council on June 20, 2011 (Doc. No. 10595/11, 2011). The draft took into account selected demands from the Parliament and member states, resulting in a unanimous agreement on the updated general approach. The Council made concessions on several counts: the European Parliament was included in the European Semester formula; economic dialogue between EU institutions was institutionalized; the Parliament was included in the process of approving the scoreboard of macroeconomic imbalance indicators; the independence of statistical authorities was strengthened; penalties were introduced for member states falsifying data; the use of reverse qualified voting majority was extended; tougher sanctions were imposed on countries failing to comply with the excessive deficit procedure, and the Commission was authorized to regularly review legislation in this area. It seems that the main problem still to be solved was to extend the reversed qualified majority voting system to include matters covered by the preventive arm of the SGP (Eu2011.hu, 2011c).

However, in the end, at a plenary session of the European Parliament on June 23, 2011, the draft modified by the parliamentary committee was submitted, instead of the version revised by the Council (Eu2011.hu, 2011d). This meant that, in order for the legislation to be passed in the first reading procedure, the Council would have to approve all of the Parliament's amendments, while withdrawing its own objections. Consequently, after a statement made by the Hungarian presidency, the chairwoman of the committee[4] motioned for the postponement of the vote under Rule 57 clause 2 of the European Parliament Rules of Procedure. The article states that, if the Commission announces that it does not intend to adopt all of the Parliament's amendments, a committee rapporteur may address the President of the Parliament to suspend the debate. And this is exactly what happened, because if the Parliament had adopted its position, and if the Commission had taken a negative stance on at least one amendment, then the Council would have had to vote unanimously. Faced with uncertainty over the positions of some countries, the Parliament decided to make changes as suggested by the committee involved, yet it refrained from voting on the legislative resolution in order to be able to carry out further consultations—this time under the Polish presidency.

The outcome of efforts related to the "six pack" under the Polish presidency

As already mentioned, the problem of the "six pack" became a previously unplanned priority for the Polish presidency. In the Agenda of the Polish Presidency of the Council

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[4] CRE 23/06/2011 – 12.13.

of the European Union (MSZ, 2011), the Polish government had declared that during its turn at the helm of the EU, Poland would work to make sure that the Economic and Financial Affairs Council mandates consistent application of the Stability and Growth Pact, assuming the "six pack" is approved earlier under the Hungarian presidency. In early July 2011, it turned out that several issues remained to be resolved and agreed upon. These included:

- more effective and predictable quasi-automatic sanctions in the preventive part of the SGP with regard to countries whose deficits and debt are approaching certain ceilings;
- acceptance, in principle, by the Council of Commission recommendations under the preventive and corrective procedure of the pact (the issue of reverse qualified majority voting);
- making sure that member state assessment under the macroeconomic imbalance procedure covers these countries' current-account balances.

Taking advantage of the presidency transfer period, parliamentarians began to make additional demands with regard to the Council. They wanted to be able to summon to the European Parliament finance ministers from countries covered by the excessive deficit procedure. In the face of these problematic issues, Poland launched talks with the European Parliament as well as talks as part of the Council under its presidency. It is worth noting that, at the beginning of July 2011, many expected that the "six pack" would be the toughest challenge for both the Council and the Parliament. Experts quoted radical parliamentarians as saying that it was better not to have these regulations at all, than to have them without the "automaticity of sanctions" (EurActiv, 2011b). This reflected the strong position of those who supported restrictive regulations. Despite the many implications of the eurozone debt crisis, they were in favor of adopting such regulations—without rushing, even if this meant that the regulations would be adopted at a later date. No political deadlines were mentioned at the time. From a legal point of view, in the first reading procedure, there are no restrictions on when the European Parliament and the Council should adopt their positions. As a consequence, it was not at all certain when the "six-pack" regulations would be approved—if at all.

To break the deadlock, the Polish government decided to launch a discussion at an informal meeting of the Economic and Financial Affairs Council in the southwestern Polish city of Wrocław on Sept. 16, 2011. Such a form of the meeting meant there was no need to ensure transparency for the debate on draft legislation, while providing an opportunity for an open exchange of views and the possibility of seeking a solution satisfactory to all member states. It should also be noted that the atmosphere of the meeting was influenced by the presence of U.S. Treasury Secretary Timothy Geithner, an advocate of an expansionary fiscal policy who was invited by Poland as the country holding the presidency of the Council of the European Union. Geithner's views met with ostracism from EU finance ministers, making those gathered aware of

the urgency of adopting a set of regulations to strengthen public finance supervision across the EU.

As regards the automatism of the Commission's decisions on sanctions, it is worth noting that, in the original versions of the draft legislation, the Commission proposed a new "reverse voting" procedure whereby decisions on sanctions would be binding on a member state unless the Council rejected these by a qualified majority of votes. In this case, the main goal was to reduce discretion in the process of enforcing sanctions and to limit the number of decisions made for purely political—rather than economic—reasons. The lack of quasi-automaticity in imposing sanctions could lead to a situation in which sanctions would still be arbitrary in nature: large and influential member states would be able to push through their position despite the economic opinion of the Commission. The European Parliament even proposed that this procedure be expanded to cover decisions on non-interest-bearing deposits (in addition to decisions on interest-bearing deposits and fines) as part of the enforcement of budgetary surveillance in the euro area. The Parliament also proposed that the procedure be used with regard to member states failing to comply with Commission recommendations related to corrective action following a disruption of their macroeconomic balance. In turn, the Council sought to bring about a situation in which, before such decisions were to become valid, the Council would be able to adopt them by a qualified majority of votes, which meant that a blocking minority would be enough to reject these decisions. This, however, created the risk that, as in the case of France and Germany, politicians and finance ministers would refrain from making decisions inconvenient to them. In the course of work on the "six pack," France led a group of countries arguing that politicians (which essentially means governments) should have more say than experts (meaning the European Commission) when assessing an economic outlook. Finally, thanks to the involvement of the Polish government, the Council fully approved the reverse qualified majority model.

In the corrective part of the SGP, compromise amendments were introduced as an initiative by the Polish government. On the one hand, the European Parliament called for the introduction to Regulation (EC) No. 1466 /97—on the strengthening of the surveillance of budgetary positions and the surveillance and coordination of economic policies (OJ L 306, 23.11.2011, p. 12)—of quasi-automaticity of sanctions imposed by the Commission on member states failing to take effective action to improve their structural balance (the Council needs the so-called reversed qualified majority to reject a Commission proposal).[5] This solution was designed to ensure that countries follow prudent budgetary policies when the economy is booming in order

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[5] Art. 6 clause 2—European Parliament amendments adopted on June 23, 2011 to the proposal for a regulation of the European Parliament and of the Council amending Regulation (EC) No. 1466/97 on the strengthening of the surveillance of budgetary positions and the surveillance and coordination of economic policies (COM(2010)0526 – C7-0300/2010 – 2010/0280(COD)) (1), OJ C 390, 18.12.2012, p. E/121.

to have a sufficient budget surplus for a time of downturn. On the other hand, some member states (chiefly France) pressed for moving away from any sanctions at this stage, leaving EU institutions only with the power to send out recommendations. These countries argued that the concept of preventive sanctions was a case of excessive and revolutionary interference in the sovereignty of eurozone countries. Finally, thanks to Poland's efforts under the Polish presidency, a compromise solution was worked out, based on the introduction of sanctions (as proposed by the Parliament), yet these sanctions could be relatively easily rejected by the Council by a simple majority of votes (in line with the French proposal).

Another contentious issue was whether to include European institutions in the debate on member state public finances in the form of the so-called economic dialogue. The European Parliament demanded greater transparency in the decision-making process by enabling parliamentary committees to invite the President of the Council, President of the Commission, and, if necessary, also the President of the European Council or the President of the Eurogroup, to join the debate on the Council's decision. However, the Council argued that these officials should be allowed to make such appearances on a voluntary basis, because taking part in such a hearing before the Parliament would mean an additional burden on the finance ministers and, more importantly, require full disclosure of future decisions on a given country's public finances. Finally, in the course of work during the Polish presidency, the list of officials that a parliamentary committee may call on in connection with a Council decision or recommendation for a member state was supplemented to include the President of the European Council (in addition to the President of the Commission, President of the Council, and the President of the Eurogroup). Moreover, a (not very restrictive) requirement was added to the Regulation that the Council is in principle expected to comply with Commission recommendations and conclusions or otherwise explain its position to the public. This was designed to ensure greater freedom for finance ministers.

A separate issue was the scope of annual reporting under the macroeconomic imbalance warning mechanism. The Commission's original proposal focused on the issue of a rising public finance deficit, but—under pressure from the center-left in the European Parliament—the scope of these annual reports was expanded to include analysis of the situation in member states in terms of the current-account balance. The Commission sought the power to investigate the causes of the detected imbalances in the context of persistent deep mutual commercial and financial ties between member states and the external effects of economic policies pursued by individual countries. The plan was opposed by Germany and the Netherlands, which, in connection with their surpluses, could be officially seen within the EU as the countries responsible for the macroeconomic imbalances of other countries—especially as France argued from the very beginning of the crisis that stimulating internal demand in Germany through an increase in wages would contribute to recovery across the euro area (Gazeta.pl,

2011). Finally, as a result of Poland's efforts during the Polish presidency, both these countries withdrew their objections in the matter.

Completion of work on the "six pack" under the Polish presidency

The Economic and Financial Affairs Council approved solutions to all these problems on Sept. 19, 2011 (Europa.eu, 2011a). The next day, Sept. 20, 2011, the Polish presidency preliminarily cleared the wording of all pieces of legislation with the European Parliament during trilateral meetings. This enabled the Parliament to approve the wording of the five pieces of legislation in question along with legislative resolutions on Sept. 28, 2011. This meant that the Council, led by Poland, let the European Parliament have its way and eventually approved the versions of the legislation as adopted by the Parliament in June 2011, without any changes.

Moreover, compared with the situation on June 23, 2011, the Parliament adopted one revised position (after clearing its content with the Council) on an amendment to the Council Regulation on speeding up and clarifying the excessive deficit procedure (P7_TC1-CNS(2010)0276). The main change concerned the aforementioned expansion of the list of officials that parliamentary committees may summon in connection with a Council decision on an excessive deficit procedure with regard to a member state—to include the President of the European Council. Moreover, a stipulation was removed from the preamble to the effect that "the Commission should play a stronger role in the enhanced surveillance procedure as regards assessments that are specific to each Member State, monitoring, on-site missions, recommendations and warnings." These changes show that member states seek to weaken the Commission's position in the process. Finally, on Oct. 4, 2011, the Economic and Financial Affairs Council (Doc. No. 14890/11, 2011) at its formal meeting held after the debate (Europa.eu, 2011b), worked out a political agreement on the "six pack" (Doc. No. 14998/11, 2011), which it formally approved on Nov. 8, 2011 (Doc. No. 16443/11, 2011, Doc. No. 16446/11, 2011). The agreements between the European Parliament and the Council were formally confirmed on Nov. 16, 2011.

Conclusion

Based on the above discussion, it is possible to assess selected aspects of the Polish presidency of the Council of the European Union in the second half of 2011. Poland's turn at the helm of the EU marked the start of talks on Multiannual Financial Framework for 2014–2020. These talks eventually ended in success for Poland and the EU as a whole, in part because they began on a positive note under the Polish presidency.

In mid-November 2011, the General Affairs Council decided (Doc. No. 16836/11, 2011) that, following up on the discussions held during the Polish presidency, the main stage of the negotiations would get under way under the Danish presidency in January 2012. One of the clear successes of the Polish presidency was that it helped

identify the problems as well as the positions of individual member states—thus setting the stage for further work under the Danish presidency. It should also be noted that work done in the second half of 2011 was positively evaluated by the European Council (an institution separate from the Council of the European Union, which was presided over by Poland), who appealed to the country next in line for the rotating presidency of the Council of the European Union to speed up work and ensure that the Multiannual Financial Framework is approved by the end of 2012. It seems that Poland's main objective—to prepare all the partners for a scenario most suitable for Poland—was finally achieved (Dowgielewicz, 2012, p. 18).

From an operational standpoint, and from the perspective of negotiating the final version of the MFF, Poland sought an optimal solution based on getting the negotiations under way. First, during the preliminary analysis of the new legislation ushering in the Multiannual Financial Framework for 2014–2020, Poland made sure that the debate focused on the overall scope of support, while leaving out financial details and detailed amounts allocated for individual measures. As a result, it was possible to effectively and efficiently carry on with the negotiations during the next presidencies, without the imprint of the country managing the decision-making process.

Another success of the Polish presidency was that it managed to bring about the conclusion of negotiations on the so-called six pack, a set of legislative measures designed to reform the Stability and Growth Pact and introduce greater macroeconomic supervision. Although this issue was not listed among the priorities for action in the latter half of 2011, it was treated as one of the most important tasks of the Polish presidency. Poland could not prepare for this problem in any special way beforehand because it learned that the European Parliament had refused to accept a compromise Hungarian proposal the week preceding July 1, 2011. Political circumstances also played a role. First, the "six pack" refers for the most part to eurozone members, while Poland is not part of the euro area. Consequently, even though it presided over the Economic and Financial Affairs Council, Poland did not participate in the meetings of the Euro+ group. Second, the issue in question had been widely debated by experts and journalists, which further limited the room for maneuver during informal talks at a meeting of the Economic and Financial Affairs Council. As a result, in what proved to be an excellent solution, the main debate was held at an informal meeting of the Council in the southwestern Polish city of Wrocław, where a compromise was finally reached.

The agreement sent out a strong signal for investors and financial markets. It clearly showed that the EU and its institutions were capable of working together, and that Europe was able and determined to respond to emerging challenges. It also seems that Financial Programming and Budget Commissioner Janusz Lewandowski was right to say that the adoption of the package would be a "fuse" preventing the EU from being divided and becoming a Europe of "two speeds"—the euro area and the remaining member states. This is especially important as a meeting of German and French leaders in Paris in August 2011 ended with a proposal to establish a common economic

government for the eurozone, headed by the President of the European Council, Herman Van Rompuy. Poland, which is not a member of the eurozone, has consistently opposed ideas to divide the EU into the eurozone and the remainder.

To sum up, Poland fulfilled its role as an efficient presidency of the EU Council. The Polish government launched and efficiently handled the discussion on the EU's Multiannual Financial Framework for 2014–2020; it managed to focus the debates in such a way that it eventually achieved most of its original goals and objectives in the last round of the talks. In another success, Poland resolved the conflict between European institutions and differences of opinion within the Council itself over the "six pack" issue. It can therefore be said that Poland has established itself as a fully valuable European partner, which should help strengthen its position in the European Union. Of course, it is possible to question how the Polish presidency directly contributed to the country's own economic and social development or how some specific problems were handled. However, it needs to be remembered that a country holding the rotating presidency of the EU Council is responsible for the overall course of affairs in the EU, while essentially being unable to pursue its own particular interests.

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6.2. Poland's Role in Shaping the Eastern Dimension of the European Union's Economic Cooperation as Part of the Eastern Partnership Initiative

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Since it joined the European Union on May 1, 2004, Poland has actively lobbied for strengthening the so-called Eastern dimension of the European Neighborhood Policy. In this report, the Eastern dimension of economic cooperation should be understood as the EU's economic relations with the Eastern Partnership countries. These are Belarus, Ukraine, Moldova, Armenia, Azerbaijan, and Georgia.

However, Russia also plays a major role in the context of the EU's economic cooperation with its eastern neighbors. Without a doubt, Russia is the EU's most important partner in the region, even though it has consistently refused to join the Eastern Partnership.

This section of the report aims to outline Poland's role in shaping the eastern dimension of the European Union's economic cooperation as part of the Eastern Partnership initiative originated by Poland, together with Sweden. Another goal is to evaluate this initiative from the perspective of economic cooperation. It can be argued that from the very beginning of its membership in the EU, and even prior to accession, Poland sought to find in its relations with EU institutions a platform of cooperation (including economic cooperation) with the countries beyond its eastern border. This became one of the priorities of Poland's foreign policy.

General characteristics of the European Union's economic cooperation with its eastern neighbors[6]

Formally and legally, the European Union's cooperation with its eastern neighbors (Russia and the Eastern Partnership countries) is based on the Partnership and Cooperation Agreements (PCA) that the EU has signed with most members of the Commonwealth of Independent States (CIS).

The main objective of the PCAs is to strengthen democracy and economic development in the Commonwealth of Independent States by reinforcing these countries' cooperation with EU member states. In particular, this cooperation is designed to:
- intensify political dialogue.
- strengthen civil liberties and democracy in the CIS.

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[6] Based on: K. Falkowski, *Dyferencjacja współpracy krajów WNP z Unią Europejską*, in: *Unia Europejska.pl*, No. 2 (219), March/April 2013, pp. 28–34.

- assist in the transition of CIS countries toward a market economy model.
- support the development of mutual trade and investment.[7]

Ukraine was the first CIS country to sign a partnership and cooperation agreement with the European Union, but the agreement between Russia and the EU was the first to take effect (see Table 2).

Table 2

The European Union's Partnership and Cooperation Agreements (PCAs) with Eastern Partnership countries and Russia

Country	Agreement signed on	In effect since
Armenia	22.04.1996	01.07.1999
Azerbaijan	22.04.1996	01.07.1999
Belarus	06.03.1995	not ratified by the EU, suspended in September 1997
Georgia	22.04.1996	01.07.1999
Moldova	28.11.1994	01.07.1998
Russia	24.06.1994	01.12.1997
Ukraine	14.06.1994	01.03.1998

Source: Zięba (2007, p. 158); *Partnership and Cooperation Agreements (PCAs): Russia, Eastern Europe, the Southern Caucasus and Central Asia*, http://europa.eu/legislation_summaries/external_relations/relations_with_third_countries/eastern_europe_and_central_asia/r17002_en.htm (22.02.2013).

When it comes to the formal and legal foundations of the European Union's cooperation with Eastern Partnership countries and Russia, it is worth noting that the bloc's partnership and cooperation agreement with Belarus has yet to take effect. It was suspended in September 1997; the EU did not ratify it in response to the authoritarian policies of President Alexander Lukashenko. Belarus, for its part, has ratified the agreement.

The EU's agreement with Russia should have formally expired in 2007. The agreement came into force in 1997 (it did not take effect earlier due to the EU's opposition to a Russian military operation in Chechnya in 1994–1996) and was to be valid for 10 years. However, it is still valid to this day because of fine print providing for the possibility of renewing it every year for a period of one year by mutual agreement. The partners have yet to agree on a new bilateral agreement.[8]

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[7] *Partnership and Cooperation Agreements (PCAs): Russia, Eastern Europe, the Southern Caucasus and Central Asia*: http://europa.eu/legislation_summaries/external_relations/relations_with_third_countries/eastern_europe_and_central_asia/r17002_en.htm (22.02.2013).

[8] In this case, coming to an agreement is increasingly difficult because Russia is seeking to eliminate from the new agreement—or at least weaken—a conditionality clause under which a country's participation in the EU market is commensurate with the progress it has made in adapting to Western European political and economic standards. Russia is also against the principle of equivalence whereby companies from non-EU countries active on the EU market are subject to EU rules. The EU has refused to accept

In any case, for all of these countries, including Russia, the European Union is a far more important partner for trade and investment cooperation than Russia and the Eastern Partnership are for the EU.

This analysis of the EU's economic, trade and investment cooperation with Eastern Partnership countries and Russia covers the 2008–2012 period. It starts in 2008 when Poland and Sweden came up with the idea of establishing a new platform of cooperation with the EU's eastern neighbors as part of the so-called Eastern Partnership. The cut-off date is 2012 because more recent statistics were unavailable. The analysis covers the EU27, which means all EU members except Croatia, which joined on July 1, 2013.

Russia is by far—and in every respect—the most important partner for the EU in the east. This is reflected in the volume of trade for both EU imports and exports. In 2012, the EU's imports from Russia totaled €213.1 billion, while exports were €123.3 billion. Ukraine is the second-largest trade partner for the EU27 among the studied countries. The EU's 2012 imports from Ukraine totaled €14.6 billion, while exports totaled €23.8 billion. Azerbaijan has been the EU27's third-largest partner in imports for several years, while Belarus is the third-largest partner in exports. Trade with Armenia, Georgia and Moldova is marginal due to several factors, including the small size of these countries.

Despite the crisis in Europe and the global economic meltdown that began in 2008, the value of the EU's bilateral trade with all the Eastern Partnership countries plus Russia has increased every year since 2009.

Table 3

The value of EU27 imports from Eastern Partnership countries and Russia in 2008–2012 (billions of euros)

	2008	2009	2010	2011	2012
Armenia	0.3	0.2	0.3	0.3	0.3
Azerbaijan	10.7	7.4	9.7	14.9	13.9
Belarus	4.7	2.6	2.6	4.3	4.5
Georgia	0.7	0.5	0.6	0.6	0.6
Moldova	0.7	0.5	0.6	0.8	0.9
Russia	178.3	118.1	160.7	199.9	213.1
Ukraine	14.6	7.9	11.5	15.1	14.6

Source: Own calculations based on Eurostat data.

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these suggestions. Moreover, Russia is insisting that all political and economic issues be put in separate sector agreements, with the main agreement limited to a brief declaration on the strategic objectives of cooperation with the European Union. See: B. Cichocki, *Perspektywy stosunków Unia Europejska–Rosja po szczycie w Chanty-Mansyjsku*, PISM, Biuletyn No. 28(496), Warszawa 2008, p. 1. More on this topic can also be found in: M. Kaczmarski, *Rosja – Unia Europejska: problemy współpracy a nowe porozumienie*, "Wspólnoty Europejskie" 2011, No. 5.

Table 4

The value of EU27 exports to Eastern Partnership countries and Russia in 2008–2012 (billions of euros)

	2008	2009	2010	2011	2012
Armenia	0.7	0.5	0.6	0.6	0.7
Azerbaijan	2.1	1.6	2.3	2.9	2.9
Belarus	6.4	5	6.6	7.2	7.8
Georgia	1.3	0.9	1.2	1.6	2.1
Moldova	1.7	1.3	1.6	1.9	2
Russia	104.8	65.6	86.1	108.4	123.3
Ukraine	25.1	14	17.4	21.3	23.8

Source: Own calculations based on Eurostat data.

The trade imbalance is clearly reflected by foreign trade statistics. The role of Eastern Partnership countries in the EU's foreign trade is marginal (see Table 5), with the exception of Russia (in exports and imports) and Ukraine (in exports). The EU's role in these countries' foreign trade is very strong though it varies considerably with each country (see Table 6).

Table 5

The role of Eastern Partnership countries and Russia in the EU27's foreign trade in 2008–2012 (% share)

	2008	2009	2010	2011	2012
	A country's share in total EU27 imports				
Armenia	0.0	0.0	0.0	0.0	0.0
Azerbaijan	0.7	0.6	0.6	0.9	0.8
Belarus	0.3	0.2	0.2	0.2	0.3
Georgia	0.0	0.0	0.0	0.0	0.0
Moldova	0.0	0.0	0.0	0.0	0.1
Russia	11.3	9.6	10.5	11.6	11.9
Ukraine	0.9	0.6	0.8	0.9	0.8
	A country's share in total EU27 exports				
Armenia	0.1	0.0	0.0	0.0	0.0
Azerbaijan	0.2	0.1	0.2	0.2	0.2
Belarus	0.5	0.5	0.5	0.5	0.5
Georgia	0.1	0.1	0.1	0.1	0.1
Moldova	0.1	0.1	0.1	0.1	0.1
Russia	7.9	6.0	6.3	6.9	7.3
Ukraine	1.9	1.3	1.3	1.4	1.4

Source: Own calculations based on Eurostat data.

Among partnership members, Azerbaijan exports the most goods and services to the EU. In 2012, 53.8% of Azerbaijan's total exports went to EU markets. Moldova shipped 51.9% of its goods and services to the EU, the second-largest figure, while Georgia and Ukraine sent the smallest portion of their exports to the EU, at 23.5% and 21.8% respectively.

In terms of imports, the EU is the largest supplier of goods and services for Moldova (53.4% in 2012), Ukraine (39.9% in 2012), and Russia (35.5% in 2011). Belarus imports the smallest percentage of goods and services from the EU; in 2012, this figure was 20% of its total imports.

Table 6

The role of EU27 countries in the foreign trade of Eastern Partnership countries and Russia in 2008–2012 (% share)

	2008	2009	2010	2011	2012
	EU27's share in a country's total imports				
Armenia	28.9	25.9	25.6	26.2	24.5
Azerbaijan	27.4	26.1	24.6	31.4	28.5
Belarus	21.9	22.9	21.6	18.9	20.0
Georgia	26.3	28.6	26.7	27.8	27.4
Moldova	42.8	43.4	44.2	55.5	53.4
Russia	43.9	45.5	43.1	35.5	–
Ukraine	33.0	33.4	30.7	30.8	39.9
	EU27's share in a country's total exports				
Armenia	52.1	42.9	44.0	41.6	35.4
Azerbaijan	55.8	44.3	46.7	58.0	53.8
Belarus	42.9	42.7	29.3	37.3	37.8
Georgia	22.1	20.0	17.5	18.8	23.5
Moldova	51.0	54.4	46.5	50.6	51.9
Russia	57.3	46.1	49.4	45.7	–
Ukraine	23.9	20.5	22.1	23.4	21.8

Source: Own calculations based on Eurostat data.

The above data are reflected in the position occupied by individual countries in the geographical structure of trade. At the same time, the figures show a strong asymmetry in bilateral trade. In 2012, the EU27 was the absolute leader in the foreign trade of each of the studied countries in both exports and imports—except in the case of Belarus, where the EU27 ranked second for imports in 2012 behind Russia. On the other hand, the role of individual Eastern Partnership countries and Russia in the EU27's foreign trade varied considerably, though Russia was by far the most important trading partner for the European Union among the studied countries (fourth place in the EU's total exports and second in the EU's imports in 2012). Significantly, mineral fuels, lubricants and related materials accounted for a staggering 76.3% of the EU's imports from Russia in 2012 (these imports accounted for 29.9% of the EU27's total imports).

Table 7

The EU27's role in the foreign trade of Eastern Partnership countries and Russia and the role of Eastern Partnership countries and Russia in the EU27's foreign trade in 2012

	A given country's rank in the EU27's foreign trade		The EU27's rank in a given country's foreign trade	
	exports	imports	exports	imports
Armenia	101	106	1	1
Azerbaijan	58	27	1	1
Belarus	35	49	1	2
Georgia	64	86	1	1
Moldova	65	77	1	1
Russia	4	2	1	1
Ukraine	19	25	1	1

Source: Own calculations based on Eurostat data.

A breakdown of the structure of commodity trade with the EU proves unfavorable to both Eastern Partnership countries and Russia. All these countries chiefly export to the EU goods with a low level of processing, from group 3 (mineral fuels, lubricants and related materials) and group 6 (manufactured goods classified by material) of the Standard International Trade Classification (SITC) (He must mean the UN measure; there is no SIC, while importing from the EU highly processed and high value-added goods from group 7 (machinery and transport equipment).

Table 8

Commodity structure of the EU27's imports from CIS countries in 2011 (by SITC group, in %)

SITC group[a]	Armenia	Azerbaijan	Belarus	Moldova	Russia	Ukraine
0	0.7	0.2	1.9	15.2	0.5	8.6
1	1.0	0.0	0.4	2.5	0.0	0.1
2	18.9	0.0	7.1	11.9	2.1	19.9
3	0.0	99.5	50.3	3.0	76.0	12.3
4	0.0	0.0	0.1	6.1	0.1	3.3
5	0.3	0.1	10.8	0.8	2.9	5.8
6	66.8	0.0	20.1	12.6	7.5	33.5
7	3.0	0.2	4.8	10.3	0.8	8.9
8	8.8	0.0	3.6	37.1	0.2	4.0
9	0.5	0.0	0.6	0.2	1.9	0.2

Note: [a] Group: 0 – Food and animals; 1 – Beverages and tobacco; 2 – Crude materials, inedible, except fuels; 3 – Mineral fuels, lubricants and related materials; 4 – Oils, fats and waxes, animal and vegetable, 5 – Chemicals and related products, 6 – Manufactured goods classified by material; 7 – Machinery and transport equipment; 8 – Miscellaneous manufactured articles; 9 – Goods and transactions not classified elsewhere in the SITC.

Source: Own calculations based on Eurostat data.

Table 9

Commodity structure of the EU27's exports to CIS countries in 2011 (by SITC group, in %)

SITC group	Armenia	Azerbaijan	Belarus	Moldova	Russia	Ukraine
0	9.0	4.0	7.7	6.4	7.2	6.4
1	3.4	2.5	0.4	1.3	1.2	0.9
2	1.5	0.8	1.7	2.0	1.4	2.1
3	0.7	0.6	0.9	14.5	1.0	6.8
4	0.5	0.1	0.2	0.2	0.5	0.2
5	10.6	9.5	15.8	12.4	16.5	18.6
6	18.1	13.9	13.8	18.7	10.9	16.2
7	36.8	48.0	52.7	32.9	48.2	36.6
8	14.7	20.0	5.6	10.3	11.8	9.8
9	4.3	0.2	0.7	0.9	0.8	0.7

Note: as in Table 8.

Source: Own calculations based on Eurostat data.

Investment is an important area of economic cooperation. As in the case of trade, there is a clear imbalance in investment in favor of the European Union. The total cumulative value of the EU's foreign direct investment in both Eastern Partnership countries and Russia increased with each year (in 2008–2012), significantly exceeding the value of these countries' investment in EU27 member states.

Table 10

The cumulative value of the EU27's foreign direct investment (FDI) in selected CIS countries and Russia (as of Dec. 31, 2011)

Country	EU27 FDI in CIS		CIS FDI in EU27	
	Value (€ million)	Share in total FDI in EU27 (%)	Value (€ million)	Share in total FDI in the EU27 (%)
Belarus	1,790	0.02	71	0.00
Russia	166,837	1.40	53,135	0.53
Ukraine	23,722	0.20	1,952	0.02
Other CIS countries	19,088	0.16	3,353	0.03
Total	211,437	1.61	58,511	0.55

Source: Own calculations based on Eurostat data.

Eastern European countries, especially Russia and Ukraine, as well as Azerbaijan are the most attractive investment destinations for EU companies, particularly those based in Germany. This is largely because these countries have extensive energy

resources. At the same time, Russia is by far the most active investor in the European Union among the analyzed countries. Russian companies primarily invest in the energy sector, especially in energy transmission infrastructure and the distribution of energy resources.

How the Eastern Partnership came to be: Poland's role

The countries of Eastern Europe have held a special place in Poland's foreign policy since 1989 for several reasons. First, Poland has never been indifferent to what happens beyond its eastern border. Poland is aware that only a politically and economically stable Eastern Europe will guarantee stabilization in the Central and Eastern Europe region as a whole. In addition, as a country that has successfully traveled the difficult road of political and economic transition, Poland was aware that without help from the outside, specifically the West, these countries would find it difficult to continue on the path of reform. Interestingly, the first time the term "Eastern dimension" was used in public was in a 1998 speech by Polish Foreign Minister Bronisław Geremek during a ceremony marking the start of Poland's EU membership negotiations.

The importance of Eastern European countries to the European Union increased after the bloc's enlargement to include a string of Central European countries in 2004, mainly because the EU's direct border with its current eastern neighbors was extended. From that time on, Poland, as a full-fledged EU member, was to have a tangible influence on the form of the EU's cooperation with its eastern neighbors. Poland took this opportunity to work toward intensifying the EU's cooperation with countries east of the Bug River.

At that time, the European Neighbourhood Policy (ENP) was the main platform for the EU's cooperation with Eastern European countries. The ENP's main objective was to prevent new lines of division between the enlarged EU and its neighbors by supporting the prosperity, stability and security of these countries. For the first time, the guidelines of the European Neighbourhood Policy were outlined in a Commission Communication of March 2003 entitled *Wider Europe*, and were subsequently developed in a strategic document entitled *The European Neighbourhood Policy*, published in May 2004 (Zięba, p. 159).

The European Neighbourhood Policy covered countries directly neighboring the European Union on land and by sea: Morocco, Algeria, Tunisia, Libya, Egypt, Israel, the Palestinian Authority, Jordan, Lebanon, Syria, Belarus, Ukraine, Moldova, Georgia, Armenia and Azerbaijan.[9] The ENP does not include Russia, which by virtue of its special strategic partnership with the EU, has never expressed an interest in working with the EU as part of this initiative.

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[9] Communication from the Commission, *European Neighbourhood Policy. Strategy Paper*, 12.05.2004, http://ec.europa.eu/world/enp/pdf/strategy/strategy_paper_en.pdf (accessed Sept. 4, 2013).

Under this policy, the EU proposed closer political relations and economic integration to the ENP countries, while not extending any promises of future membership. However, the actual scope of cooperation was to depend on these countries' readiness to edge closer to the EU and comply with certain EU standards.

As it turned out, the European Neighbourhood Policy failed to meet the expectations of countries in Eastern Europe, if only for the simple reason that it targeted a large number of countries (16 in all) with different geography, economic potential, and political goals as well as diverse needs and aspirations in terms of the level and extent of cooperation with the European Union. Taking into account all these features of the ENP and seeking to strengthen the EU's Eastern policy, in early 2003 Poland came up with the so-called Eastern Dimension concept, modeled after the Northern Dimension and targeted at the EU's eastern neighbors. That initiative, however, met with little interest among member states and was shelved until May 2008 when Poland, together with Sweden, proposed to deepen the EU's relations with its eastern neighbors under a new initiative billed as the Eastern Partnership.

This time the initiative met with more understanding within the EU, evidently because of greater awareness of the challenges and threats lurking in Eastern Europe and the South Caucasus. Moreover, work on the Polish-Swedish project gained momentum after the outbreak of a Russian-Georgian conflict over Abkhazia and South Ossetia. Officially, the EU's Eastern Partnership initiative was launched at a summit in the Czech capital of Prague on May 7, 2009. The emergence and launch of the Eastern Partnership, despite widespread criticism as to the effectiveness of this initiative, undoubtedly marked a major success for Poland and its diplomats.

The key objectives of the Eastern Partnership and the extent to which these have been achieved[10]

The Eastern Partnership aims to gradually strengthen the European Union's political and economic cooperation with Eastern Partnership countries.

The key objectives of the Eastern Partnership include:[11]

a) in the EU's bilateral cooperation with individual partner countries:
   – working toward political association,
   – establishing deep and comprehensive free trade areas,
   – gradually liberalizing the visa regime, leading to the establishment of a visa-free regime

b) in multilateral cooperation:
   – creating structures of multilateral cooperation with partner countries in the form of four platforms (democracy, good governance and stability; economic

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[10] as of the end of November 2013.

[11] *Partnerstwo Wschodnie*, Ministerstwo Spraw Zagranicznych RP, http://www.eastern-partnership.pl/pw_pl/MSZ%20PW%20PL.pdf (accessed Sept. 2, 2013).

integration and convergence with EU policies; energy security; and contacts between people).

One of the fundamental objectives of the Eastern Partnership is to develop mutual cooperation on the basis of Association Agreements, which will eventually replace the current Partnership and Cooperation Agreements (except in the case of Belarus). The Association Agreements will be strictly political pacts that, when signed, will mean that a partner country is ready for far-reaching cooperation with the EU, including a readiness to comply with EU standards in areas such as democracy, the rule of law and respect for human rights. These agreements will also serve as the starting point for closer economic cooperation as part of free trade areas.

The Eastern Partnership countries are at different stages on their road to association agreements. Belarus is doing the worst in this respect because it has yet to start negotiations on the subject. Azerbaijan is conducting such negotiations, and Georgia and Moldova have initialed their association agreements with the EU during the third Eastern Partnership summit in Vilnius, Lithuania, on Nov. 28–29, 2013. The EU's association agreements with Georgia and Moldova are due to be signed during the next year. Originally, Armenia was also expected to initial its association agreement at Vilnius, but officials in that country changed their minds a few weeks before the summit. They instead voiced their desire to join the Customs Union being established by Russia, Belarus and Kazakhstan. Ukraine, which completed its association agreement negotiations with the European Union in December 2011, and which was due to be sign that agreement at the Vilnius summit, unexpectedly backpedalled on this plan, and, despite expectations, the agreement was not signed, becoming a direct cause of escalated sociopolitical tensions in that country.

The second key objective of the Eastern Partnership, to create Deep and Comprehensive Free Trade Areas (DCFTAs), refers to economic cooperation. Thanks to such zones, partner countries will gain access to the EU market for goods and services, which is expected to stimulate their socioeconomic development in the long term. Significantly, the DCFTAs are expected to increase their international credibility as full-fledged market economies that meet all the requirements of close cooperation with the EU. This is hoped to have a positive impact on the inflow of EU investment and increased access to technology, which is critical as all Eastern Partnership economies are in need of modernization, for which EU financial support and technology is needed. In this context, closer ties with these economies, in the context of deep and comprehensive free trade areas, are seen as a major opportunity for significant development in these countries.

However, the EU does not immediately offer all partner countries the possibility of creating free trade areas. The process of economic integration, in which these areas are only the first step, comes with a series of caveats. The first and most important condition is that these countries must be functioning market economies. Another equally important requirement is that they must be members of the World Trade Organization (WTO).

By the end of 2013, only Ukraine, Georgia, Moldova, and Armenia had completed their negotiations on deep and comprehensive free trade areas. Other partner countries (Azerbaijan and Belarus) had not yet started their negotiations on establishing a free trade area with the European Union. It should be emphasized at this point that a pre-condition for starting such talks, in addition to political will, is that a specific country must be a member of the World Trade Organization. Neither Azerbaijan nor Belarus are members of the WTO.

The third objective of the Eastern Partnership in the area of bilateral cooperation—one that is also potentially significant for economic cooperation in the broad sense—is a gradual liberalization of the visa regime (including a reduction or complete abolition of visa fees), with a view to eventually establishing a visa-free regime. It seems that the Eastern Partnership countries should be especially interested in a rapid achievement of this particular objective. However, the prospect of introducing visa-free regimes in passenger traffic between the EU and partner countries is relatively distant due to the urgent need to ensure border security, create integrated border management systems, and crack down on illegal migration.

In assessing the extent to which the third objective of the Eastern Partnership has been achieved, Ukraine and Moldova were the most advanced in a two-phase process for visa liberalization as of November 2013. The EU was conducting official dialogue with these countries on a visa waiver program. In the case of Georgia, the agreement on visa facilitation and readmission entered into force on March 1, 2011. Similar agreements with Ukraine and Moldova have been in force since 2008. Armenia and Azerbaijan started negotiating their visa facilitation and readmission agreements in early 2012. Armenia has signed both agreements (the visa facilitation agreement in December 2012 and the readmission agreement in April 2013).[12] Azerbaijan signed its visa facilitation agreement with the EU at the Eastern Partnership Summit in Vilnius on Nov. 29, 2013.

In addition to the three main objectives of the Eastern Partnership as part of the EU's bilateral cooperation with the partner countries, energy security and support for social and economic development play an important role. In the case of energy cooperation, the partner countries are presented with the opportunity to integrate their energy markets with the EU market in order to reduce these countries' future dependence on energy imports from Russia. However, this goal will not be easy to achieve because Russia has strategic energy interests in both Belarus and Ukraine as well as in the South Caucasus countries.

It should be noted at this point that the European Union, as part of its support for reforms in partner countries and these countries' preparations for carrying out the Eastern Partnership objectives, has created a special support instrument in the form of so-called Comprehensive Institution Building Programmes (CIBs). Funds were set

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[12] http://www.msz.gov.pl/pl/p/msz_pl/polityka_zagraniczna/europa/partnerstwo_wschodnie/wymiar_dwustronny/ (accessed Sept. 6, 2013).

aside for individual partner countries to implement these programs in the 2011–2013 period: €32.81 million for Armenia, €19.20 million for Azerbaijan, €30.86 million for Georgia, €41.16 million for Moldova, and €43.37 million for Ukraine. Belarus was allocated €5.88 million for the 2011–2013 period under a separate support instrument called Joint Interim Plan. The total budget of the CIBs for 2011–2013 was around €175 million.[13]

Economic ties in the broad sense also play an important role in multilateral cooperation as part of the Eastern Partnership initiative. This especially applies to economic cooperation as part of the so-called second multilateral platform—"economic integration and convergence with EU policies." The main long-term priorities in this area include (MSZ, 2012, p. 24):
- trade and trade-related regulatory approximation,
- financial and macroeconomic cooperation,
- boosting socioeconomic development,
- environmental protection.

Meetings as part of this and other platforms are held twice a year; the goal is to plan, arrange and coordinate projects designed to support the development of multilateral cooperation under a specific platform.

Moreover, special flagship initiatives are carried out as part of multilateral efforts. These include:
- the Integrated Border Management Programme,
- the SME Facility designed to support small and medium-sized enterprises,
- a civil protection and disaster prevention initiative,
- a program for exchanging information in the area of environmental protection,
- an initiative related to regional energy markets and energy efficiency.[14]

As part of the SME Facility, a special project called East-Invest has been launched; its main aim is to improve the investment climate in partner countries and create a network of business contacts between the EU and Eastern Partnership countries. In addition, a special financial instrument has been developed with the support of the European Investment Bank and the European Bank for Reconstruction and Development to support the implementation of the program.

Overall, the European Union allocated €1.9 billion under its European Neighbourhood and Partnership Instrument (ENPI) for the achievement of all the Eastern Partnership objectives in the 2010–2013 period. In 2011, this amount was increased by a further €10 million.[15]

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[13] http://eastbook.eu/faq-o-partnerstwie-wschodnim/ (accessed Sept. 7, 2013).

[14] http://www.msz.gov.pl/pl/p/msz_pl/polityka_zagraniczna/europa/partnerstwo_wschodnie/wymiar_wielostronny/ (accessed Sept. 6, 2013).

[15] http://www.msz.gov.pl/pl/p/msz_pl/polityka_zagraniczna/europa/partnerstwo_wschodnie/finansowanie/ (accessed Sept. 6, 2013).

The Eastern Partnership and the Eastern dimension of economic cooperation during Poland's presidency of the EU Council

One of the main objectives of Poland's presidency of the Council of the European Union in the second half of 2011 was to lend a "new impetus" to the Eastern Partnership.[16] Poland also sought to advance progress in association agreement negotiations. The key issue in this context was to bring about the signing of an agreement with Ukraine. Other priorities included agreements on deep and comprehensive free trade areas and work to accelerate the visa liberalization process as part of the Eastern Partnership, in addition to the broadest possible inclusion of partner countries in Community sector policies, particularly those related to education, science, culture, the economy, infrastructure, agriculture and customs services and statistics (Fundakowska, 2011, p. 11). Yet another important issue was the process of Russia's accession to the World Trade Organization. At the start of its presidency of the EU Council, Poland hoped it would welcome Russia as a WTO member on behalf of the European Union by the end of 2011. However, Russia did not join the WTO until late 2012.

Poland presided over the EU Council at a difficult time. The economic crises in Greece and other Southern European countries and the instability of the euro gave Poland little room for maneuver toward its goals with the Eastern Partnership, as the European Union was largely preoccupied with issues other than cooperation with its eastern neighbors. Nevertheless, to the extent the situation allowed, Poland tried to carry out its objectives on a step-by-step basis (Falkowski, 2012, pp. 119–142).

As part of these efforts, a project known as the Conference of Local and Regional Authorities for the Eastern Partnership was launched in Poznań in September 2011 under the auspices of the Committee of the Regions. The Conference is designed to be a platform for cooperation between local and regional governments in EU member states and Eastern Partnership countries. An especially important area of this cooperation is support for networking and the development of business contacts by small and medium-sized enterprises, and exchange of experiences between local and regional governments in EU member states and Eastern Partnership countries—when it comes to the conditions for doing business and the overall investment climate.

Moreover, the First Eastern Partnership Business Forum was held in Sopot, in northern Poland, in September 2011, attended by representatives from business organizations,

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[16] For details see: *Program 6-miesieczny polskiej prezydencji w Radzie Unii Europejskiej w II połowie 2011 r.*, http://prezydencjaue.gov.pl/obszary-przygotowa/programowanie (accessed May 23, 2011). This issue is also discussed in the previous chapter of this book—see: A. Ambroziak, The Track Record of the Polish Presidency of the Council of the European Union.

businesspeople, and officials from governments and institutions in both the European Union and partner countries. The aim of the Forum was to exchange experiences, create opportunities to establish business contacts, and discuss investment opportunities and joint projects to be carried out as part of the Eastern Partnership.

Without a doubt the political highlight of the Polish presidency was the second Eastern Partnership Summit in Warsaw on Sept. 29–30, 2011. The summit, which was not attended by Belarus, adopted a document called the Warsaw Declaration. It states that Eastern Partnership countries are ready for full integration into the EU internal market and are also ready to create a common economic area covering the EU and the Eastern Partnership partner countries in the future.

Evaluation of the Eastern Partnership and of Poland's efforts to promote it over the past four years

The track record of the first four years of the Eastern Partnership, a joint Polish-Swedish initiative as part of the EU's European Neighbourhood Policy, deserves moderately positive ratings. Even though the period has been devoid of spectacular successes, the very fact that the initiative has gotten off the ground is a big success for Poland and Polish diplomats—by far the biggest at the EU level to date, especially as the main objectives of the Eastern Partnership are consistent with the vital interests of both Poland and most other EU countries. Poland and Sweden, the initiators of the Eastern Partnership, have managed to persuade other EU countries that the bloc cannot focus exclusively on its own problems, while turning a blind eye to what is happening in the world around, including in countries beyond the EU's eastern border. These countries are not only a huge market for EU goods and services, but also a potential scene of conflicts and international disputes. The EU's eastern neighbors include not only Russia, but also other smaller and less well developed countries that are in need of support and development aid. From this point of view, it is appropriate and desirable for the EU to pay more attention to the problems of Eastern Europe as a whole, and Poland has been working to make that happen for years.

Although the initiative itself should be rated positively, the extent to which it has been put into practice leaves much to be desired. Of course, an important determinant is the internal economic situation in the European Union. During the hard-hitting crisis in southern Europe, EU member states were hardly keen to focus on the objectives of the bloc's Eastern policy. But even if the EU economy recovers, it seems that some of the Eastern Partnership's objectives will be extremely difficult to achieve in the foreseeable future.

The main reason is that Eastern Partnership countries are highly diversified geographically,[17] economically,[18] and politically. This results in a varied level of determination among these countries to become economically integrated with the European Union. Another important factor is Russia's policy vis-à-vis the post-Soviet area, including Eastern Partnership countries, oriented at maintaining and reinforcing Russia's influence. The best confirmation of this was a case of "economic blackmail" used by Russia with regard to Ukraine when the latter planned to sign an association agreement with the EU at the Eastern Partnership Summit in Vilnius at the end of November 2013. Another example was Russia's successful efforts to dissuade Armenia from initialing its association agreement with the EU.

Eastern Partnership countries are highly selective in how they treat the EU's proposals of closer cooperation. For example, Belarus, and to an extent Azerbaijan, are only ready for economic cooperation as part of the Eastern Partnership (in trade and investment), while turning a deaf ear to calls for system and institutional reforms. By agreeing to such exemptions, the EU weakens the efforts of the partner countries to meet its basic goals of promoting democracy, the rule of law, and human rights.

The economic crisis in the eurozone has also tarnished the credibility of the liberal economic model followed in the European Union and recommended as a target model for partner countries as they embark on economic reforms.

The efforts to achieve the goals of the Eastern Partnership are not helped by the fact that most partnership countries know little or nothing about either the initiative itself or its potential benefits. This is a major challenge for Poland as well as the European Union as a whole. Without these countries being aware of the benefits of edging closer to the EU rather than to the Customs Union of Russia, Belarus and Kazakhstan—which is due to be expanded—it will be difficult to achieve the objectives of the Eastern Partnership.

The EU's political weakness in managing regional conflicts casts a shadow on its efforts to deepen its economic integration with Eastern Partnership countries. The best proof is the Azeri-Armenian conflict over Nagorno-Karabakh. In practice, Azerbaijan is interested in closer cooperation with the European Union only because it can export oil to the EU market. Oil accounts for 99.5% of Azerbaijan's total exports. On the other hand, the EU is eager to work with Azerbaijan because it is interested in Azeri oil.

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[17] Some Eastern Partnership countries are in Eastern Europe (Belarus, Ukraine, Moldova) and others in the South Caucasus (Armenia, Azerbaijan, Georgia). In addition, these countries vary by a factor of 1 to 20 in terms of area and by a factor of 1 to 15 in terms of population (Ukraine has the largest population, while Armenia has the smallest). They also vary by a factor of 1 to 3 in terms of population density (Belarus has the largest population density, while Moldova is at the other extreme). Ukraine accounts for three-fifths of the six partner countries' total area and population.

[18] The Eastern Partnership countries are heavily diversified economically. For example, Belarus' GDP per capita in PPP terms is only 41.5% of the EU27 average, while Moldova's GDP per capita in PPP terms is only 7.6% of the EU27 average. In terms of GDP per capita at PPP, Belarus is roughly at the same level as Romania, one of the poorest EU members.

In assessing the Eastern Partnership and Poland's role in it, it should be noted that there is no consensus on many issues of importance to this initiative. These include the issue of the EU's association agreement with Ukraine. When, after the imprisonment of Ukraine's former Prime Minister Yulia Tymoshenko, the EU decided to suspend the signing of its already initialed association agreement with that country—and to suspend the establishment of a deep and comprehensive free trade area due to the lack of any response from the authorities in Kiev—some EU countries insisted that the EU should scrap these agreements altogether. Moreover, there is no consensus among EU countries on liberalizing the visa policy because some states are concerned their labor markets could suffer if the rules of migration into the European Union are relaxed.

All this explains why the Eastern Partnership initiative, steadfastly and painstakingly advocated by Poland, does not have the full support of all EU members. On the other hand, Eastern Partnership countries show little determination to become economically integrated with the EU. The best example is Ukraine. All this puts a big question mark over the effectiveness of the Polish-Swedish initiative in the future.

Conclusion

Soon after joining the European Union, Poland began lobbying for the launch of a separate program as part of the EU's European Neighbourhood Policy to advance the bloc's cooperation with its eastern neighbors. An important element of these efforts was a plan to enhance economic relations as well as business, trade and investment ties based on free-market rules and increasingly liberalized forms of mutual cooperation. Poland was also concerned about stabilizing the socio-political situation in the countries of Eastern Europe. These efforts culminated when Poland, together with Sweden, pushed through their Eastern Partnership initiative. With all certainty, it can be said that the Eastern Partnership would not have emerged had it not been for Poland's determination and a favorable international situation (including destabilization in the region in the wake of the Russian-Georgian conflict, combined with a strong will to bring Ukraine closer to the European Union under President Viktor Yushchenko).

The results of the Eastern Partnership initiative are still limited, though views that it has proved a failure are far from the truth. The Eastern Partnership countries are slowly but surely edging closer to the European Union, regardless of Ukraine's actions at the end of November 2013.

Despite intensified efforts as part of the Eastern Partnership, Russia is and will remain the EU's most important economic partner in the east. However, Russia is hardly eager to be part of the Eastern Partnership, and it is also accusing Poland and some other EU countries of hostile activity in the former USSR, a region perceived by the Kremlin to be its own direct sphere of influence. What's more, Russia is advancing its own idea of a Eurasian Union that would welcome all the countries now covered by the EU's Eastern Partnership initiative. All this is not helping Poland and the EU

as a whole in their efforts to bring about stronger economic integration between the bloc and Eastern Partnership countries.

Still, there is no doubt that, despite the limited results of the Eastern Partnership so far, the Polish-Swedish initiative should be evaluated moderately positively from the Polish point of view, and Poland should continue making efforts to achieve the strategic objectives of the initiative. It is in Poland's strategic interest to make every effort to bring the Eastern Partnership countries closer to the European Union economically and otherwise. Without a doubt, this would not only increase Poland's role and importance in the EU, but also increase security and enhance socioeconomic development in countries beyond the EU's eastern border. Of course, the *sine qua non* condition of these countries' deeper economic integration with the EU is their political will and real determination toward convergence with the European Union.

In view of the dramatic events in Ukraine in February and March 2014 as well as the highly intensified political and military activity of Russia in Crimea, which resulted in Russia's annexation of the Crimean Peninsula, the pressing issue of the future of the Eastern Partnership in its current form is still open. The future role of Poland in shaping the economic dimension of the EU's cooperation with the Eastern Partnership countries is also up in the air.

The fact is that within the EU itself, support is growing for adopting a more individual approach to the Eastern Partnership countries, mainly with regard to financial instruments. This suggests that the Eastern Partnership concept is being reevaluated. All the same, it is in Poland's vital interest to ensure that the EU does not treat the question of enhancing economic ties with the Eastern Partnership countries as an *either/ or* alternative (either with the EU or with Russia) and does not force them to choose one party as a partner for economic integration.

In conclusion, the role of Poland in shaping the EU's economic cooperation with the Eastern Partnership countries, in particular Ukraine, seems to be invaluable. On the one hand, in view of Russia's *de facto* expansion into a substantial part of former Soviet territory, an intensification in the EU's trade and investment relations with not only Ukraine but also other Eastern Partnership countries seems to be imperative for supporting their further development. On the other hand, such actions might be perceived unfavorably by Russia. Because of the lack of a consensus by EU member states on an Eastern Europe policy, Russia could seek to marginalize the role of Poland and the Eastern Partnership in shaping the EU's economic relations in the east.

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Summary and Conclusions: Poland's Competitive Position in the European Union at the Start of 2014

Marzenna Anna Weresa

How does the Polish economy fare compared with other economies in the European Union? Has the country made the kind of progress during its first 10 years in the EU that many Poles dreamed of when Poland joined the bloc in May 2004? To what extent has EU membership made Poland more competitive internationally and helped it advance from resource-based to knowledge-based competiveness? These questions call for an analysis of the successes and failures that Poland experienced during its first decade as an EU member.

From a theoretical point of view, membership in a collective produces a mixture of short- and long-term effects, some of which are static while others are dynamic (Ładyka, 2000). The potential impact of Poland's EU membership was extensively analyzed and evaluated before Poland became part of the bloc (cf. Kawecka-Wyrzykowska, 1999; Kawecka-Wyrzykowska, Synowiec, 2001). In this monograph, we have made an attempt to assess this impact after Poland's first decade in the EU.

During this period, EU membership has had an impact not only on the Polish economy, but also on Polish politics, society, and culture. Therefore an evaluation limited to statistics would certainly be insufficient. Moreover, it is difficult to separate the impact of EU membership from that of other factors that have influenced the development of the Polish economy over the past decade. For this reason, we focus exclusively on selected aspects of this complex issue—those that are directly related to the competitiveness of the Polish economy and changes in this competitiveness during the first decade of EU membership.

The starting point for this evaluation of changes in Poland's competitive position in the EU from 2004 to 2014 is the country's potential resulting from its area, population

and national income. Poland ranks sixth in the EU28 in terms of area, population, and size of the economy measured by the value of GDP at purchasing power parity (PPP). In terms of GDP at current exchange rates, Poland ranks eighth among EU countries. This means Poland's contribution to the EU28's economic potential is smaller than suggested by the country's area and population. Still, since 2004, Poland has moved up four notches in terms of GDP at PPP, ranking behind Germany, Britain, France, and Italy, while in 2004, Poland was also behind the Netherlands, Belgium, Sweden and Austria. If competitiveness is measured by GDP growth, from 2004 to the end of 2013, Poland's GDP growth totaled 41%, meaning an expansion of 4% per annum on average. Slovakia was the only EU11[1] country that did better in this respect (42%).

As a result, Poland's competitive position measured by GDP per capita (in PPS terms) has improved since 2004. In 2004, Poland's GDP per capita (in PPS terms) accounted for 45% of the average level in the EU15, while in 2013 the figure improved to 62%. Poland's development gap with the EU15 has therefore narrowed by 17 percentage points. On the other hand, there have also been processes of divergence between EU11 countries. Some EU countries from Central and Eastern Europe, such as Lithuania and Slovakia, bridged the development gap separating them from the EU15 slightly faster than Poland in 2004–2013. Moreover, Poland's GDP per capita (€15,500 in PPS terms) is among the lowest in the EU28 and far below the EU average (€25,700), ranking Poland 23rd in the EU, ahead of only Hungary, Latvia, Croatia, Romania, and Bulgaria.

There are smaller disparities between Poland and the EU15 in terms of social well-being indicators. A composite measure of the quality of life and social development understood in this way is the Human Development Index (HDI), computed by the United Nations Development Program (UNDP). Poland's HDI is steadily rising. In 2013, Poland was ranked 39th in terms of the HDI, three slots higher than in 2004, and ahead of some EU15 countries, including Portugal.

Poland's international competitive position measured by the size and structure of its external economic relations has changed substantially since the country's EU accession. The dynamic growth of exports and imports has led to an increase in Poland's still-insufficient contribution to overall EU trade. In 2004, Poland's contribution to total EU exports (i.e. the combined exports of the 28 countries that were EU members in 2013) was 2.3%, while the country's contribution to total EU imports was 2.7%. In 2013, Poland's role rose to 4% in EU28 exports and 3.8% in imports. Moreover, Poland's contribution to total EU exports increased more rapidly than in the case of imports. A look at the geographical breakdown of Poland's foreign trade reveals that the share of EU28 countries in both Polish exports and imports decreased by about 7–8 percentage points from 2004 to 2013. However, EU countries remain the main export

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[1] The EU11 stands for the countries from Central and Eastern Europe (CEE) that joined the EU in 2004, 2007 and 2013. In addition to Poland, these are the Czech Republic, Hungary, Slovakia, Slovenia, Estonia, Latvia, Lithuania, Romania, Bulgaria, and Croatia.

and import markets for Polish goods; they account for about 70% of Poland's total exports and for nearly two-thirds of the country's imports. Germany remains Poland's number one economic partner, although its share in Polish exports fell from 30% in 2004 to 25% in 2013, and its share in Polish imports decreased from 24% to 21%.

The significant increase in Poland's foreign trade during the country's first decade in the EU confirms the theoretical findings about integration having a trade creation effect. Meanwhile, the geographical structure of Poland's trade is being diversified rather slowly. The good news, however, is that the growth in Poland's trade with foreign partners, including those throughout the EU, has been accompanied by a gradual decline in the role of EU countries in Poland's foreign trade. This means Polish companies are building their competitiveness not only on the EU market but globally.

Also of note is a fundamental change in Poland's foreign trade balance. When it joined the EU in 2004, Poland had a deficit in the intra-EU trade of goods. Since 2005 this trade has shown a surplus—and one that has been steadily growing since 2008. Also on the rise is the coverage of imports by exports in Poland's overall foreign trade; that increased from 0.83 in 2004 to 0.98 in 2013. Positive but relatively slow changes have taken place in the structure of Poland's exports. The share of technology-intensive goods rose from 2.3% in 2004 to around 6% in 2013, but these are mostly goods that are easy to imitate. Labor-intensive goods remain an important export item for Poland, accounting for more than 20% of the country's total exports.

Since the country's EU entry, there has been a qualitative asymmetry in Poland's trade with other EU countries. Poland had comparative advantages chiefly in the trade of goods produced in sectors with low value added, while its main trading partners have had advantages in the trade of technology-intensive goods. Poland does not have advantages in the trade of technology-intensive products that are difficult to imitate, but has made some progress in this area: its comparative disadvantage is steadily decreasing. Moreover, the proportion of intra-industry trade in Poland's total trade with other EU countries gradually increased from 2004 to 2013, but inter-industry trade still accounts for the dominant portion of this exchange.

Summing up the general trends in Polish foreign trade in 2004–2013, it is important to note that the scale and intensity of all the positive changes that could be observed in Poland's foreign trade were insufficient to contribute to a significant improvement in the country's international competitive ability to sell, although some progress is already visible in this area.

Aside from foreign trade, another manifestation of the international competitiveness of the Polish economy is the ability to attract foreign factors of production, especially foreign direct investment (FDI). Poland leads the way among EU11 countries in terms of its share of the cumulative FDI stock in the EU11 region. This share is high, at about 30%, and remained unchanged in the 2004–2013 period. However, the FDI inflow to Poland declined in 2009–2010 as a result of the global crisis. After a slight short-lived increase in 2011, the FDI inflow slowed down again in 2012–2013. As a result, Poland's share of the EU11's total FDI inflow has been in single-digit

territory since 2012. In 2004–2011, it had hovered around 30%-40%. This means Poland's long-term attractiveness as a destination for FDI remains at a moderate level, mainly due to factors such as fewer advantages related to low labor costs, a worsening demographic situation and cumbersome administrative barriers for doing business.

This is confirmed by an assessment made by the United Nations Conference on Trade and Development (UNCTAD), according to which Poland's investment attractiveness index has remained unchanged since the country's EU accession and is still among the lowest in the EU11. This does not mean that Poland's EU membership has had no impact on the country's attractiveness to foreign investors. Just the opposite: the stream of FDI flowing into Poland began growing when Poland was still an EU candidate state (Weresa, 2006). The econometric analysis conducted in this book shows that Poland's EU entry has enhanced the country's appeal to foreign investors and led to an increased inflow of FDI.

To sum up this evaluation of changes in Poland's competitive position in 2004–2013, it should be noted that the competitiveness of the Polish economy improved during the country's first decade in the EU, despite the high volatility of the international environment and the need to meet new challenges posed by the outbreak of the global crisis in 2007. Poland showed considerable resilience to the negative implications of the crisis, maintaining a moderate rate of GDP growth and clinging to the path of economic convergence. The increased competitiveness of the Polish economy is confirmed by its better position in international competitiveness rankings. In the World Economic Forum's *Global Competitiveness Report*, Poland moved up from 60th place in 2004 to 42nd place in 2013, ranking second among EU11 countries after Estonia. In 2004, Poland was behind most EU11 countries in this league table, outperforming only Romania and Croatia.

Several factors contributed to improving Poland's competitiveness in 2004–2013. In terms of resources, two factors were of key importance: investment and human capital.

The impact of investment on the Polish economy was especially visible in 2004–2008 when the value of investment increased steadily, mustering double-digit growth in 2006–2007. This was largely due to Poland joining the EU and the improvement in the Polish economy. However, the global economic crisis put a stop to this positive trend, and the value of investment in Poland decreased from 2009 onward—except in 2011, when a short-lived rebound was recorded. In 2013, investment continued to decrease, albeit at a slower rate.

Overall, with Poland in the EU, investment has been stimulated by increased FDI and a growing absorption of EU structural funds. These have helped finance a number of new infrastructure projects. Poland's network of expressways and freeways increased more than fourfold in 2004–2013, accompanied by the development of airport infrastructure and the start of work to modernize railroad infrastructure. However, these positive changes have not covered energy infrastructure, which has fallen into disrepair, largely due to unstable regulations and changing environmental standards. Still,

growing investment—especially in the first few years after accession—and the gradual improvement of the road infrastructure stimulated the growth of competitiveness in the 2004–2013 period.

Further resource-related factors behind Poland's increased competitiveness are an improved quality of human capital and an increase in total factor productivity (TFP). In 2004–2013, total factor productivity in Poland grew at an average rate of 1.8% a year, which was one of the best figures in the EU11. Among EU11 countries, only Slovakia and Lithuania had similar rates of TFP growth, while the EU15 recorded no change in total factor productivity in 2004–2013 (with the growth rate at 0.0%). In Poland, the TFP contribution to economic growth was 36% on average in 2004–2013, slightly less than in most other EU11 countries, but more than in the EU15 on average.

The detailed nature of Poland's economic growth can be scrutinized using a human capital-augmented growth accounting model—one expanded to include human capital, along with capital and labor. Human capital—defined as the number of employed persons with a tertiary education and aged 15–74 years—contributed significantly to Poland's economic growth during the country's first decade in the EU. This means that the country's economic growth and the improvement in the competitive position of the Polish economy were driven to some extent by an increased accumulation of human capital.

Poland's EU entry has also resulted in many changes in economic policy. Adapting the country's legal system to European law has led to economic liberalization and increased the role of market processes and competition. These adjustments covered the market for goods, services, capital and labor and led to some improvement in the conditions of doing business since 2009. That the conditions of doing business in Poland have improved is confirmed by the country's advancement by 10 notches, to 45th place, in the World Bank's *Doing Business 2014* rankings. In terms of conditions of doing business, Poland outperformed countries including Spain, the Czech Republic, Slovakia, and Hungary. However, several EU11 countries, namely Estonia, Latvia, Lithuania, and Slovenia, ranked ahead of Poland.

To sum up the analyses contained in this book, it can be concluded that Poland managed to improve its competitive position among European Union states during its first decade in the EU, mainly due to a better use of internal resources and greater resilience to external shocks than in other EU countries. It is difficult to fully evaluate quantitatively to what extent this was the result of Poland's EU membership, and to what extent other factors were at play. In any case, this assessment of Poland's competitiveness is relative: we compare Poland with other EU member states, specifically its Central and Eastern European peers, which had undergone similar transitions from central planning to a market economy. In other words, we measure Poland's competitive position in relative terms, so it depends not only on the progress made in the Polish economy, but also on the robustness and direction of the changes that have taken place in other countries.

A full aggregate assessment of Poland's track record as an EU member extends beyond the scope of this study. The intention of the authors was to show some key trends and focus on selected areas of special importance to competitiveness.

Of special note among the direct benefits of EU membership are changes in how Polish enterprises function on the EU single market. EU entry has also enabled Polish companies to join European and global value chains, and made the country eligible for a wealth of funds for infrastructure projects and human capital development. Poland has access to the EU's Cohesion Fund, which seeks to level out development disparities.

On the minus side, EU membership has not yet led to an improved innovativeness of the Polish economy. Moreover, increased R&D financing from the EU budget has yet to result in significant progress in Poland's science and technology system. Poland has one of the lowest scores in the EU Excellence of Science and Technology Index. Equally low is Poland's ranking in the Index of Economic Impact of Innovation, which is only half the EU average. As a result, the process of Poland's convergence with the EU15 in terms of real GDP per capita has been accompanied by a divergence in relation to the EU average in terms of innovativeness. Catching up with EU innovation leaders has been impossible. Of course, the impact of membership is not only direct, but also indirect and sometimes only visible in the long term. This especially applies to investment in science and education, which tends to produce results only after several years. Therefore regular monitoring of progress in this area and potential adjustments in economic policy are crucial.

Despite the many benefits of Poland's integration with the EU, many problems still need to be resolved. For example, bureaucracy is still a major issue in Poland, the law-making and enforcement system is complicated and riddled with red tape, and the country has made insufficient progress in reforming institutions. Moreover, Poland is reaching a point where it will no longer be able to compete with low input costs alone. The country's human capital resources are shrinking due to demographic factors and to people leaving the country to work in other EU countries. A further rise in productivity is needed to improve competitiveness—a boost that could come from competing with innovative goods and services. But Poland still has a lot of catching up to do in this department. According to the Central Statistical Office (GUS), the percentage of revenue generated by Polish enterprises from the sale of innovative products is among the lowest in the EU11. What's more, in 2012 this percentage was just over half that in 2004. Meanwhile, rapid productivity growth depends on a greater use of new sources of competitiveness, especially innovation and human capital. For this reason, it is necessary to not only invest in the creation of new knowledge and the development of human capital, but also support the transfer of knowledge from science to business and the spread of innovation. This is not possible without further institutional changes, especially without supporting the development of entrepreneurship, making the labor market more flexible, and reducing bureaucracy. A further significant improvement in the competitiveness of the Polish economy would be a transition from competing with

resources to competing with knowledge. This means that the current imitation-based model should be scrapped and replaced by a model based on innovation.

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THE WARSAW SCHOOL OF ECONOMICS

Established in 1906, the Warsaw School of Economics (SGH) is the oldest university of economics in Poland. One in three economists in Poland in the 20th century was a graduate of the School.

The Warsaw School of Economics has about 15,000 students, including postgraduate students and Ph.D. candidates. Every year it produces about 2,000 graduates who find employment in both the public and private sectors—in banks, financial institutions, consulting firms and multinational companies.

The Warsaw School of Economics offers more than a dozen study programs at the bachelor's and master's levels in Polish and English as well as more than 120 postgraduate courses, two MBA programs and a choice of doctoral studies. The School is a member of the Global Alliance in Management Education (CEMS), an elite alliance of academic and corporate institutions dedicated to educating future generations of international business leaders.

How does the Polish economy fare compared with other economies in the European Union? Has the country made the kind of progress during its first 10 years in the EU that many Poles dreamed of when Poland joined the bloc in May 2004? To what extent has EU membership made Poland more competitive internationally and helped it advance from resource-based to knowledge-based competitiveness?

This book aims to find answers to these questions and determine how competitive Poland is in the European Union a decade after it joined the bloc. The Polish economy is shown in a broader comparative perspective against the background of other EU members.

The analyses in this book go beyond a simple scoreboard approach that could fail to capture all structural factors. The country comparisons are conducted in both quantitative and qualitative terms, enabling the authors to forecast future trends and indicate policy priorities.