POLAND

COMPETITIVENESS REPORT 2013

National and Regional Dimensions

WORLD ECONOMY RESEARCH INSTITUTE
WARSAW SCHOOL OF ECONOMICS

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Edited by
Marzenna A. Weresa

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This book is a result of statutory research of the Collegium of the Word Economy. The research was conducted by the World Economy Research Institute and financed with funds provided by the Ministry of Science and Higher Education.

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First edition

ISSN 2083-229X
ISBN 978-83-7378-820-6

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www.wydawnictwo.sgh.waw.pl
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Aktualizacja okładki
Studio Graficzne AGAT Jerzy Burski

DTP
DM Quadro

Print and binding
QUICK-DRUK s.c.
tel. 42 639 52 92
e-mail: quick@druk.pdi.pl

Order 100/V/13

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Preface

This book presents the results of systematic comparative research conducted for more than 20 years at the World Economy Institute of the Warsaw School of Economics. This year's edition seeks to evaluate changes in the competitiveness of the Polish economy in 2012, at both the macroeconomic and regional levels. This assessment is the basis for a further in-depth analysis of factors influencing the competitive position of Poland and its regions between 2005 and 2012.

The international competitiveness of the economy is closely linked to the production of goods and services offered on foreign markets, as well as to the attractiveness of a country to foreign investors. Benefits derived from participation in the international division of labor are reflected in an improved level of citizens' welfare. Such a broad interpretation of competitiveness is used in this book to assess the current competitive position of Poland and its evolution over the past five years. This approach is a common part of many different definitions of competitiveness that can be found in the economic literature. Individual chapters of this book cover different aspects of competitiveness. Furthermore, the key factors that determine competitiveness are analyzed in an attempt to look at both the current competitive position of the Polish economy and its ability to compete with other economies.

The Polish economy is compared with other European Union economies, in particular with those in Central and Eastern Europe (EU10). A wide range of quantitative and qualitative indicators was used in this comparative study. They include gross domestic product (GDP) growth, GDP per capita, income inequality and the poverty level as well as the growth and structure of foreign trade, revealed comparative advantages in trade and their changes over time, the size and growth of foreign direct investment (FDI), and the balance of payments. On the basis of these analyses, forecasts have been presented for changes in the competitiveness of the Polish economy in the coming years. Moreover, priorities have been indicated for pro-competitive economic policies.

This book consists of three parts, each divided into chapters. **Part I (Chapters 1 and 2)** is concerned with the competitive position of the Polish economy. It includes an assessment of changes in the development of the Polish economy measured by GDP growth and GDP per capita in relation to other EU countries. That is followed by a dis-

cussion of convergence vs. divergence trends as well as the level of income inequality and poverty. In addition to the macroeconomic research, development differences between Poland's regions are analyzed and their implications for income convergence or divergence are presented.

The international aspects of the competitive position of the Polish economy discussed in Chapter 2 include foreign trade performance, FDI inflow and outflow, and trends in Poland's balance of payments.

The second part of this book (Chapters 3 and 4) highlights factors that contributed to changes in the competitive position of the Polish economy in 2012. The determinants of the country's competitive position are grouped into two broad categories:

1) the availability of resources, such as labor, capital, technology and innovation as well as their productivity,
2) contextual factors, such as economic policy, financial markets and the overall business environment.

Chapters 3 and 4 focus on the detailed characteristics of each of these factors and their importance in shaping Poland's competitiveness in 2012.

The third part of this report (Chapters 5 and 6) looks at selected aspects of the competitiveness of Polish regions. The starting point for this analysis is a comparative assessment of the competitiveness of Polish regions in relation to other EU regions. This evaluation is based on key development indicators, such as GDP, geographical concentration (reflected by the presence of industrial clusters in a region) and selected measures of exports and imports handled by Polish regions as well as indicators of innovation and investment attractiveness. European cohesion policy is mentioned here as a way to reduce disparities among Polish regions as well as minimize the gap between them and their counterparts in other EU countries and worldwide. The new paradigm of regional policy advanced by the Organization for Economic Cooperation and Development (OECD) is an opportunity for Polish regions. It involves the diffusion of growth effects from developed to underdeveloped regions.

These three parts of the book are followed by conclusions on the possible paths of Poland's development as well as pro-competitive economic policy choices for the 2014–2020 period.

Marzenna Anna Weresa

PART I

POLAND'S COMPARATIVE ECONOMIC PERFORMANCE AND COMPETITIVE POSITION IN 2012

Chapter 1
Economic Development and Its Convergence

This chapter focuses on the macroeconomic aspect of competitiveness in the Polish economy. The comparative analysis is based on key economic indicators such as GDP growth, inflation, unemployment, public finances, and the current-account balance, which collectively form the so-called "magic pentagon of competitiveness." Moreover, this comparative analysis covers the degree of convergence among the new EU member states from Central and Eastern Europe (including Poland) in terms of GDP per capita as well as the convergence between this group of countries and the EU15. The chapter ends with a discussion of changes in income inequality in Poland compared with other EU countries.

As the main focus of this edition of the report is the competitiveness of Polish regions, in each of the subsections, the macroeconomic perspective of Poland's competitiveness is supplemented by a presentation of selected aspects of development trends in Polish regions. The regional dimension of Poland's competitiveness outlined in this chapter is analyzed in depth in Part III of this report (Chapters 5 and 6).

1.1. Comparative Economic Performance in 2012

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 2012, we will first outline its global context, i.e. sketch a picture of the changing patterns in economic growth that occurred in the world economy over the past 12 months.

Table 1
World economic growth 2006–2012 (rates of growth in %)

Year	2006–2009 (annual averages)	2010	2011	2012[a]
World	3.2	5.1	3.8	3.3
Developed countries	0.4	2.6	1.4	1.1
Euro zone	0.6	2.1	1.5	–0.5
USA	0.3	2.4	1.8	2.1
Japan	–0.7	4.5	–0.7	1.5
Transition countries	3.9	4.4	4.5	3.5
Russia	3.5	4.3	4.3	3.7
Developing countries of which: least developed countries	5.8 7.5	7.7 5.8	5.7 3.7	4.7 3.7
Africa	5.0	4.7	1.1	5.0
Southeastern Asia	7.6	9.0	6.8	5.5
China	11.4	10.3	9.2	7.7
India	7.8	9.6	6.9	5.5
Latin America	3.4	6.0	4.3	3.1

[a] preliminary data.
The world economic growth rates are calculated based on IMF data; the remaining growth rates are calculated based on UN figures. The economic growth rates of country groups according to the UN are calculated as a weighted average of the GDP growth rates in individual countries, with the weights based on GDP in 2005 prices and exchange rates.

Source: United Nations (2013), *World Economic Situation and Prospects 2013*, New York; IMF (2012), *World Economic Outlook Database*, October 2012.

As can be seen from preliminary data shown in Table 1, the global Gross Domestic Product grew 3.3% in 2012, slightly less than in 2011. Yet the world economy returned to its medium-run growth trend, experienced in 2006–2009, including the deepest contraction of output since World War II, which occurred in 2009.

As in 2010 and 2011, the continuing recovery of the global economy was mostly due to fast economic growth in developing economies; the GDP growth rate for these countries was 5.0%. The most remarkable growth indices in this group were recorded in Southeastern Asia (5.5%), in particular in China (7.7%) and India (5.5%). The macroeconomic performance of the world economy was also fueled by the relatively good growth performance of transition economies[1] and Africa.

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

Size of the economy

We begin our analysis of the Polish economy in 2012 and its international competitive position with a brief assessment of Poland's economic potential and its role in the world economy as well as in the enlarged European Union.

Table 2, based on the latest IMF data, ranks the world's largest economies in 2012 according to GDP measured in US$ at current exchange rates (CER) and at purchasing power parity (PPP)[2]. The data on the GDP in 2012 given in the table are preliminary and may be subject to further revisions.

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

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

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

Table 2
The world's largest economies in 2012 (GDP in US$ billion)

Rank	Country	GDP at CER		GDP at PPP	
		billions of US$	% of world's total	billions of US$	% of world's total
1 (1)	United States	15,653	22.0	15,653	18.9
2 (2)	China	8,250	11.6	12,383	15.0
3 (4)	Japan	5,984	8.4	4,617	5.6
4 (5)	Germany	3,367	4.7	3,194	3.9
5 (9)	France	2,580	3.6	2,253	2.7
6 (8)	United Kingdom	2,434	3.4	2,316	2.8
7 (7)	Brazil	2,425	3.4	2,366	2.9
8 (10)	Italy	1,980	2.8	1,834	2.2
9 (6)	Russia	1,954	2.7	2,512	3.0
10 (3)	India	1,947	2.7	4,711	5.7
11 (13)	Canada	1,771	2.5	1,446	1.7
12 (18)	Australia	1,542	2.2	961	1.2
13 (14)	Spain	1,340	1.9	1,407	1.7
14 (11)	Mexico	1,163	1.6	1,758	2.1
15 (12)	Korea (South)	1,151	1.6	1,622	2.0
16 (15)	Indonesia	895	1.3	1,212	1.5
17 (16)	Turkey	783	1.1	1,125	1.4
18 (23)	Netherlands	770	1.1	710	0.9
19 (22)	Saudi Arabia	657	0.9	741	0.9
20 (35)	Switzerland	623	0.9	362	0.4
21 (33)	Sweden	520	0.7	396	0.5
22 (39)	Norway	500	0.7	278	0.3
23 (17)	Iran	484	0.7	997	1.2
24 (30)	Belgium	477	0.7	421	0.5
25 (21)	Argentina	475	0.7	747	0.9
26 (20)	**Poland**	**470**	**0.7**	**802**	**1.0**
27 (19)	Taiwan	466	0.7	902	1.1
28 (36)	Austria	391	0.5	359	0.4
29 (25)	South Africa	391	0.5	579	0.7
30 (24)	Thailand	377	0.5	646	0.8

Note: All GDP data for 2012 are IMF preliminary estimates. Ranks in the first column correspond to GDP calculated at CER and GDP calculated at PPP (the latter in parenthesis).

Source: IMF, World Economic Outlook Database (www.imf.org), accessed Feb. 2, 2013.

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

According to these data, Poland, depending on the conversion rate, ranked 20th or 26th among the world's largest economies in 2012. With GDP calculated at CER, Poland's economy, at US$ 470 billion, ranked 26th between Argentina and Taiwan, while in terms of GDP estimated at PPP, Poland, at US$ 802 billion, ranked 20th between Taiwan and Argentina. Compared with the previous year, Poland's position in this ranking did not change in terms of the PPP GDP value (20th place in both 2012 and 2011), but it deteriorated substantially in terms of GDP measured at CER (26th rank now, against 22nd previously). This is a result of the slowdown in Poland's economic growth noted last year and of the depreciation of the Polish zloty against the U.S. dollar[3].

The point is that when analyzing the changing position of individual countries over time in such international comparisons, we should bear in mind that changes in the GDP values expressed in current US$ or another international currency reflect not only the change in output volumes, but also changes in exchange rates. A better basis for assessing the comparative position of a given country in the global economy or in other international comparisons is data for a longer period, which reveals the long-term trend in the relative economic potential of the country. In the case of Poland, this trend was positive until recently, meaning a gradual improvement in the international competitive position of the Polish economy. However, the last few years have brought some deterioration in this position despite Poland's relatively good growth record. This is because some other countries have grown more rapidly or benefited from more advantageous trends in exchange rates and relative price levels.

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

[3] As a matter of fact, the almost 9% decrease in the value of Poland's GDP expressed in US$ at CER compared with the previous year was exclusively due to the changing exchange rate. National Bank of Poland data show that the average exchange rate of the U.S. dollar against the Polish zloty increased by almost 10% in 2012 compared with the previous year.

global financial and economic crisis has not stopped the rapid growth in the developing countries of the Far East and they have become the most dynamic part of the global economy in the last few years.

Before we go on to evaluate the position of the Polish economy in the enlarged European Union, let us first describe the role of the EU27 in the world economy. According to preliminary IMF estimates, the combined GDP of all EU27 countries in 2012 was $ 16,414 billion at CER or $ 16,074 billion at PPP. This represented 23.0% or 19.4% of global output respectively. These figures testify to the economic potential of the European Union. To compare, the GDP of the United States, the largest single economy in the world, was $ 15,653 billion that same year (22.0% or 18.9% of global output). China, the second-largest economy, remained far behind the European Union in terms of GDP at CER ($ 8,250 billion), but is rapidly bridging the gap in terms of GDP at PPP ($ 12,383 billion), representing 11.6% or 15.0% of global output respectively.

Table 3 provides data on the size of EU economies. It includes preliminary data on the value of GDP in individual member countries in 2012, calculated in euros at current exchange rates (CER) and at the purchasing power standard (PPS)[4]. It should be remembered that GDP data for 2012 are preliminary estimates that will be subject to revision.

As in the case of GDP estimates at PPP expressed in U.S. dollars, the GDP value at PPS expressed in euros depends on the purchasing power of the international currency (in this case, the euro) in a given country, i.e. on the relative price level (against the average price level in the EU). In countries where prices are relatively high, the GDP value calculated at PPS is lower than its value calculated at CER and, vice versa, in countries with relatively low prices, the GDP value at PPS is higher than its value at CER. For all CEE countries, the GDP values at PPS are much higher than the values calculated at CER. For Poland, the difference in 2012 was 72%, for the Czech Republic it amounted to 41%, and for Bulgaria it was 114%. The difference between the GDP value at PPP or PPS and the GDP value at CER is usually the bigger, the less developed the country concerned is. However, this is not a strict rule since the difference is related to the relative price level, which may not be proportional to the development level. It cannot be ruled out that the GDP values at PPP or PPS for the CEE countries given by the World Bank, IMF and Eurostat may be overestimated. The conversion rates (parities) used in estimating GDP at PPP or PPS are highly favorable for most CEE countries. This should be taken into account when interpreting the comparative position of CEE economies in the EU and in assessing the distance between CEE and the EU15 in terms of GDP per capita. This is why we include both CER and PPP or PPS estimates of GDP in our comparisons.

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

Table 3
GDP of EU member countries in 2012 (€ billion)

Rank	Country	GDP at CER		GDP at PPS	
		billions of €	%	billions of €	%
1 (1)	Germany	2,645.0	20.5	2,564.4	19.8
2 (2)	France	2,033.7	15.7	1,820.8	14.1
3 (3)	United Kingdom	1,914.3	14.8	1,754.9	13.6
4 (4)	Italy	1,565.8	12.1	1,527.5	11.8
5 (5)	Spain	1,050.2	8.1	1,150.6	8.9
6 (7)	Netherlands	609.1	4.7	561.1	4.3
7 (9)	Sweden	410.7	3.2	312.2	2.4
8 (6)	**Poland**	**381.0**	**2.9**	**654.9**	**5.1**
9 (8)	Belgium	377.1	2.9	335.6	2.6
10 (10)	Austria	309.3	2.4	282.1	2.2
11 (15)	Denmark	245.1	1.9	180.7	1.4
12 (12)	Greece	195.0	1.5	216.3	1.7
13 (17)	Finland	194.7	1.5	159.2	1.2
14 (14)	Portugal	166.5	1.3	206.5	1.6
15 (18)	Ireland	162.3	1.3	150.4	1.2
16 (13)	Czech Republic	152.5	1.2	215.0	1.7
17 (11)	Romania	131.3	1.0	261.2	2.0
18 (16)	Hungary	99.6	0.8	166.6	1.3
19 (19)	Slovakia	72.9	0.6	105.2	0.8
20 (23)	Luxembourg	43.6	0.3	36.4	0.3
21 (20)	Bulgaria	39.2	0.3	88.0	0.7
22 (22)	Slovenia	35.7	0.3	43.2	0.3
23 (21)	Lithuania	32.5	0.3	53.0	0.4
24 (24)	Latvia	21.9	0.2	32.3	0.3
25 (26)	Cyprus	17.8	0.1	20.2	0.2
26 (25)	Estonia	16.9	0.1	23.8	0.2
27 (27)	Malta	6.8	0.1	9.3	0.1
	EU27	12,930.5[a]	100.0	12,930.5[a]	100.0

Note: All GDP data are preliminary Eurostat estimates. The ranks given in the first column refer to GDP calculated at CER and PPS (the latter given in parenthesis). Percentage shares in EU27 total were calculated by the author.

[a] The total sum of the GDP values shown in the table for individual countries differs slightly from the total GDP value for the EU27 given by Eurostat (€ 12,810.1 billion).

Source: Eurostat database (ec.europa.eu/eurostat), Feb. 6, 2013.

The European Union is composed of 27 member states of different size and different economic potential. The five biggest countries in terms of population and production volume–Germany, France, United Kingdom, Italy, and Spain–represent 63% of the total population of the EU27 and 72% of the combined GDP if calculated at CER or 68% if calculated at PPS. The 15 countries that belonged to the EU before its extension (EU15) represent 80% of the total population and produce 93% of the combined GDP calculated at CER or 87% of the combined GDP calculated at PPS. At the same time, the 12 new member states that joined the EU in 2004 and 2007–i.e., 10 CEE countries along with Cyprus and Malta–represent 20% of the total population and produce only 7% or 13% of the total EU GDP respectively. This substantial asymmetry between the "old core" of the EU and the new entrants (or, more broadly, between Western Europe and Central Eastern Europe) should be kept in mind when evaluating Poland's position in the European Union.

Poland is the largest of the 12 new member states of the European Union in terms of area, population, and GDP. In the enlarged European Union (EU27), Poland ranks sixth in terms of area and population (7.2% and 7.7% respectively). In terms of GDP volume, it also ranks sixth (5.1%) if GDP is calculated at PPS, 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 European Union is much lower than what might be suggested by the size of its territory or population but, in light of historical experience, this fact should come as no surprise. Nevertheless, it should be emphasized that Poland has significantly improved its position in the overall economic potential of the EU27 since it entered the bloc in 2004. Poland's contribution to the total GDP of the EU27 calculated at CER rose steadily from 1.9% in 2004 to 2.5% in 2007, 2.9% in 2010, and 3.0% in 2011, but in 2012 it decreased to 2.9% (mainly as a result of a depreciation of the Polish zloty against the euro). Similarly, Poland's share in the total GDP of the EU27 calculated at PPS rose from 3.9% in 2004 to 4.2% in 2007, 4.8% in 2010, 4.9% in 2011, and 5.1% in 2012. In 2010, Poland advanced one place in the EU27 in terms of GDP at CER, moving ahead of Belgium, but in 2012 it was outdistanced by Sweden. In terms of PPS GDP, Poland's position has not changed.

Economic growth and real convergence

The 1990s and the subsequent decade saw a fast real convergence of the Polish economy vis-à-vis both EU countries and all transition economies. The improvement of Poland's relative development level was mostly the result of its economic growth, which was the second-fastest among 28 transition economies and by far the fastest in the new CEE members of the European Union (EU10). The relevant data is shown in Table 4. The average annual growth rate of Poland's GDP in real terms during 1989–2012 totaled 3.1% including a deep contraction of output in 1990–1991 (by a combined 14.7%) due to the effects of the "transformation recession."

Table 4
Growth of Gross Domestic Product, 1990–2012

Country	Real GDP growth rate				Real GDP index in 2012	
	Average annual % growth	Annual % growth				
	1990–2012	2010	2011	2012	1989=100	2000=100
Poland	**3.1**	**3.9**	**4.3**	**2.4**	**201**	**157**
Czech Republic	1.4	2.5	1.9	–1.3	139	140
Slovakia	2.4	4.4	3.2	2.6	172	169
Hungary	1.1	1.3	1.6	–1.2	129	122
Slovenia	1.6	1.2	0.6	–2.3	143	128
Estonia	1.6	3.3	8.3	2.5	144	158
Lithuania	0.5	1.5	5.9	2.9	113	167
Latvia	0.2	–0.9	5.5	4.3	105	157
Bulgaria	0.5	0.4	1.7	0.8	111	153
Romania	0.8	–1.1	2.2	0.8	119	155
EU15	1.6	2.1	1.4	–0.4	145	113

Source: Eurostat (ec.europa.eu/eurostat); EBRD (www.ebrd.com); IMF, *World Economic Outlook Database*, October 2012; own calculations.

As a result of both the shallowest GDP decline in the early stage of the transition and the fastest economic growth during the 1990s, the GDP produced in Poland in 2012 represented 201% of the level recorded in 1989. This index favorably compares with similar indices for all the remaining former communist countries while also exceeding the corresponding indicator for the EU15[5]. As far as the former communist countries are concerned, however, one important point should be raised. Since the beginning of the previous decade, Poland has lost its leading position as the fastest-growing economy in the region. In 2001–2012, it was outpaced by Estonia, Lithuania, and Slovakia.

The 2009–2012 period produced dramatic changes in economic growth trajectories. The global economic crisis, which began in the fall of 2008 in the United States, spread to most of the world's developed countries and triggered a deep recession in the European Union. The recession affected all new EU member countries in Eastern and Central Europe except Poland.

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

Seen against this background, Poland's macroeconomic performance looks particularly impressive. The Polish economy was the only one in the European Union to show real GDP growth in 2009; in 2010–2012, it ranked among the fastest-growing in Europe. These results may indicate its strong resistance to negative external shocks connected with the global financial crunch. Furthermore, if we combine this growth trend with the performance of the Polish economy during the "transformation recession" in the early 1990 s, we come to the conclusion that the rising international competitiveness of Poland is not only a function of its fast economic growth but also a result of its exceptionally strong resistance to both external and internal negative shocks. This last salient feature makes long-run economic growth in Poland not only relatively fast but also sustainable and relatively stable.

Table 5

Relative development levels in Poland and selected EU countries, 1989–2012 (GDP per capita at PPP, Poland = 100)

Country	1989	2000	2006	2007	2008	2009	2010	2011	2012[a]
Poland	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**
Germany	279	246	221	213	207	189	189	189	184
France	268	240	208	200	191	179	171	169	164
Italy	274	246	200	193	186	170	160	156	148
Britain	256	248	233	217	202	182	176	170	164
Spain	199	202	202	194	186	169	157	153	147
Ireland	195	275	281	272	236	213	205	202	193
Portugal	159	169	152	146	139	131	127	120	115
Greece	178	175	177	167	166	154	138	123	113
EU15 average	**262**	**240**	**215**	**206**	**198**	**180**	**175**	**172**	**165**
Czech Republic	197	148	154	154	145	136	127	125	120
Hungary	146	113	121	113	114	107	103	103	98
Slovakia	155	104	121	126	130	120	116	114	115
Slovenia	194	167	167	163	163	143	133	131	124
Estonia	142	94	127	130	123	103	100	105	105
Lithuania	145	83	106	109	109	90	90	103	104
Latvia	137	75	102	106	104	89	86	91	93
Bulgaria	122	58	73	74	77	72	70	72	71
Romania	89	54	73	76	84	77	75	77	72

[a] preliminary estimates.

Source: IMF, *World Economic Outlook Database, September 2005* (for 1989); Eurostat (for 2000–2012); own calculations.

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

Table 6

Development gap in new EU member countries vis-à-vis the EU15 average, 1989–2012 (GDP per capita in PPP, EU15 = 100)

Country	1989	2004	2010	2011	2012[a]
Poland	**38**	**45**	**57**	**58**	**61**
Czech Republic	75	69	73	73	73
Slovakia	59	50	66	66	70
Slovenia	74	77	76	76	75
Hungary	56	56	59	60	59
Estonia	54	50	57	61	64
Lithuania	55	45	51	60	63
Latvia	52	42	49	53	56
Bulgaria	47	31	40	42	43
Romania	34	30	43	45	44

[a] preliminary estimates.

Source: Rapacki R., Próchniak M. (2009), "The EU Enlargement and Economic Growth in the CEE New Member Countries," *European Economy, Economic Papers*" No. 367, March; IMF, *World Economic Outlook Database, September 2005* (for 1989); Eurostat (for 2004–2012); own calculations.

As can be seen from the data in Table 6, in 2012 Poland's GDP per capita in PPP terms stood at 61% of the EU15 average, up from 58% a year earlier. This was equivalent to a gain of 23 percentage points between 1989 and 2012, of which 18 points have been gained since Poland's entry to the European Union in May 2004[6]. The catching-up process has been particularly fast toward the largest EU economies including Germany, France, Britain and Italy.

The performance of the Polish economy also looks impressive against the background of other new EU members in Central and Eastern Europe. Only Slovakia, Estonia, and Romania managed to significantly narrow their development gaps toward EU15

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

countries (Slovakia's gap narrowed by 11 percentage points, and Estonia and Romania each mustered 10 points). In the remaining CEE economies, the gap remained essentially unchanged or has even widened (in Bulgaria and the Czech Republic) since 1989.

This general cumulative outcome of the real convergence process in CEE countries was largely due to changes in the economic growth performance of these countries in the last four years. The contraction of output triggered by the global crisis in all new EU member countries except Poland was deeper than in "old" EU economies (Table 4). As far as Poland is concerned, the huge diversification of GDP growth rates among EU countries was conducive to a spectacular improvement in its competitive position. Poland not only narrowed its development gap toward the EU15 by 7 percentage points, but also outpaced Latvia and Hungary in terms of the relative development level and has been swiftly catching up with Greece and Portugal (see Tables 5 and 6).

Socioeconomic development and standard of living

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

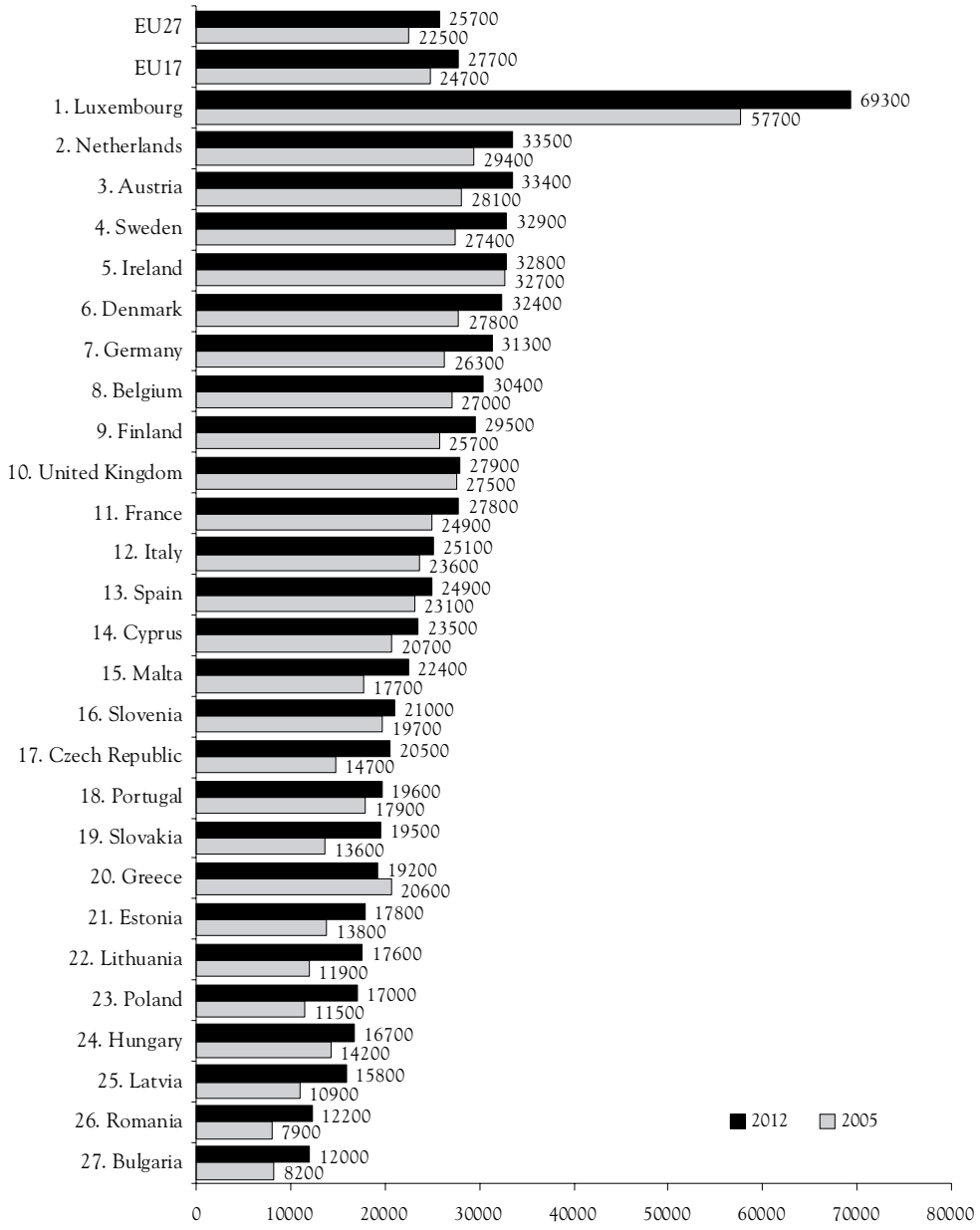
The basic measure of socioeconomic development and standard of living is national income per inhabitant. Figure 1 shows GDP per capita measured at PPS in EU27 countries in 2005 and 2012. The figure enables us to compare the value of GDP per capita and to evaluate the growth of real income in individual countries between 2005 and 2012, the period after the main EU enlargement. The GDP per capita data for 2012 are preliminary. It should be remembered that both the total GDP of CEE countries and their per capita GDP estimated at PPS are much higher than the corresponding values calculated at CER. As previously noted, the GDP figures at PPS for CEE countries are imprecise and may be overestimated.

According to our calculations based on the most recent Eurostat data, the average GDP per capita in the enlarged EU (EU27), converted at PPS, was € 25,700 in 2012. In the euro area (EU17), the figure was € 27,700, and in the "old EU countries" (EU15), it was € 28,100.

Luxembourg leads the EU in terms of per capita GDP, with € 69,300[7]. A high per capita income (around € 30,000 or more) is also recorded in the Netherlands, Austria, Sweden, Ireland, Denmark, Germany, Belgium, and Finland. The largest EU countries except Germany, namely France, Britain, Italy, and Spain, have lower per capita GDP (ranging between € 25,000 and € 28,000). Less advanced Western European countries such as Greece, Portugal, Cyprus, and Malta have much lower incomes (between € 19,000 and € 24,000). In CEE countries, GDP per capita ranges from € 12,000 in Bulgaria to € 21,000 in Slovenia.

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

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



Note: Ranking based on preliminary PPS GDP estimates for 2012. Reference data for 2005 illustrate the change in the period after EU enlargement. GDP per capita was calculated by dividing total GDP by total population.

Source: Presentation based on data taken from Eurostat database Feb. 6, 2013 (ec.europa.eu/eurostat).

Against this background, Poland's position in the EU in terms of per capita GDP is unimpressive. With a GDP per capita of € 17,000 in 2012, Poland ranked in the bottom part of the list of the enlarged EU. Only four other EU member countries, Hungary, Latvia, Romania, and Bulgaria, have lower income per inhabitant. In the last few years, the league table has undergone substantial reshuffling due to different responses in individual countries to the global financial crunch and the euro-area crisis. As a result, Poland has outdistanced Hungary and Latvia, and narrowed the gap toward Estonia and Lithuania, but the distance to Slovakia, the Czech Republic, and Slovenia remains substantial.

Referring to the income convergence process–discussed in the preceding section – between Poland and other CEE countries on the one hand, and the EU "core" on the other, we can add some interesting findings based on the GDP per capita data given in Figure 1. During the last seven years, Poland's GDP per capita, measured at PPS, increased by 48% while the same indicator for the EU17 (roughly equivalent to that for the EU15) rose by only 12%. As a result, the index showing the relative PPS GDP per capita level in Poland (taking the EU17 as 100) went up from 47 in 2005 to 61 in 2012, implying further progress in closing the income gap. Moreover, the rise in real GDP per capita in Poland over this period was greater than in any other CEE country except Romania.

When assessing the wealth of inhabitants in individual countries, apart from the current income, it is necessary to take into account the value of assets possessed. Unfortunately, international statistics do not offer such data, because information on household assets, gathered from occasional censuses and surveys, is incomplete and inaccurate.

The available information on income inequality, particularly poverty, is also incomplete and often outdated. The latest estimates of poverty rates–which use an international poverty line of $ 2 per day, as defined by the World Bank–show that in all EU countries except Bulgaria and Romania, the incidence of absolute poverty 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. In Poland, according to a survey conducted in 2002, the proportion of the population living below the national poverty line was estimated to be 16.6% (World Bank, 2013a).

A conventional gauge of income inequality is the Gini coefficient, which measures the overall concentration of household income. Poland is among the countries with relatively high income inequalities. The Gini coefficient for Poland, at 31.1 in 2011, was comparable with that in Italy and slightly higher than the EU27 average. Among the new member states of the EU27, more egalitarian proportions of income distribution are reported by the Czech Republic, Slovakia, Slovenia, and Hungary, while more equality among Western European countries can be seen in Denmark, Belgium, Luxembourg, the Netherlands, Sweden, Finland, Austria, and Germany, the countries that most strongly promote the idea of a welfare state.

Another indicator of income inequality is the income gap between the poorest and the richest people in a given country. According to the Eurostat data (Eurostat, 2013),

the ratio between the income earned by the 20% wealthiest and 20% poorest families in Poland in 2011 was 5:1, which was roughly equal to the EU27 average. But in most EU countries this ratio was lower, and a significantly bigger disproportion between the rich and the poor was only seen in Italy, Spain, Portugal, and Greece as well as in Romania, Bulgaria, Latvia, and Lithuania. 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 30% of total disposable income. In a recent OECD report on income inequality (OECD, 2008), Poland was ranked fourth among 30 OECD countries in terms of income inequality[8].

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 and the education level, which are assumed to represent three basic dimensions of human development: a long and healthy life, thorough knowledge, and a decent standard of living. The index ranges from 0 to 1 (higher values mean a higher development level).

In last year's edition of the WERI report (Weresa, ed., 2012, pp. 25–26), we included a table with 2011 data on HDI and its components for all EU27 countries. Since the next UNDP report with HDI data for 2012 will appear at a later date, we will confine ourselves here to briefly recapitulating the conclusions we drew from the analysis of the indicator last year, with a special focus on Poland's position in the worldwide HDI standings for 2011, which cover 187 countries (UNDP, 2011).

The following countries lead the way in the global HDI classification: Norway, Australia, the Netherlands, the United States, and New Zealand. When it comes to EU27 members, the Netherlands, Ireland, Germany and Sweden are among the top 10 countries. Among the new EU member countries in CEE, Slovenia ranks the highest, followed by the Czech Republic, Estonia, Slovakia, Hungary, Poland, Lithuania, Latvia, Romania, and Bulgaria. Poland, with an HDI of 0.813, is close to the CEE average but behind most other countries in the enlarged EU and ahead of only Lithuania, Latvia, Romania, and Bulgaria. In the worldwide HDI standings, Poland now ranks 39th.

Poland's HDI has increased consistently, which testifies to the continuity of the country's socioeconomic development[9]. In 2011, Poland advanced in the HDI ranking by two notches, leaving Portugal behind. However, Poland's HDI rank worldwide is still remote, closer to 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 level, health, and education.

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

9 When analyzing historical HDI time series, it should be remembered that the formula used to calculate the indicator was changed in 2010, and the new values of the indicator are not comparable with the former ones. The revised HDI time series, calculated according to the new formula, are available for Poland for the period after 2000.

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

One important aspect of social wealth and living standards that is not directly considered in the HDI is the availability of jobs and the existing employment opportunities. This factor directly influences income and wealth as well as the extent to which education and human capital may be transformed into higher living standards. Undoubtedly, high unemployment is in sharp conflict with people's sense of well-being and wealth. Meanwhile, high unemployment has become one of the main economic problems in Europe and elsewhere; its acuteness increased in the last few years due to the global crisis. 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 because changes in employment and unemployment lag behind changes in output and are usually smaller. In 2012, the highest unemployment rates in Western Europe were recorded in Spain (25.0%), Greece (24.1%), Portugal (15.7%), and Ireland (14.9%). Among the CEE countries, Latvia (15.1%), Lithuania (13.0%), and Slovakia (14.0%) were the most affected[10]. Poland, with an annual unemployment rate of 10.2% noted in labor market surveys, was roughly at the EU average, but in many regions and cities registered unemployment was much higher. A special problem is high unemployment among young people. On average in the EU27, the unemployment rate among young people is two or three times higher than that among adults. In Poland, the unemployment rate among those aged under 25 was almost 23% in 2012 (Eurostat, 2013).

The global crisis of 2008–2009 and the current crisis in the euro area have strongly affected the economic well-being of people across Europe, reducing real incomes, adding to unemployment, and compounding social problems related to living standards. The impact of the global crisis on living standards in CEE and other transition countries is scrutinized in a recent study by the EBRD (EBRD, 2011) and in another report drawn up by World Bank experts (World Bank, 2011). The research shows that the adverse impact of the crisis on social well-being in transition countries has been much stronger than that seen 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, and decreasing consumption and savings.

10 All these data are the average unemployment rates recorded in labor force surveys (LFS) during the first three quarters or first 11 months of 2012. Registered unemployment was usually higher.

Comparative assessment of macroeconomic performance

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

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

The tool used in this analysis is the pentagon of macroeconomic performance[11]. It illustrates the degree of meeting five macroeconomic goals: (a) economic growth, (b) full employment, (c) internal equilibrium (no inflation), (d) public finance equilibrium, and (e) external payments equilibrium. The degree of fulfilling these goals is expressed by the variables marked on the axes of the pentagon.

The tips of the pentagon, representing maximum or minimum values of the indicators, are considered to be desirable (positive) targets, although in some cases this can be disputable. For example, a high current-account surplus or a surplus in the state budget, as well as zero inflation or zero unemployment may not be an optimal result. Another problem is interrelations (notably conflicts) between individual macroeconomic goals, e.g. the fact that low unemployment (according to the Phillips curve) is often accompanied by high inflation, and vice versa. A separate 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 take into consideration both their surface and their shape. A larger surface of the pentagon is assumed to mean a better general economic performance while a more harmonious shape indicates more balanced growth. Of course, such an assessment is confined to the five aforementioned parameters of current macroeconomic performance. It tells nothing about the size of the given economy, its economic potential, and development prospects. It does not even tell much about its possible performance in the next year, though a good current condition of the economy raises the chance of good future performance. Nevertheless, any analysis based on this method must be made with caution.

[11] This refers to the concept used in the analysis of the general condition of Poland's economy and in the comparative analysis of economic situation in post-socialist countries (Kołodko, 1993; Misala, Bukowski, 2003; Matkowski, 2003, 2004, 2007). This method was also used in the comparative analysis of the macroeconomic performance of the Polish economy presented in earlier WERI reports.

Following our discussion in last year's WERI report (Weresa, ed., 2012), here we compare the overall performance of Poland's economy in 2012 with the situation in three other CEE countries: Hungary, the Czech Republic, and Slovakia, and in four Western European countries: Germany, France, Spain, and Sweden. The choice of the countries included in this comparison is not accidental. Among the CEE countries, Hungary, the Czech Republic, and Slovakia are the most similar to Poland in the development level, structure of the economy, advancement of the transition process, and the progress of integration with the European Union. In Western Europe, Germany and France (along with Italy) are Poland's main trade partners and major sources of FDI inflows. On the other hand, Spain is a country similar to Poland in terms of its size and structure of the economy; moreover, it now faces a number of similar macroeconomic problems, including a sizeable public finance deficit, large foreign debt, and high unemployment. Sweden has been included in this comparison because of its similar value of GDP at CER and because of its good economic performance in the last few years, which was achieved despite (or thanks to) its non-participation in the European Monetary Union (EMU).

Table 7
Key macroeconomic indicators for Poland and some other EU countries in 2012

Country	GDP growth[a]	CPI inflation	Unemployment rate	General government balance	Current-account balance
	%	%	%	% of GDP	% of GDP
Czech Republic	–1.1	3.5	7.0	–3.2	–2.4
France	0.0	2.2	10.3	–4.7	–1.7
Germany	0.9	2.1	5.5	–0.4	5.4
Hungary	–1.8	5.7	10.9	–2.9	2.6
Poland	2.0	3.7	10.2	–3.4	–3.7
Slovakia	2.1	3.7	14.0	–4.8	0.8
Spain	–1.4	2.4	25.0	–7.0	–2.0
Sweden	1.1	0.9	7.7	–0.2	7.2

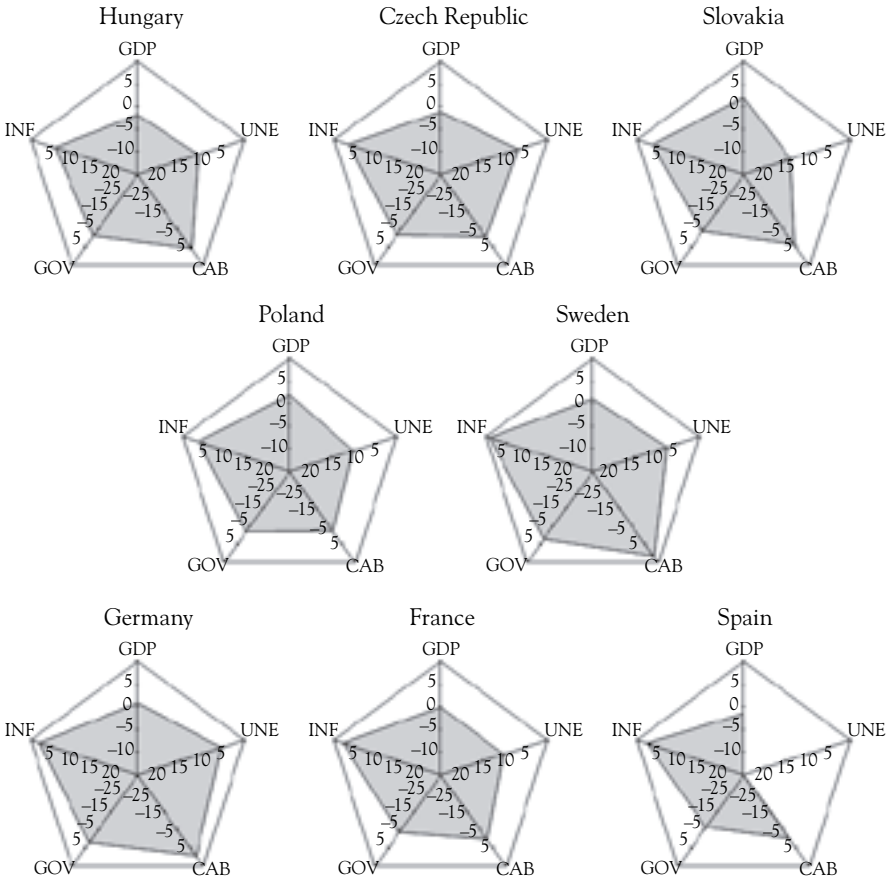
Note: All the data are preliminary estimates.
[a] The estimated GDP growth rate in 2012 has been corrected according to the newest quarterly data from Eurostat; for Poland, the preliminary estimate by the Central Statistical Office (GUS, 2013b) is included.

Source: GDP growth rate, CPI inflation, and unemployment rate (harmonized unemployment rate based on survey data, yearly average) according to Eurostat Database (ec.europa.eu/eurostat); general government balance and current-account balance according to IMF World Economic Outlook Database (www.imf.org), Feb. 6, 2013.

Table 7 shows the five indicators describing the general performance of the economy in Poland and seven other EU countries in 2012. These are the most recent data available from international sources (IMF and Eurostat). All the data given in the table are preliminary estimates, which may be subject to further corrections and revisions.

In case of Poland, these data are more or less in line with the official preliminary data published by the Central Statistical Office (GUS) and the National Bank of Poland (NBP) (GUS, 2013b, c; NBP, 2012), and the minor differences do not significantly affect our general assessment of the condition of the Polish economy and the conclusions drawn from this analysis. Figure 2 presents the data in the form of pentagons, more convenient for a comparative analysis.

Figure 2
The macroeconomic performance of Poland and some other EU countries in 2012



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

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

We begin our analysis with an inter-country comparison of the five macroeconomic indicators (in light of the overall economic situation in the EU27), considering changes from the previous year. Then, we compare the pentagons showing the general performance of the economies concerned in 2012–from the point of view of the comparative position of the Polish economy–while taking into account changes from the previous year.

The year 2012 was the third year of moderate growth in the world economy after the global economic crisis of 2008–2009. However, Europe was affected again by a slowdown, linked with the financial crisis in the euro area. Preliminary Eurostat data show that in 2012 the total real GDP of the EU27 dropped by 0.3% (0.5% in the euro area). This was mainly the result of a considerable slowdown in Germany, stagnation in France and Britain, and a renewed recession in Italy and Spain. In the analyzed group, the highest output growth, by around 2%, was noted by Slovakia and Poland. Germany and Sweden saw a meager growth of output, by around 1%; France recorded a complete stagnation; and the Czech Republic, Hungary and Spain saw output decrease by 1%–2%. Compared with the previous year, all the above economies noted a considerable decline in their output growth rates.

The slowdown has not been accompanied by a remarkable reduction of inflation as yet. For the EU27 as a whole, the average CPI inflation in 2012 was around 2.5%, compared with 3% in 2011. Nevertheless, in most EU countries, inflation was kept under control by restrained fiscal and monetary policies. In the analyzed sample, all the countries except the Czech Republic and Hungary saw slightly lower inflation than in the previous year. In Germany, France, and Spain, inflation was kept within a safe range of 2% and 2.5%; in Sweden it was reduced to 1%; in Poland, the Czech Republic and Slovakia it stayed at around 3.5%, whereas in Hungary inflation jumped to 5.5% or more, despite the recession). In most European countries, governments and central banks are now again faced with the uneasy problem of how to curb inflation in a way that would not jeopardize output growth.

In most EU countries, unemployment remains at relatively high levels because it is predominantly composed of long-term structural and short-term frictional unemployment. In 2012, the average unemployment rate in the EU27 was almost 10.5% and was slightly higher than in 2011. In the analyzed group, the unemployment rate decreased only in Germany (to 5.5%), while staying at about the same level as in the previous year in the Czech Republic (7%), Hungary (11%) and Sweden (around 7.5%). In the four remaining countries, unemployment increased: to over 10% in Poland, 14% in Slovakia, and to an alarming 25% in Spain. It should be remembered that all the unemployment rates quoted here refer to the average yearly unemployment rate recorded in labor market surveys; they are usually lower than the registered unemployment rates. For example, in Poland, the registered unemployment rate in 2012 was 12.7%.

The financial crisis in the euro area and growing concerns over the state of public finances have brought about some public finance consolidation in almost all EU member countries, both in the euro area and outside it. According to the preliminary data, the average budget deficit level in the EU27 was reduced from 4.5% of the GDP in 2011 to 4.0% in 2012. In the analyzed group, the most significant improvement in the

general government balance was reported by Poland, where the state budget deficit was reduced from 5.1% of GDP to 3.4% of GDP. Germany reduced its budget deficit to 0.4% of GDP, and Sweden closed its state budget with an almost zero balance, as in the two preceding years. France and the Czech Republic have maintained their budget deficits at around 3% of the GDP, while Spain and Slovakia continue to show deficits amounting to almost 5% and 7% of the GDP respectively, despite the tighter fiscal discipline in the euro area. Hungary, after a dubious surplus noted in the previous year, recorded a deficit again, though its level is kept under strict control (below 3% of the GDP).

Despite this progress, the road toward meeting the 3% budget deficit limit imposed by the Maastricht Treaty is still quite long for many EU countries. A closely related problem is a rise in public debt, both in terms of its absolute level and relative to GDP. In the analyzed group, the ratio of public debt to GDP at the end of 2011 ranged from 38% in Sweden to just over 40% in the Czech Republic and Slovakia to 56% in Poland, 69% in Spain, 81% in Germany and Hungary, and 86% in France (Eurostat, 2013). In most countries, the public debt burden is growing due to continuous state budget deficits and rising interest payments.

The current-account balances in individual countries are not directly comparable because they depend on a variety of factors that determine the volume of exports and imports, terms of trade, and current international payments and short-term capital flows. The current-account deficits or surpluses reported by individual countries are to a large extent structural in nature. At the same time, cyclical changes in current-account balances do not follow a uniform, regular pattern and are difficult to forecast. Three countries in the analyzed group, Germany, Sweden, and Hungary, have noted current-account surpluses in the last few years, while five other countries, including Poland, have continuously reported deficits. In 2012, there was no significant change in the relative size of the current-account balance in the analyzed group of countries. The largest current-account deficit (almost 4% of the GDP) was recorded in Poland while the largest surplus (5%–7% of the GDP) was reported by Germany and Sweden.

When analyzing the changes in the five macroeconomic performance indicators in 2012 compared with the previous year, we arrive at the following conclusion. In all the countries in the analyzed group there was a significant slowdown in economic growth (turning into a stagnation or recession in some of these countries). The slowdown was accompanied by the typical cyclical changes in the remaining economic indicators: a slight decline in inflation, an increase in unemployment, and an improvement in the current-account balance (though not all of these changes were equally pronounced). Most countries in the sample further reduced their budget deficits (in relation to GDP) as a result of continued efforts to improve the condition of public finances.

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

Both the surface and the shape of the pentagon reflecting the overall condition of the Polish economy in 2012 are similar to those shown by the economies of the Czech

Republic and France. This means that in terms of the five macroeconomic indicators considered here, the overall performance of these economies was more or less comparable. Unlike the Czech Republic and France, Poland's economy is still growing, but amid higher inflation. The unemployment rate in Poland is comparable to that in France, but considerably higher than in the Czech Republic. As regards the budget deficit, the opposite is the case: its relative size in Poland and the Czech Republic is roughly the same, but lower than in France. All three countries have a current-account deficit slightly higher than in Poland.

Poland's economy is also doing well compared with Slovakia and Hungary. It has a better growth record than Hungary, with equally high unemployment. Compared with Slovakia, Poland has recently had similar growth but lower unemployment. Compared with Hungary, Poland has a better growth track record and lower inflation, but equally high unemployment. As regards public finance, all three countries have significantly reduced their budget deficits. The biggest progress in this respect has been made by Poland, where the deficit has been reduced from 7.9% of the GDP in 2010 to 5.0% in 2011 and 3.4% in 2012, though a significant part of that reduction has been made possible by some accounting manipulation.

The shape of the pentagon drawn for Poland is also similar to those of Germany and Sweden, but its surface is smaller. This indicates that, in terms of the five macroeconomic criteria analyzed here, the results achieved by the Polish economy in 2012 were generally not as good as those reported by Germany and Sweden, though the difference is insubstantial. Poland's GDP growth rate was higher than Germany's and Sweden's. However, in all the other respects, Germany and Sweden have better scores. Inflation and unemployment in Sweden and Germany are considerably lower; both countries have a sizeable current-account surplus; and both of them have achieved better results in improving the general government balance. At the same time, Poland's economy continued to perform much better than Spain's, which has been in recession almost continuously since 2008 and which is again plagued by record unemployment. Inflation in Spain is slightly lower than in Poland, but the relative size of the budget deficit and public debt in Spain is higher. Both countries have a structural deficit in their current accounts, but Spain is closer to equilibrium.

Compared with the preceding year, the overall performance of the Polish economy in 2012 undoubtedly deteriorated as a result of the slowdown across Europe, but also due to increasing internal problems (including unfavorable demographic trends), which may pose a variety of risks in the long term. The GDP growth rate posted by Poland in 2012 was roughly half that recorded in the previous year and showed a continuous downward trend on a quarterly basis. The inflation rate was reduced slightly, but the unemployment rate increased significantly. The state budget deficit has been reduced, but is still higher than the ceiling accepted in the EU, while public debt, expressed as a percentage of the GDP, has approached a limit imposed by law. The small improvement in the current-account balance is mainly due to reduced imports in the wake of slower growth in output and incomes.

Overall, in terms of the five basic macroeconomic performance indicators, the results achieved by the Polish economy in 2012, as in the previous year, were relatively good, especially if assessed in the light of the current economic conditions in Europe and worldwide. However, one should not overlook the existing problems and threats to further development.

The Polish economy in 2012 and the outlook for the years ahead

Poland was the only European Union country to avoid a recession during the global economic and financial crisis of 2008–2009. Even though this was mainly the result of a somewhat artificial improvement in Poland's foreign trade balance (a deeper fall in imports than in exports), the very fact that Poland was able to avoid a drop in real GDP during the crisis was undoubtedly a success, proving both its relative resistance to external shocks and its good general economic condition. Despite the adverse effects of the current financial crisis in the euro area, the Polish economy continues to do well. With GDP growth rates of 3.9% in 2010 and 4.3% in 2011, Poland is still among the growth leaders in Europe, even though in 2012 its economic growth decelerated substantially to 2.0%. The question is whether the current slowdown is just a temporary cyclical trend or a sign of a more permanent change in the long-run growth trend. Another question is about the economic prospects for the near future, i.e. the probable economic situation in Poland in 2013 and the years ahead.

In order to answer the first question, about the long-term prospects of the Polish economy, one would have to make a thorough analysis of the supply-side factors of economic growth beyond the scope of this chapter[12]. Nevertheless, we will point out some factors (notably demographic trends) that pose a serious threat to long-run growth in the Polish economy and their implications for the future rate of growth. In order to answer the second question, concerning the short-term prospects of the Polish economy, especially as regards the outlook for 2013, we have to analyze the changes in the main components of aggregate demand that led to the slowdown in output growth in 2012, and assess their probable changes in 2013.

In the last two WERI reports, we assessed the demand factors that enabled Poland to avoid a recession in 2009 and led to the acceleration of economic growth in 2010–2011. Here we will conduct a similar analysis for the 2011–2012 period in order to identify the main demand factors that contributed to the slowdown in economic growth in 2012. This analysis will help us determine the extent to which the latest slowdown in economic growth in Poland is simply the consequence of the external shock caused by the slack observed across Europe, as well as the extent to which it is the result of internal

[12] The supply-side analysis of growth factors is provided in chapter 3 of this book.

tension. The results of the analysis may also be helpful in assessing the growth prospects of the Polish economy in 2013.

Table 8

Contribution of final demand components to changes in real GDP in Poland, 2011–2012 (%)

GDP and demand components	Q1 2011	Q2 2011	Q3 2011	Q4 2011	Q1 2012	Q2 2012	Q3 2012	Q4 2012
GDP[a]	4.4	4.1	4.1	4.6	3.6	2.3	1.4	0.7
Domestic demand	4.2	4.1	2.7	3.0	2.5	–0.4	–0.7	–1.7
Consumption	2.4	1.6	0.6	0.6	1.0	0.8	0.1	–0.2
private	2.1	1.9	1.5	0.7	1.1	0.7	0.1	–0.1
public[b]	0.3	–0.3	–0.9	–0.1	–0.1	0.1	0.0	–0.1
Gross capital formation	1.8	2.5	2.1	2.4	1.5	–1.2	–0.8	–1.5
Fixed investment	0.9	1.4	1.7	2.9	0.7	0.3	–0.3	–1.2
Change in stocks[c]	0.9	1.1	0.4	–0.5	0.8	–1.5	–0.5	–0.3
Net exports	0.2	0.0	1.4	1.6	1.1	2.7	2.1	2.4

[a] The GDP growth rate calculated 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.

The impact of individual final demand components on real GDP growth in the consecutive quarters of the years 2011–2012 is illustrated by the data in Table 8. The table shows the direct contribution of the individual demand components to the observed real GDP growth rate (without multiplier effects). This contribution is calculated by multiplying the growth rate of a given demand component by its share in the absorption of GDP[13]. The analysis makes it possible to identify the demand components that helped maintain or speed up GDP growth and those that hampered this growth. It also enables us to state whether the observed GDP growth is firmly supported by an increase in internal and external demand, which is essential for a further rise in output.

The first row of the table shows the real GDP growth rate measured against the same quarter of the preceding year (without seasonal adjustment). It is equal to the sum of the impact of the demand components (domestic and external) shown in the given column. Net exports are the difference between exports and imports. The change in stocks is

[13] More precisely, it is the product of the growth rate of the given demand component and of its share in GDP in the corresponding period of the preceding year, according to the known method of decomposition of the GDP growth rate.

calculated as the difference between gross capital formation and fixed investment. Public consumption is calculated as the residual of total consumption over private consumption.

Looking at the data in Table 8, we can see that domestic demand (particularly the increase in private consumption and investment) was the main driver of total demand that was responsible for the growth of output in 2011. A noteworthy fact is that gross capital formation (despite its relatively low share in the total final demand) directly generated a larger part of the increase in real GDP than consumption expenditure (private and public combined), which is an extremely rare occurrence. The large increase in the investment volume as well as the rise in stocks were mainly caused by the completion of a number of large-scale public construction projects (including soccer stadiums built for Euro 2012 tournament, along with highways and expressways), partly financed from EU funds. Private investment remained at a low level. The impact of foreign trade on output growth was neutral in the first half of the year and slightly positive in the second half (because exports grew faster than imports).

The slowdown in GDP growth in 2012 was the result of decelerated growth in domestic demand caused by a stagnating volume of individual consumption and a slower increase, and subsequently an outright decrease, in the volume of investment outlays, with a relative stabilization in government expenditure. Contrary to popular belief, foreign trade did not hamper output growth; just the opposite: it was the main factor behind continued GDP growth and postponed the potential slide of the economy into a recession. This was especially clear in the second half of 2012 when seasonally adjusted real domestic demand began to fall, and the only factor that sustained GDP growth was a statistical improvement in the external trade balance, the effect of an increase in exports combined with a simultaneous decrease in imports. A similar trend could be observed in 2009, as the improvement in the foreign trade balance, caused by a reduction in imports deeper than the drop in exports, helped Poland avoid a recession. In any case, the data in Table 8 unambiguously show that the slowdown in Poland's economic growth, which began in 2012 and which will probably continue in 2013, cannot be explained as a simple result of the slack in Western Europe, without considering the internal factors on both the demand and the supply sides that have contributed to the significant deceleration in output growth.

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

However, the growth of Poland's exports and the increase in total investment in the country strongly, if not predominantly, depend on further economic developments in Western Europe, i.e., in the countries that are Poland's key export markets and a major source of FDI inflows. Meanwhile, economic activity in Western Europe remains weak, and there are no signs of radical improvement in 2013.

The outlook for the European economy and Poland for 2013 is uncertain and not exactly encouraging. According to the latest forecast by the European Commission, the EU's total GDP may rise by 0.4% (but only 0.1% in the euro area) in 2013, as a result of an improvement in economic activity expected in the second half of the year. The World Bank and the IMF have revised downward their previous GDP growth forecasts for the EU27 and the euro area to 0.2% and 0.1% respectively (World Bank, 2013a; IMF, 2013a). With stagnation in Western Europe, there is no chance for a noticeable improvement in the condition of the Polish economy.

The stagnation in Western Europe will hamper the growth of Polish exports, while domestic demand will probably remain relatively weak, due to a slow rise in consumer spending, almost no increase in real public spending, and a probable drop in investment outlays. Private consumption will be unable to rise significantly due to high unemployment and no increase in real wages, while total investment may even decrease as a result of delays in public infrastructure projects (highways, railways, and the subway in Warsaw) combined with an interrupted flow of EU funds. Most economic experts believe that Poland's GDP growth in 2013 will be in the range between 1% and 2%. The first half of the year will probably be marked by almost complete stagnation in total output (or even a minor drop), while some improvement is expected in the second half of the year.

Short-run growth forecasts for the Polish economy have been recently reduced in connection with the overall downward revisions of global economic prospects as well as those for the European economy in particular. The European Commission has lowered its GDP growth forecast for Poland to 1.8% in 2013 and 2.6% in 2014 (Eurostat, 2013). The OECD has reduced its growth forecast for Poland to 1.6% in 2013 and 2.5% in 2014 (OECD, 2012), and the IMF has followed suit, revising downward its projections to 1.7% in 2013 and 2.3% in 2014 (IMF, 2013b).

A medium-term IMF growth forecast until 2017 (IMF, 2012) assumes that, after the current slowdown, both the euro area and the EU27 as a whole will return to their "usual" not-too-high growth rates of around 1.5% and 2.0% respectively by 2015. For Poland, the IMF predicts a GDP growth rate of 3% in 2015, followed by 3.5% in both 2016 and 2017.

Several analyses of growth factors in the last few years have shown that the development potential of the Polish economy is still considerable and, if properly utilized and supported by an adequate growth-oriented economic policy, it can make it possible to maintain a sustainable growth rate of about 4% a year[14]. However, some recent

[14] Such a long-term growth rate was assumed in most development visions of the Polish economy for the next 20–30 years – see e.g. Kleer et al. (eds.), 2011; Boni (ed.), 2009; Płowiec (ed.), 2010; cf. also Matkowski, 2010 and Kołodko, 2013.

studies by both domestic and foreign authors warn that future growth in the Polish economy may be significantly reduced to around 2% a year, or even less, due to adverse demographic trends.

Long-term growth forecasts until 2060, recently produced under the auspices of the European Commission and the OECD (European Commission, 2012; OECD, 2012), suggest that Poland and other CEE countries will see a gradual decline in their growth rates after 2015. Under the European Commission forecast, Poland's GDP growth will decelerate from 4.3% in 2010 and 3.3% in 2015 to 2.0% in 2020, 1.5% in 2030, 1.2% in 2040, 0.5% in 2050, and 0.6% in 2060. Under the OECD forecast, Poland's average yearly GDP growth will decrease from 4.3% in 1995–2011 to 2.6% in 2011–2030, and 1.0% in 2030–2060. The most important cause of the gradual slowdown of economic growth predicted in both these forecasts will be unfavorable demographic changes, notably the aging population, the drop in fertility, and a massive outflow of workers, especially young, well-educated working-age people.

If these forecasts come true, Poland will face the prospect of not only slower growth and reduced prosperity, but also a possible reversal, around 2045, of the former catching-up process and a renewed broadening of the income gap to Western Europe. In order to avoid such a scenario, proper action should be taken as part of the government's socioeconomic policy to neutralize the threats and maintain a satisfactory growth rate. The same is true of the remaining CEE countries facing a similar threat to growth[15].

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

Development trends at the regional level

In this section, we focus on major characteristics of economic growth paths and development levels in Polish regions. The analysis does not include those aspects of regional development that are discussed in other parts of this report (e.g., GDP per capita compared with the EU average and changes in the standard deviation of the GDP per capita between regions – see Chapter 5).

Table 9 has data on GDP per capita for Poland's 16 provinces in 2000 and 2010 (since regional statistics are published with a significant delay, the most recent data are for

15 For more on this see: Matkowski, Próchniak, Rapacki, 2012; Rapacki, 2012; Rapacki and Próchniak, 2013.

2010). In terms of GDP per capita, the unquestioned leader is the Mazowieckie region. Its 2010 GDP per capita stood at ZL60,359, which represented 163% of the national average. The Dolnośląskie region ranked second with a GDP per capita of ZL41,750, which was 13% above the national average and 31% less than in Mazowieckie. In 2010, the development level in two other regions, Śląskie and Wielkopolskie, exceeded the national average. The GDP per capita of the remaining 12 provinces was lower than the national average. The poorest regions included Podkarpackie (67% of the average GDP per capita nationwide and 41% of that in Mazowieckie) and Lubelskie (68% and 42% respectively).

The data in Table 9 confirms the huge disparities between regions in Poland in terms of GDP per capita. A typical resident of the least developed provinces is more than 50% poorer than the average inhabitant of the Mazowieckie region. Comparing the results for 2010 with those for 2000, it turns out that the GDP per capita differences in Poland tended to increase during the last decade. For example, in 2000, the average resident of the Podkarpackie region was 54% poorer than the average resident of Mazowieckie and 30% poorer than the average citizen of Poland. Ten years later, these differences widened to 59% and 33% respectively. On the other hand, while in 2000 the average GDP per capita in Mazowieckie was 53% higher than the national average, by 2010 the gap widened to 63%. These data clearly show that the disparities between Polish regions in terms of GDP per capita are substantial and reveal an upward trend that implies a growing divergence at the regional level.

At a more disaggregated level of classification, the GDP per capita differences and diverging growth trends are even greater. Table 10 shows the five richest and five poorest subregions in Poland according to the NUTS3 classification. In 2010, the richest subregion was the city of Warsaw, with a GDP per capita of ZL111,696, three times more than the national average. Warsaw is the undisputed leader in this ranking because the second-ranked subregion, the city of Poznań, had a GDP per capita of ZL72,664; even though that was almost twice as much as the national average, the figure was 35% lower than in Warsaw. In 2010, the top five subregions also included the Legnicko-Głogowski subregion, chiefly due to the high profits of the local copper giant KGHM, as well as the cities of Wrocław and Cracow.

The development gap between the poorest and richest subregions in Poland is enormous. In 2010, the lowest GDP per capita was recorded in the Przemyski subregion; its GDP per capita of ZL19,718 represented just 53% of the national average and only 18% of the GDP per capita in Warsaw. The bottom five subregions also included the Puławski, Chełmsko-Zamojski, Nowosądecki, and Krośnieński subregions; their GDP per capita accounted for 57%–58% of the national average and for 19% of the GDP per capita in Warsaw.

As we can see, the development disparities between territorial units in Poland are substantial. Residents in the poorest subregions are more than 80% poorer on average than the inhabitants of Warsaw (although it should be kept in mind that GDP per capita does not take into account income inequalities. The high GDP per capita in Warsaw is

partly overestimated because the city is home to many companies, especially large and profitable multinational firms that have their headquarters in Warsaw.

The disparities in economic development between subregions are high and rising. This is reflected by the data for 2000 and 2010: the more developed subregions became even richer during this period while the less developed ones became even poorer. For example, in 2000 the average GDP per capita in Warsaw was 182% higher than the national average; by 2010 the figure rose to 201%. At the same time, the GDP per capita of the poorest regions accounted for 21%–22% of the Warsaw level in 2000, followed by 18%–19% in 2010.

It should be noted, however, that despite the growing differences in the relative level of economic development, real incomes in absolute terms in all the provinces increased over the studied period. Table 11 shows the growth rates for real GDP per capita during 2004–2010 and the cumulative change in real GDP per capita between 2003 and 2010. In terms of economic growth, the leader is Mazowieckie province where real GDP per capita in 2010 was 47% higher than in 2003. The Śląskie and Łódzkie regions rank second and third respectively with cumulative GDP per capita indices of 141 and 139 respectively.

During 2003–2010, the real GDP per capita went up in all the provinces by at least 22%. This means that even the least developed provinces increased their level of economic development in real terms, although the pace of economic growth in individual regions differed from the average figure for the economy as a whole.

Summing up, the empirical evidence shows that despite growing relative disparities in GDP per capita among Polish regions or income-level divergence, real GDP per capita increased in absolute terms in all the provinces. This suggests that the absolute level of competitiveness of Poland's provinces has improved. It also shows the positive impact of EU policies aimed at accelerating economic growth in the poorer regions of the country. Despite the large relative differences in income levels, the poorest regions displayed moderate GDP growth, which probably would not have been achieved without funds received from the EU under regional and structural policies.

Finally, we will compare key trends in regional development between Poland and three other Central European countries: the Czech Republic, Slovakia, and Hungary. Even though all these countries are divided into regions based on the NUTS2 classification, the results may be partly biased due to incomparable administrative divisions in individual countries. For example, the Polish and Czech capitals, while also being the richest cities, are classified differently in the NUTS2 system: Prague is a separate region, while Warsaw is part of the larger Mazowieckie province, which also includes much poorer areas. This must be taken into account when interpreting the results.

Table 12 gives an account of the GDP per capita levels at purchasing power parity (in euros) in regions in Poland, the Czech Republic, Slovakia, and Hungary. The data attest to the huge differences in regional development levels in the analyzed countries. In 2009 in Poland, the GDP per capita of the poorest region represented 42% of that in the richest region; in the Czech Republic the corresponding figure was

38%, in Slovakia 28%, and in Hungary 36%. At first glance, these figures suggest that Poland had the lowest regional disparities. However, the results are not comparable and should be corrected because the reference point in Poland is the Mazowieckie region, which is a large territorial unit, while in the Czech Republic, Slovakia, and, to a smaller extent, Hungary, the reference point is the richest city or a small area. If we exclude the richest region of a given country and look at the income span between the poorest and the second-richest regions, it will turn out that the results change dramatically. In Poland, the second-best region in terms of GDP per capita is 61% richer than the poorest one; in the Czech Republic the figure is 13%, in Slovakia 40%, and in Hungary 53%. These data show that, if we exclude territorial units based on the capital city, the regional disparities in economic development will turn out to be the biggest in Poland. The Czech Republic, in turn, displays the most well-balanced regional development pattern (excluding, of course, Prague).

With a few exceptions, Poland's poorest provinces are also much poorer than the least-developed regions in the peer countries. For example, in 2009, the poorest region in the Czech Republic, Střední Morava, was 61% richer than Poland's Lubelskie province (in terms of GDP per capita) while the poorest region in Slovakia, Východné Slovensko, was 20% wealthier than Poland's Lubelskie province. Only the least-developed region of Hungary, Észak-Magyarország, was 3% poorer than Poland's Lubelskie province.

Between 2000 and 2009, Poland, the Czech Republic and Slovakia (Hungary is not included due to a very short time series) also experienced increasing disparities or divergence trends at the regional level. The relative GDP per capita level in Poland's poorest region, compared with the richest region, decreased from 46% in 2000 to 42% in 2009; in the Czech Republic, the corresponding figure fell from 40% to 38%, and in Slovakia the decrease was from 35% to 28%.

Table 9
GDP per capita in Poland's regions, 2000 and 2010

Region	2000				2010			
	ZL	Rank	The richest region = 100	Poland = 100	ZL	Rank	The richest region = 100	Poland = 100
Mazowieckie	29,753	1	100	153	60,359	1	100	163
Dolnośląskie	19,968	4	67	103	41,750	2	69	113
Śląskie	20,930	2	70	108	39,677	3	66	107
Wielkopolskie	20,730	3	70	107	38,629	4	64	104
Pomorskie	19,355	6	65	100	35,597	5	59	96

Łódzkie	17,394	8	58	89	34,180	6	57	92
Zachodniopomorskie	19,514	5	66	100	32,268	7	53	87
Małopolskie	17,034	10	57	88	31,501	8	52	85
Lubuskie	17,378	9	58	89	31,348	9	52	85
Kujawsko-Pomorskie	17,700	7	59	91	31,107	10	52	84
Opolskie	16,115	11	54	83	29,498	11	49	80
Świętokrzyskie	14,931	13	50	77	28,134	12	47	76
Warmińsko-Mazurskie	15,287	12	51	79	27,228	13	45	73
Podlaskie	14,517	14	49	75	26,985	14	45	73
Lubelskie	13,728	15	46	71	25,079	15	42	68
Podkarpackie	13,632	16	46	70	24,973	16	41	67

Source: GUS, own calculations.

Table 10

GDP per capita in Poland's richest and poorest subregions according to the NUTS3 classification, 2000 and 2010

Subregion	2000				2010			
	ZL	Rank	The richest subregion = 100	Poland = 100	ZL	Rank	The richest subregion = 100	Poland = 100
Most developed subregions								
City of Warsaw	54,857	1	100	282	111,696	1	100	301
City of Poznań	38,739	2	71	199	72,664	2	65	196
Legnicko-Głogowski	25,296	9	46	130	66,937	3	60	180
City of Wrocław	28,791	5	52	148	56,461	4	51	152
City of Cracow	30,578	3	56	157	55,970	5	50	151
Least developed subregions								
Krośnieński	12,851	58	23	66	21,602	62	19	58
Nowosądecki	11,507	65	21	59	21,467	63	19	58
Chełmsko-Zamojski	11,658	64	21	60	21,291	64	19	57
Puławski	12,071	62	22	62	21,262	65	19	57
Przemyski	12,144	61	22	62	19,718	66	18	53

Source: GUS, own calculations.

Table 11

GDP per capita growth rates in Poland's regions, 2004–2010 (constant prices)

Region	2004	2005	2006	2007	2008	2009	2010	
	Previous year = 100							2003 = 100
Mazowieckie	104.5	106.2	108.6	108.0	104.9	102.8	104.8	147
Śląskie	103.3	100.8	109.9	109.4	107.1	100.5	104.5	141
Łódzkie	105.5	103.4	106.9	106.7	106.5	100.7	104.2	139
Lubuskie	108.4	106.1	104.8	105.6	105.5	100.1	102.6	138
Dolnośląskie	103.5	105.7	102.8	109.2	105.3	101.5	105.0	138
Podkarpackie	106.2	105.8	105.0	104.7	106.8	101.1	103.2	138
Pomorskie	107.5	103.7	105.2	106.6	102.3	103.5	103.2	137
Małopolskie	107.3	104.2	104.2	104.4	106.6	101.9	102.3	135
Wielkopolskie	110.1	102.7	103.7	104.9	103.4	101.8	102.5	133
Świętokrzyskie	105.0	100.9	107.4	107.0	106.7	99.3	102.6	132
Kujawsko-Pomorskie	106.9	102.6	107.0	106.6	104.0	98.7	102.9	132
Lubelskie	102.7	102.2	105.1	105.7	106.8	99.4	104.1	129
Zachodniopomorskie	104.1	103.5	104.9	103.0	102.8	102.1	103.3	126
Podlaskie	102.0	102.7	104.0	104.9	103.1	103.2	101.9	124
Warmińsko-Mazurskie	103.4	101.5	103.7	103.3	104.5	102.1	103.1	124
Opolskie	106.6	98.8	104.0	107.8	101.2	99.9	102.3	122
POLAND	105.3	103.6	106.2	106.8	105.1	101.6	103.9	137

Source: GUS, own calculations.

Table 12

GDP per capita at purchasing power parity in the regions of Poland, the Czech Republic, Slovakia and Hungary according to the NUTS2 classification

Region	2000		2004		2007		2009	
	A	B	A	B	A	B	A	B
Poland								
Mazowieckie	13,900	100	16,700	100	21,700	100	22,800	100
Dolnośląskie	9,500	68	11,200	67	14,700	68	15,500	68
Śląskie	9,900	71	12,300	74	14,500	67	15,300	67
Wielkopolskie	9,800	71	11,800	71	14,200	65	15,100	66
Pomorskie	9,100	65	10,700	64	13,400	62	13,900	61
Łódzkie	8,300	60	10,100	60	12,600	58	13,000	57

Zachodniopomorskie	9,300	67	10,200	61	12,100	56	12,500	55
Lubuskie	8,300	60	9,800	59	12,000	55	12,200	54
Małopolskie	8,000	58	9,300	56	11,700	54	12,200	54
Kujawsko-Pomorskie	8,400	60	9,800	59	11,800	54	12,100	53
Opolskie	7,800	56	9,400	56	11,200	52	11,600	51
Świętokrzyskie	7,100	51	8,500	51	10,500	48	11,100	49
Podlaskie	6,900	50	8,200	49	10,100	47	10,500	46
Warmińsko-Mazurskie	7,200	52	8,500	51	10,100	47	10,500	46
Podkarpackie	6,400	46	7,600	46	9,200	42	9,800	43
Lubelskie	6,400	46	7,600	46	9,200	42	9,600	42
Czech Republic								
Praha	26,400	100	35,300	100	42,700	100	41,200	100
Jihovýchod	12,100	46	15,000	42	17,800	42	17,500	42
Střední Cechy	12,900	49	15,800	45	18,600	44	17,300	42
Jihozápad	12,600	48	15,800	45	17,800	42	16,700	41
Moravskoslezsko	10,600	40	13,800	39	16,700	39	15,900	39
Severovýchod	12,200	46	14,300	41	16,400	38	15,700	38
Severozápad	11,300	43	13,900	39	15,700	37	15,700	38
Střední Morava	11,000	42	13,300	38	15,500	36	15,500	38
Slovakia								
Bratislavský kraj	20,700	100	27,900	100	40,100	100	41,800	100
Západné Slovensko	9,000	43	11,700	42	16,500	41	16,100	39
Stredné Slovensko	7,900	38	10,100	36	13,400	33	13,600	33
Východné Slovensko	7,200	35	9,100	33	11,600	29	11,500	28
Hungary								
Közép-Magyarország	.	.	.	.	25,400	100	25,500	100
Nyugat-Dunántúl	.	.	.	.	15,000	59	14,200	56
Közép-Dunántúl	.	.	.	.	14,200	56	12,600	49
Dél-Dunántúl	.	.	.	.	10,500	41	10,500	41
Dél-Alföld	.	.	.	.	10,200	40	10,100	40
Észak-Alföld	.	.	.	.	9,700	38	9,900	39
Észak-Magyarország	.	.	.	.	9,800	39	9,300	36

Relative level of GDP per capita in the richest region of a given country as compared with the richest region in Poland (GDP per capita in Mazowieckie = 100)				
Region in Czech Republic	190	211	197	181
Region in Slovakia	149	167	185	183
Region in Hungary	.	.	117	112

Region	2000		2004		2007		2009	
	A	B	A	B	A	B	A	B
Relative level of GDP per capita in the poorest region of a given country as compared with the poorest region in Poland (GDP per capita in Lubelskie = 100)								
Region in Czech Republic	166		175		168		161	
Region in Slovakia	113		120		126		120	
Region in Hungary	.		.		105		97	

A – in euros at purchasing power standards (PPS); B–the richest region in a given country = 100.

Source: Eurostat, own calculations.

1.2. Real Income Convergence

Zbigniew Matkowski, Mariusz Próchniak

This subchapter analyzes income convergence among the 10 Central and Eastern European (CEE) countries that joined the EU in 2004 and 2007: Poland, Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Slovakia, and Slovenia (EU10). We assess convergence inside this group as well as convergence between the EU10 and the old EU members (EU15). The analysis covers the 1993–2012 period, but the calculations were also made for two shorter subperiods: 1993–2004 and 2004–2012. The inclusion of these subperiods allows us to assess the pace of the catching-up process before and after EU enlargement[16]. A new element in this edition of the report extends regional convergence research to encompass regions in all European Union countries (EU27). The convergence analysis is important for the assessment of Poland's competitiveness, defined here as the capacity to increase the real incomes of the population faster than in other countries.

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

The analysis is based on the time series of real GDP per capita at purchasing power parity (PPP, in US$), calculated by the author using International Monetary

16 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, 2012). The methodology of the analysis is described in detail in the 2008 edition of the report (Próchniak, 2008).

Fund data (IMF, 2013). 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. The regional analysis is based on GDP per capita at purchasing power standards (PPS, in €) for regions, calculated based on Eurostat data with small estimations if necessary (Eurostat, 2013), and deflated by the eurozone inflation index in order to determine real changes.

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

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

The explained variable is the average annual growth rate of real GDP per capita between period T and 0; the explanatory variable is the log of the GDP per capita level in the initial period, while ε_t is the random factor. If parameter α_1 is negative and statistically significant, β-convergence exists. In such a case we can calculate the value of coefficient β, which measures the speed of convergence, from:

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

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

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

The explained variable is the standard deviation of log GDP per capita levels between the economies; the explanatory variable is the time variable ($t = 1,\ldots,20$ for the 1993–2012 period), while ε_t – as before – is a random factor. If parameter α_1 is negative and statistically significant, σ-convergence exists.

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

Despite the assessment of the pace of convergence in the whole analyzed period, we also try to indicate how the catching-up process evolved over time. To do this, the period under study is divided into two subperiods: 1993–2004, i.e. the years before EU enlargement, and 2004–2012, i.e. the membership period of the EU8 economies in the European Union (Bulgaria and Romania joined the EU in 2007). If convergence

before EU enlargement turned out to be faster, this would mean that many benefits from EU accession (including a significant improvement in the competitiveness of the economies) were gained in the period before the official date of EU entry. This would show that the integration anchor started to work before the enlargement took place and that the countries managed to take advantage of many of the enlargement-related benefits in the first decade of transition. However, if it turned out that convergence accelerated in 2004 or later, this would mean that it was official EU membership that allowed the Central and Eastern European countries to catch up with Western Europe more rapidly and to significantly increase their competitiveness.

Convergence among EU10 countries

β-convergence

Table 13 and Figure 3 show the results of estimating β-convergence among the EU10 countries. The first column in Table 13 indicates the period. The next columns give the estimated values of parameters α_0 and α_1, *t*-statistics, *p*-values and R^2. The last two columns provide information about the existence of β-convergence (the answer is "yes" if the GDP growth rate is negatively and significantly correlated with the initial income level), giving the estimated value of coefficient β.

The results confirm the existence of weak β-convergence during 1993–2012. This means that less developed countries within the group grew faster on average than more developed ones, but this is not sufficiently confirmed by statistical data. Although the slope of the regression line is significant (*p*-value less than 0.1), the R^2 coefficient is only 35%.

Figure 3 shows a negative correlation between the average annual GDP per capita growth rate over the 1993–2012 period and the initial GDP per capita level. Although the trend is negative, the points indicating the position of individual countries do not fit very well with the regression line, testifying to weak income convergence.

The Baltic states, the poor CEE economies in 1993, grew the most dynamically during 1993–2012, with the average growth rate exceeding 4% per annum. Apart from the Baltic states, the group of the fastest-growing economies also includes Poland (which recorded a GDP growth rate of 4.4% per annum during 1993–2012) and Slovakia. The outcomes achieved by the Baltics and Poland are in line with the convergence hypothesis: these are the initially low-income countries that reported high rates of economic growth. As shown in Figure 3, the convergence hypothesis is also supported by Slovenia and the Czech Republic, relatively rich countries which noted a relatively slow pace of economic growth during 1993–2012.

The two newest EU members, Bulgaria and Romania, did not follow the pattern of the catching-up process. Although the 1993 GDP per capita levels of these two countries were comparable with those of the Baltic states, their growth rates during 1993–2012

were low, comparable with those reported by the Czech Republic and Slovenia, initially the wealthiest EU10 economies. Hungary also lies far from the trend line due to its economic growth rate, the slowest in the EU10 group.

Table 13

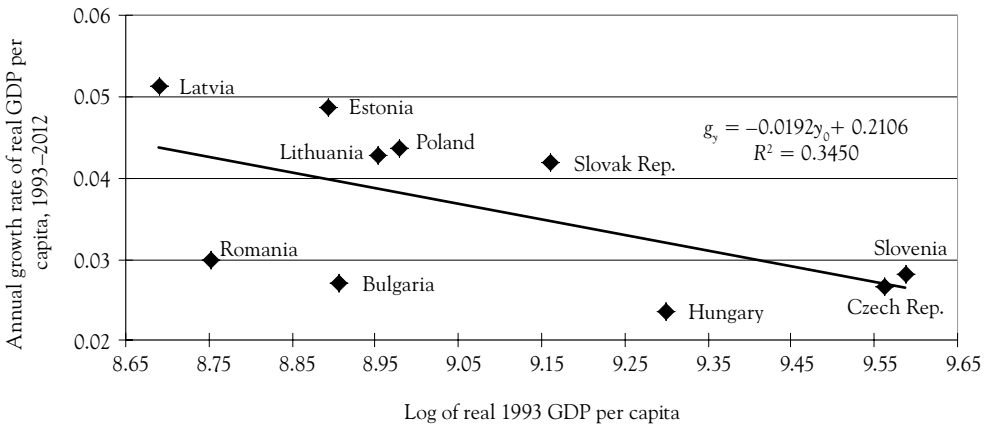
Regression results for β-convergence

Period	α_0	α_1	*t*-stat. (α_0)	*t*-stat. (α_1)	*p*-value (α_0)	*p*-value (α_1)	R^2	β-convergence	β
1993–2012	0.2106	–0.0192	2.48	–2.05	0.038	0.074	0.3450	yes	0.0239
1993–2004	0.1885	–0.0161	1.34	–1.04	0.218	0.330	0.1183	yes (?)	0.0177
2004–2012	0.2610	–0.0244	2.29	–2.05	0.051	0.075	0.3437	yes	0.0271

Source: Own calculations.

Figure 3

GDP per capita growth rate over the 1993–2012 period and the initial GDP per capita level



Source: Own calculations.

Since convergence was slow, differences in income levels between EU10 countries are still considerable. Romania and Bulgaria are much poorer than Slovenia and the Czech Republic. In 2012, per capita income (at current prices) in Romania and Bulgaria was $ 12,838 and $ 14,235 respectively, while Lithuania reported $ 20,089, Slovakia $ 24,284, the Czech Republic $ 27,165, and Slovenia, the richest of these countries, $ 28,648. In Poland, GDP per capita at PPP was $ 20,976 in 2012. As we can see, per capita income in the wealthiest EU10 country is more than twice as high as per capita income in the poorest country of the group.

A detailed analysis of the results leads to the conclusion that Poland's competitiveness during 1993–2012 did not change in relative terms compared with the remaining EU10 countries, assuming that a country's competitiveness is measured by its income level relative to those of other countries in the group (of course, Poland's competitiveness in absolute terms, measured by the absolute per capita income level, undoubtedly improved). In 1993, Poland was in fifth place in terms of GDP per capita; higher income levels were recorded in Slovenia, the Czech Republic, Hungary, and Slovakia. Poland also ranked fifth in 2012 (behind Slovenia, the Czech Republic, Slovakia and Estonia, but ahead of Lithuania, Hungary, Latvia, Bulgaria and Romania). In the per capita income ranking, the permanent leader was Slovenia, followed by the Czech Republic.

Figure 3 shows that economic growth in Poland was quite fast, at 4.4% per annum in the 1993–2012 period on average. Comparing these data with the results obtained in earlier rounds of research, notably before the global crisis, we may conclude that Poland came closer to the Baltic states in terms of the pace of economic growth over the whole analyzed period. This largely results from the fact that Poland was the only country in the European Union that went through the crisis with GDP growth, whereas the remaining countries of the region, especially the Baltic states, fell into a deep recession. Hence, Poland's competitive position during the last few years has improved significantly compared with other new EU member countries. For example, in 2006–2007, Poland was in eighth place among EU10 countries in terms of GDP per capita, just ahead of Romania and Bulgaria. In 2008, Poland moved to seventh place, outperforming Latvia, while a year later it climbed to fifth place, ahead of Estonia and Lithuania. In 2010, after outdistancing Hungary, Poland ranked fourth among the EU10 countries in terms of the per capita income level. In 2011, however, Poland was outdone by Estonia and slipped back to fifth place, keeping the same rank in 2012.

The estimated value of coefficient β for the entire period is 2.39%. This indicates a slow income convergence among the EU10 countries. If the average growth patterns observed in 1993–2012 are maintained, the EU10 countries will need about 30 years to reduce the gap by half to their common hypothetical steady state (this value is calculated as follows: – ln (0.5)/0.0239). The global economic crisis has hampered the speed of the catching-up process in average terms for the whole group. This stems from the fact that the crisis led to a deep recession in the Baltic states, which reported low 1993 income levels and rapid growth rates, especially in 2000–2007, in a trend that stimulated the convergence of the whole group.

A more precise analysis shows that the catching-up process of the EU10 countries was observed both before and after EU enlargement (i.e. in 1993–2004 and 2004–2012). For these two subperiods we obtain a negative slope of the regression line, but for 1993–2004 the results are statistically insignificant. After EU enlargement, during 2004–2012, the pace of convergence was similar to that observed for the whole period. Namely, the β-coefficient in 2004–2012 amounted to 2.71% and was only slightly higher than in the analyzed period as a whole (2.39%). In 1993–2004, the β-coefficient was lower: 1.77%,

but the lack of statistical significance of the model (insignificant explanatory variable and the *R*-squared of only 12%) does not make it possible to draw reliable findings.

As we can see, our results do not confirm a clear-cut turning point in the pace of convergence among the EU10 countries at the time of EU enlargement. After EU enlargement, the real economic convergence of the new EU member countries took place at about the same pace on average as in the whole 1993–2012 period (though it is necessary to keep in mind that the results presented in the tables are aggregated calculations for the whole population; the economic growth paths of the individual countries could differ in the periods before and after EU enlargement). Such results need not be spurious because EU accession could have accelerated convergence towards the income level recorded in Western Europe and not among individual Central and Eastern European countries. The convergence towards the EU15 will be verified in a later section.

σ-convergence

Table 14 and Figure 4 show the results of estimating *σ*-convergence between the EU10 countries. Table 14 is analogous to Table 13. The last column of Table 14 provides information about the existence of *σ*-convergence, giving the "yes" answer if the slope of the trend line is negative and statistically significant.

The results in Table 14 confirm the existence of *σ*-convergence in the entire period of 1993–2012 as well as in the shorter 2004–2012 subperiod, encompassing the years after EU enlargement. For the 1993–2004 subperiod, however, the estimated model is not statistically significant despite a negative slope of the trend line. These results are similar to those for *β*-convergence where, on a subperiod basis, the catching-up process was statistically confirmed only in the 2004–2012 period.

Table 14

Regression results for *σ*-convergence

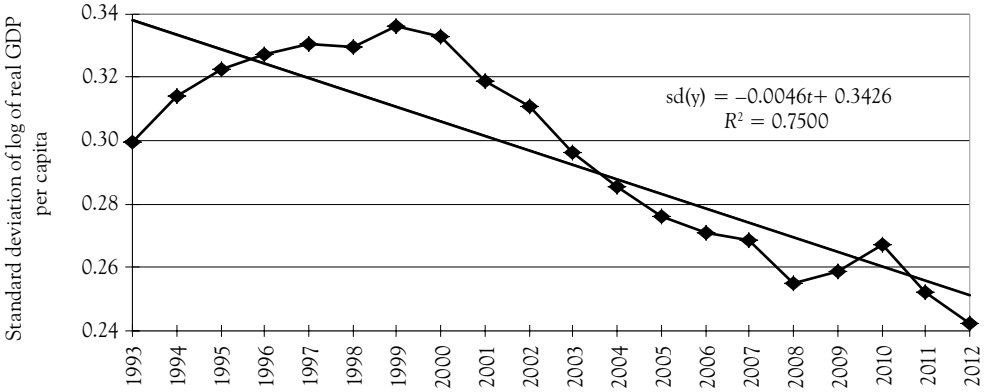
Period	α_0	α_1	*t*-stat. (α_0)	*t*-stat. (α_1)	*p*-value (α_0)	*p*-value (α_1)	R^2	*σ*-convergence
1993–2012	0.3426	–0.0046	45.99	–7.35	0.000	0.000	0.7500	yes
1993–2004	0.3264	–0.0015	33.22	–1.11	0.000	0.294	0.1091	yes (?)
2004–2012	0.2858	–0.0044	64.33	–5.52	0.000	0.001	0.8133	yes

Source: Own calculations.

The rate at which differences in income levels decreased was not regular over time, which is clearly shown in Figure 4. At the beginning of the analyzed period, during 1993–1999, differences in GDP per capita levels increased. Then, between 2000 and 2008, they showed a consistent and rapid decline. However, in 2009–2010, income

differences increased again, at an extremely rapid pace, driven by the global economic and financial crisis. This confirms our previous findings that the economic crisis has negatively affected the process of convergence of the EU10 countries, implying even divergence trends. Admittedly, since the economic recovery in 2011, income differences among EU10 countries have narrowed again.

Figure 4
Standard deviation of GDP per capita, 1993–2012



Source: Own calculations.

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

Convergence between EU10 and EU15

β-convergence

Our analysis confirms the existence of *β*-convergence between the EU10 countries and the EU15. *β*-convergence has been evidenced for 25 individual countries as well as two regions (the average for the 15 old EU members and the average for the 10 new EU entrants). The results are given in Table 15 and Figure 5.

Table 15 shows that all the member countries of the enlarged EU, except Malta and Cyprus, developed in line with the convergence hypothesis during 1993–2012. Less developed countries in this group recorded faster economic growth than more developed ones.

Table 15

Regression results for β-convergence

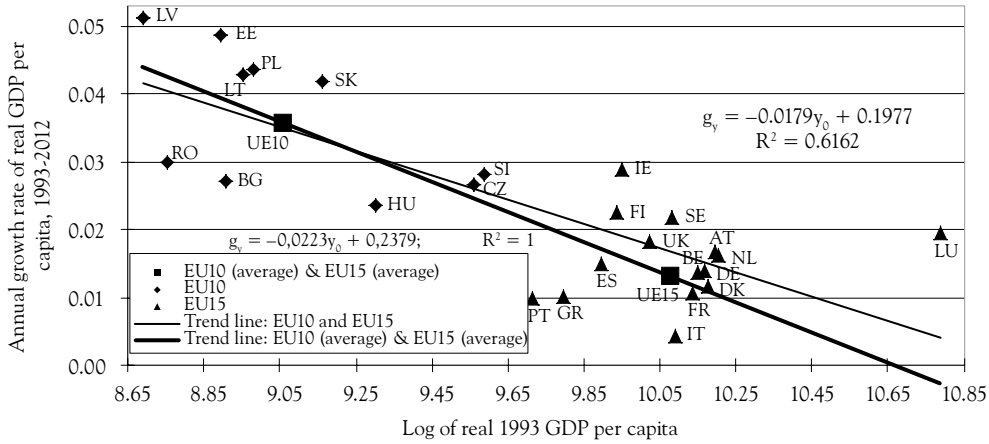
Period	α_0	α_1	t-stat. (α_0)	t-stat. (α_1)	p-value (α_0)	p-value (α_1)	R^2	β-convergence	β
25 countries of the enlarged EU									
1993–2012	0.1977	–0.0179	6.90	–6.08	0.000	0.000	0.6162	yes	0.0219
1993–2004	0.1827	–0.0155	4.46	–3.68	0.000	0.001	0.3705	yes	0.0170
2004–2012	0.2543	–0.0241	5.12	–4.88	0.000	0.000	0.5083	yes	0.0268
2 regions (EU10 and EU15)									
1993–2012	0.2379	–0.0223	.	.	.	.	1.0000	yes	0.0290
1993–2004	0.2081	–0.0186	.	.	.	.	1.0000	yes	0.0208
2004–2012	0.3576	–0.0344	.	.	.	.	1.0000	yes	0.0403

Source: Own calculations.

Figure 5 shows that the average annual growth rate of the 25 current EU members during 1993–2012 was inversely related to their initial GDP per capita level. In the figure, the position of individual countries is marked by dark rhombuses (EU10 countries) and triangles (EU15 members). The β-coefficient for 25 countries is 2.19%. The value of R^2 is 62%, being negatively affected by the fact that several countries (mainly Luxembourg, Romania, and Bulgaria) diverge considerably from the common experience.

Figure 5

GDP per capita growth rate over the 1993–2012 period and the initial GDP per capita level



Source: Own calculations.

The convergence is also seen in a regional approach. The big squares in Figure 5 show the initial average GDP per capita level and the average GDP growth rate in the EU10 and EU15. The average growth rate in the EU10 was higher than in the EU15, while the initial GDP per capita was lower. The β-coefficient for these two regions is 2.90%.

The β catching-up process accelerated after EU enlargement, i.e. in the 2004–2012 period. In 2004–2012, the β coefficient for the 25 countries amounted to 2.68%, while that for the two regions was 4.03%. The corresponding coefficients for the 1993–2004 period were 1.70% and 2.08% respectively[17]. Faster convergence in the Central and Eastern European countries towards Western Europe was partly due to further trade liberalization, including significant tariff cuts, combined with labor market liberalization (at least partial) in a trend that led to labor force migration from regions and countries where wages are low to those with high wages. Moreover, the EU10 countries also adapted better to EU technical standards, which was conducive to the development of international trade. FDI inflows to these countries also peaked in this period.

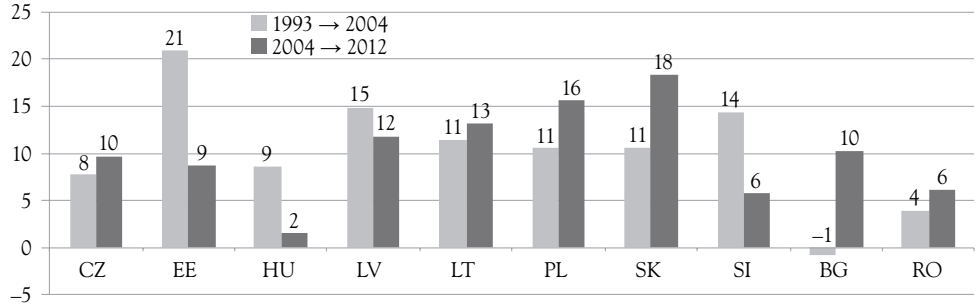
For the entire period, however, our analysis indicates a relatively slow income convergence between Poland and other new EU entrants, on the one hand, and the old EU members, on the other. We should not expect a rapid equalization of income levels between the EU10 and EU15. The β coefficient of 2.19% or 2.90% indicates that, if the average economic growth patterns observed in 1993–2012 are maintained, the countries of the enlarged EU will need between 24 and 32 years to decrease by half the distance to their common hypothetical steady state.

The results of β-convergence presented here are the average results for the whole region. The individual EU10 countries displayed a different degree of convergence. Thus, it is worth taking a look at the nature of the catching-up process of the individual EU10 countries towards the EU15 in the period before and after EU enlargement. This will be done by referring to Figure 4, which shows by how many percentage points the income gap of a given EU10 country to the EU15 area decreased in the 1993–2004 and 2004–2012 periods. It turns out that the catching-up process accelerated after EU enlargement in only six countries. On the one hand, in the two Baltic states (Estonia and Latvia) as well as Slovenia and Hungary, the income gap toward the EU15 narrowed faster in the period before EU enlargement (although it is necessary to remember that this period is longer). On the other hand, in Poland, the Czech Republic, Slovakia, Lithuania, Bulgaria and Romania, the reduction in the income gap toward Western Europe was more rapid after EU enlargement (although one should remember that Bulgaria and Romania joined the EU in 2007, so their 2004–2012 convergence also includes a part of the pre-accession period). We may conclude that the paths differed among individual EU10 countries that reduced their income gaps. Some countries took advantage of most of the benefits from European integration before EU enlargement, while others benefited in terms of income level equalization mostly after EU accession.

17 Próchniak and Witkowski (2013), apply more advanced econometric models, based on the Bayesian model averaging, to the analysis of time stability of the conditional β-convergence in the EU.

Figure 6

The reduction in individual EU10 countries' income gap toward the EU15 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.

Our analysis indicates that in the short run, no major changes can be expected between Poland and other EU10 countries on the one hand, or between Poland and the old EU members on the other, as regards competitiveness measured by real GDP per capita. Moreover, the economic performance of the EU10 countries may deteriorate unless the implications of the crisis are overcome quickly and the fiscal stance improves soon. The period of time it takes to return to the pre-crisis economic growth path will be a key determinant of the future competitive position of EU10 countries compared with the EU15 area.

σ-convergence

Poland and other EU10 countries also display *σ*-convergence toward the EU15. The results are given in Table 16 and Figure 7. Table 16 shows that income differences diminished among the 25 current EU members and between the EU10 region and the EU15 area in the whole 1993–2012 period. For this period, the slope of the estimated regression equations is negative, accompanied by high *R*-squares: 91% (25 countries) and 95% (two regions). Convergence took also place in both shorter subperiods: 1993–2004 and 2004–2012.

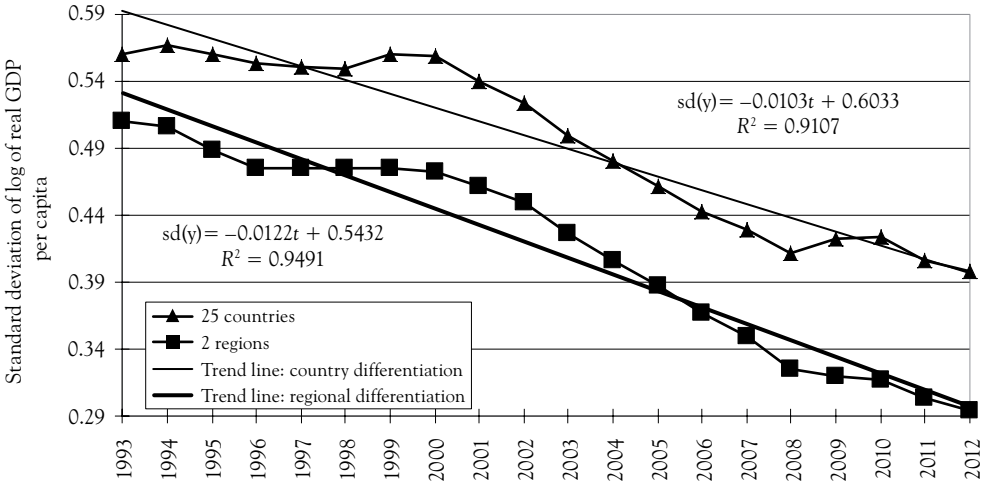
Figure 7 shows the standard deviation of log GDP per capita levels. As we can see, income differences between the EU10 countries and the old EU members generally displayed a downward trend. Income differences decreased the most evidently and consistently in the second half of the analyzed period, that is, after 2000. In 2009–2010, due to the economic crisis and decelerated economic growth in many rapidly developing countries, income differences increased among the 25 countries of the analyzed group, although the average data for the two regions do not support this evidence.

Table 16
Regression results for σ-convergence

Period	α_0	α_1	t-stat. (α_0)	t-stat. (α_1)	p-value (α_0)	p-value (α_1)	R^2	σ-convergence
25 countries of the enlarged EU								
1993–2012	0.6033	–0.0103	66.32	–13.55	0.000	0.000	0.9107	yes
1993–2004	0.5825	–0.0062	58.60	–4.59	0.000	0.001	0.6779	yes
2004–2012	0.4759	–0.0090	59.21	–6.29	0.000	0.000	0.8496	yes
2 regions (EU10 and EU15)								
1993–2012	0.5432	–0.0122	67.87	–18.33	0.000	0.000	0.9491	yes
1993–2004	0.5192	–0.0078	75.46	–8.29	0.000	0.000	0.8730	yes
2004–2012	0.4102	–0.0138	64.39	–12.14	0.000	0.000	0.9547	yes

Source: Own calculations.

Figure 7
Standard deviation of GDP per capita, 1993–2012



Source: Own calculations.

Regional convergence

In this part of the analysis, we verify the existence of β and σ convergence at the regional level. The research refers to the focus of this report, namely the analysis of regions, and supplements the findings obtained on the basis of the cross-country approach.

The study covers the regions at the NUTS-2 level from all the EU member countries (EU27). The analysis covers a shorter period due to lower data availability. Figures on regional GDP per capita are available for all 271 regions only in the 2000–2009 period; for 1995–1999, we have data for 231 regions (missing observations include Italy, Austria and Hungary). Hence, we run all the calculations for the two periods: 1995–2009 and 2000–2009.

β-convergence

Table 17 shows the estimated regression equations for regional *β*-convergence (*n* is the number of observations). The results confirm the existence of convergence among EU27 regions. A negative and statistically significant slope of the regression line has been obtained for both the 1995–2009 and 2000–2009 periods. It turns out that, in the European Union as a whole, poorer regions exhibited faster economic growth than richer regions on average. This is confirmed by Figure 8, which shows the relationship between the 2000–2009 per capita GDP growth rate and the 2000 per capita income level. Since the figure refers to the 2000–2009 period, it includes complete data on all the regions in the EU27.

Table 17
Regression results for regional *β*-convergence among EU27 regions

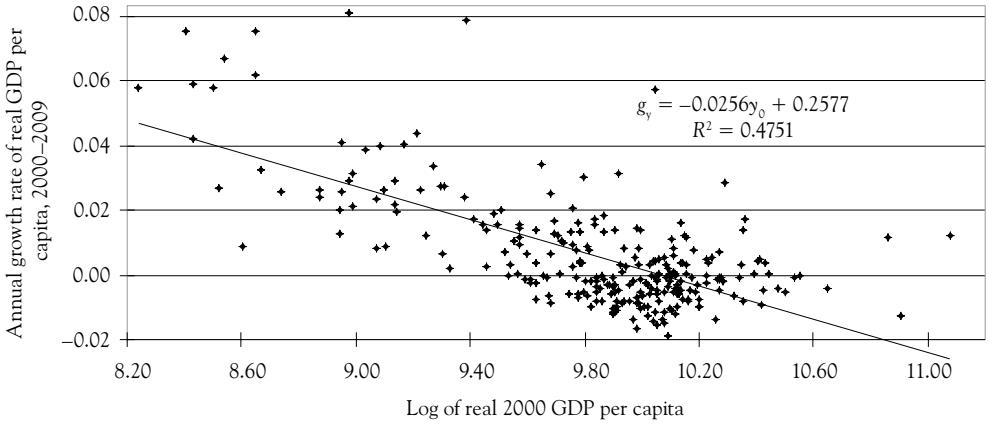
Period	α_0	α_1	*t*-stat. (α_0)	*t*-stat. (α_1)	*p*-value (α_0)	*p*-value (α_1)	R^2	*n*	*β*-convergence	*β*
1995–2009	0.1825	–0.0172	12.69	–11.51	0.000	0.000	0.3666	231	yes	0.0196
2000–2009	0.2577	–0.0256	15.97	–15.60	0.000	0.000	0.4751	271	yes	0.0291

Source: Own calculations.

The analysis yields the following findings. First, it indicates a relative efficiency of EU structural policy aiming at decreasing income differences between regions. Aid funds from the EU were mainly directed to poorer EU regions to accelerate their economic growth and reduce existing differences in the level of economic development. The results seem to confirm this view. Second, regional convergence observed in the whole EU27 group need not imply the existence of a regional catching-up process inside individual countries. Many recent studies (including our own analyses) indicate that intra-country differences in the standard of living may even rise despite the fact that the European Union as a whole reveals convergence on an inter-country and regional basis. Third, when interpreting the results it is necessary to remember that regional division is unevenly distributed between the countries. On the one hand, small countries such as Cyprus, Estonia, Lithuania, Luxembourg, Latvia, and Malta are each treated as one region (i.e. they are not divided according to the NUTS2 classification); on the other

hand, big countries such as Germany and UK are divided into almost 40 regions, while regions in some other countries include overseas territories (e.g. in the case of France, these are Martinique, Guadalupe, French Guyana, and Reunion). All this should be taken into account when interpreting the results.

Figure 8
Regional *β*-convergence in the EU27, 2000–2009



Source: Own calculations.

σ-convergence

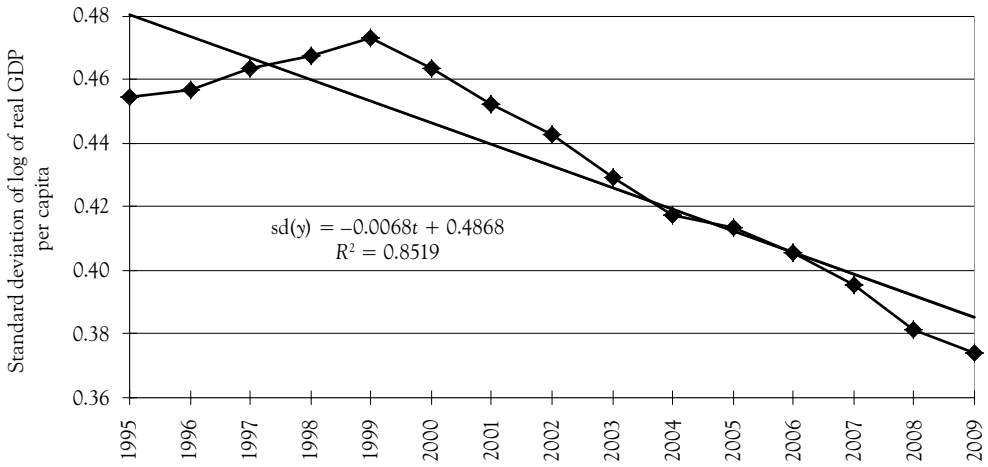
Table 18 shows that EU27 regions also revealed *σ*-convergence, in both the 1995–2009 and 2000–2009 periods. Figure 9 indicates, however, that the equalization of income levels between regions was not constant over time. During 1995–1999, regional differences in GDP per capita increased, suggesting a trend toward divergence. In 2000, income disparities between rich and poor EU regions started to narrow permanently and systematically.

Table 18
Regression results for regional *σ*-convergence among EU27 regions

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
1995–2009	0.4868	–0.0068	68.36	–8.65	0.000	0.000	0.8519	yes
2000–2009	0.4712	–0.0098	256.40	–32.97	0.000	0.000	0.9927	yes

Source: Own calculations.

Figure 9
Regional *σ*-convergence in the EU27, 1995–2009



Source: Own calculations.

It can be assumed that it was EU policy, among other factors, that contributed to the convergence trends. European funds, which were directed mainly to poorer EU regions, notably those in EU10 countries, were not very high in the first decade of transition. As a result, income disparities at the regional level increased rapidly. At the beginning of the 21st century, when EU enlargement for the EU10 countries was approaching, EU financial aid intensified considerably. As a result, poorer EU regions started to grow dynamically and differences in income levels began to diminish.

Closing the income gap: a forecast

In the preceding sections, income convergence among the CEE countries as well as between the EU10 countries and EU15 in the 1993–2012 period was analyzed with the help of some econometric methods. This section presents a simulative forecast of the catching-up process between the EU10 and the EU15.

Our forecast (or, more precisely, simulation) of the further pace of income convergence between the two groups of countries (EU10 and EU15) will be made according to three hypothetical scenarios. The first two scenarios update our earlier forecasts presented in previous editions of this report by the World Economy Research Institute (e.g. Weresa, ed., 2012); the third scenario is entirely new.

The first scenario, which is a simple extrapolation of the past growth trends, assumes that individual EU10 countries and the EU15 group as a whole will maintain in the future the average yearly GDP per capita growth rates noted in the 1994–2010

period[18]. For most EU10 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.

The second scenario assumes that in the 2011–2016 period the EU10 countries and the EU15 group as a whole will develop according to the real figures for 2011–2012 and in line with the newest IMF forecast for the next four years, and from 2017 on they will continue to grow at the constant GDP growth rate forecast by the IMF for 2017, with a minor correction for Hungary and Bulgaria[19]. The assumed growth rates of total GDP have been transformed into per capita terms using demographic projections[20]. This scenario seems to be more realistic though the assumptions about the future GDP growth rates in the EU10 countries are also relatively optimistic.

The common feature of both these scenarios is the assumption that the EU10 countries will maintain their lead over the EU15 group in the future as regards the growth of GDP per capita and, as the result, the catching-up process and the equalization in average income levels will continue. We will 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 EU10 countries and the EU15 group in the first scenario are assumed to remain the same as in the 1994–2010 period, while in the second scenario, these ratios may change, according to current growth trends and assumed future growth rates.

Table 19
Closing the income gap – scenario 1

Country	GDP per capita growth rate (%)	GDP per capita in 2010 (EU15 = 100)		Number of years necessary to reach the average level of GDP per capita in the EU15	
		PPS	CER	PPS	CER
Bulgaria	2.8	40	17	72	139
Czech Republic	3.0	73	51	21	46
Estonia	5.4	57	38	15	26
Hungary	2.6	59	35	49	97

[18] The GDP per capita growth rates quoted here refer to the growth of real GDP measured at constant prices in national currencies (the 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 previous sections of this analysis.

[19] For Hungary the target GDP growth rate was increased by 0.5% and for Bulgaria it was decreased by 0.5% (compared with the IMF forecast), to 2.3% and 4.0% respectively, in order to make the estimates more comparable with the growth rates assumed for the remaining EU10 countries.

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

Latvia	5.3	49	29	19	34
Lithuania	4.9	52	30	20	37
Poland	4.6	57	33	19	37
Romania	3.3	42	21	49	89
Slovakia	4.6	66	43	14	28
Slovenia	3.5	76	62	14	24
EU15	1.5	100	100	–	–

Source: Author's calculation based on data from the Eurostat Database (ec.europa.eu/eurostat), supplemented if necessary by some auxiliary data from the IMF and World Bank (www.imf.org; databank.worldbank.org), accessed Feb. 6, 2013.

Table 20
Closing the income gap – scenario 2

Country	Growth rate of GDP		GDP per capita in 2010 (EU15 = 100)		Number of years necessary to reach the average level of GDP per capita in the EU15	
	2011–2014	2015–	PPS	OER	PPS	OER
Bulgaria	2.4	4.0	40	17	32	67
Czech Republic	1.9	3.4	73	51	21	42
Estonia	4.3	3.9	57	38	20	36
Hungary	0.9	2.3	59	35	71	159
Latvia	4.5	4.0	49	29	21	41
Lithuania	3.9	3.6	52	30	24	49
Poland	2.9	3.6	57	33	26	50
Romania	2.5	3.5	42	21	40	76
Slovakia	3.2	3.6	66	43	21	41
Slovenia	0.7	2.3	76	62	52	87
EU15	0.9	1.7	100	100	–	–

Source: Author's calculation based on data from the Eurostat Database (ec.europa.eu/eurostat) and the IMF World Economic Outlook Database (www.imf.org), accessed Feb. 6, 2013.

In both the above scenarios, the reference point in our forecast is the relative level of GDP per capita in 2010[21]. The period necessary to close the income gap depends on the assumptions made about the future growth of per capita GDP, i.e. on the assumed

[21] We take the 2010 data as the reference point because this is the last year for which we have firm GDP per capita data expressed in PPS. It will be also easier to compare the results of our calculations made now under the first two scenarios with the results obtained in our previous analysis and with the implications of the third scenario, which has the same starting point.

growth rate of total GDP and the expected change in population numbers. One should remember that the length of that period is calculated beginning in 2010.

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

The assumptions made in the first two scenarios and the results of our calculations are presented in Table 19 and Table 20. The first column in both tables shows the assumed growth rates of total GDP or per capita GDP. The next two columns give the initial levels of GDP per capita at PPS and CER relative to the average level in the EU15, and the last two columns indicate the number of years necessary to reach the average level of GDP per capita in the EU15 if the initial GDP per capita level is measured at PPS or at CER.

In 2010, GDP per capita in all the EU10 countries was much lower than the EU15 average. The lowest level of GDP per capita was noted in Bulgaria (40% of the EU15 average at PPS and 17% at CER) and Romania (42% and 21% respectively), while the highest level was seen in Slovenia (76% at PPS and 62% at CER) and in the Czech Republic (73% and 51%). In Poland, GDP per capita in 2010 accounted for 57% of the EU15 average when calculated at PPS and 33% when calculated at CER[22]. For all the EU10 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 EU10 countries and the EU15 group will maintain the average yearly growth rates of GDP per capita noted in the 1994–2010 period. Under this assumption, individual EU10 countries would need 14 to 72 years to reach the average level of GDP per capita seen in the EU15 group if the initial income gap is calculated at PPS, and 24 to 139 years if it is calculated at CER. Slovenia has the best position in the catching-up process; it needs only 14 years at PPS or 24 years at CER to reach the average income level of the EU15. Under the same assumptions, Slovakia would need 14 or 28 years respectively to catch up with the EU15, and Estonia could do that within 15 or 26 years. Poland would need 19 years if the initial income gap is calculated at PPS or 37 years if it is calculated at CER. For the Czech Republic, the convergence period is 21 and 46 years

[22] The GDP per capita indicator for Poland (EU15 = 100) calculated at PPS increased to 58 in 2011 and 61 in 2012.

respectively. For Latvia and Lithuania, the convergence periods are 19 or 34 years and 20 or 37 years respectively. Hungary, Romania and Bulgaria are in the worst position: keeping up the earlier growth trend, Hungary would need 49 years to achieve the average income level at PPS seen in the EU15 or 91 years at CER, and Romania and Bulgaria would take 49 or 89 years and 72 or 139 years respectively.

The time required to close the income gap to the EU15 under scenario two differs from that obtained in scenario one because the current and future growth rates assumed here differ from the past trends. For some EU10 countries this period turns to be longer than in the first scenario, while for some other countries it appears to be shorter. The convergence period becomes much shorter for Bulgaria (32 years at PPS and 67 years at CER) and Romania (40 or 76 years), but longer for Estonia (20 or 36 years), Slovakia (21 or 41 years), Slovenia (52 or 87 years), and Hungary (71 or 159 years). For Poland the catching-up period is 26 years if the calculation is based on PPS, and 50 years if it is based on CER. For the remaining countries, the period needed to close the income gap does not differ much from that estimated in the first scenario. For the Czech Republic, this period is 21 or 42 years, and for Latvia and Lithuania it is 21 or 41 years and 24 or 49 years respectively.

The above estimates of the catching-up period in terms of per capita GDP measured at PPS should be treated as minimal because they have been made at constant prices and exchange rates noted in 2010, on the assumption that the current price differentials between the EU10 and EU15 will not change. In fact, due to the gradual equalization of price levels within the EU27, the actual purchasing power of the future income earned in any of the EU10 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.

We have also analyzed some other scenarios of the convergence process, including an alternative extrapolation variant, which assumes that future development will follow the GDP per capita growth pattern observed in the 2000–2010 period (Matkowski, 2010a), as well as some other variants of the analytical forecast, with different assumptions as to the future growth rates in the EU10 countries and in the EU15 group. In all the analyzed variants, the period necessary for Poland to reach the average EU15 income level calculated at PPS ranges from 20 to 30 years. We can therefore conclude that, under all realistic assumptions as to future growth, the period necessary for Poland to catch up with the EU15 in the PPS income level is at least 20 years (Matkowski, 2010a).

Thus, expectations that Poland can reach the income level seen in Western Europe within 10 years are entirely unrealistic. This could only happen if the Polish economy began to grow at a rate of 5% per year while the EU15 countries would stop growing altogether. Such a scenario, however, should be excluded because complete stagnation in Western Europe is improbable, and also because the Polish economy, which is highly dependent on exports to Western markets and on the inflow of foreign investment, would be unable to grow under such conditions. Therefore, we have to accept the fact that it is perhaps possible to make up for the delay in historical development and close

the income gap separating us from Western Europe, but this requires quite a long time and much effort. On the other hand, one cannot exclude the possibility of a considerable slowdown in future growth in Poland and other EU10 countries, which could bring down the rate of the convergence process and eventually reverse it into divergence. Such a possibility is implied by scenario three, which is presented below.

Scenario three is based on a long-term growth forecast for EU27 countries up to 2060 developed under the auspices of the European Commission. This forecast, already mentioned earlier in this chapter, is based on a thorough analysis of the unfavorable trends and resulting changes in employment and labor productivity, as well as on expected changes in total factor productivity (TFP). Under the forecast, beginning 2015 or 2020, economic growth in Poland and most other CEE countries is expected to slow down, mainly as a result of population aging and an outflow of 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 EU10 and EU15, including even complete disappearance of any growth advantage and the reversal of the growth ratio between the two groups, at a very low growth rate level. 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 the reversal of the convergence process and a renewed broadening of the income gap. It should be noted that this forecast is highly pessimistic, not only because it excludes the possibility of bridging the income gap towards 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 GDP per capita) over the next 50 years for both the EU15 and most EU10 countries.

The implications of this scenario for the catching-up process between the CEE countries and Western Europe are shown in Table 21. The reference point here is the average level of per capita GDP at PPS in the euro zone (EU17), which does not differ much from the average value of the same indicator calculated for the EU15 group[23]. For the sake of simplicity and clarity in presenting the results, the relative income levels illustrating the size of the income gap are given only in terms of GDP per capita calculated at PPS (the alternative estimates of the income gap in terms of GDP per capita calculated at CER would be much lower).

As shown in Table 21, in most CEE countries the switch from convergence to divergence against Western Europe would appear around 2045 (a little earlier in the case of Slovenia and Slovakia). At their turning points from convergence to divergence, individual EU10 countries can reach the following income levels relative to Western Europe (EU17 = 100), illustrating the minimum size of the income gap: Slovakia – 89%, Czech Republic – 87%, Slovenia – 82%, Latvia and Lithuania – 68% and 70%, Hungary – 64%, and Romania – 50%. Poland would reach the minimum income gap towards Western Europe in 2044, with a relative income level of 75% against the EU17 aver-

[23] For the EU15 group, we have no reference data.

age. Bulgaria is the only EU10 country that will be not affected by divergence (at least not within the forecast time frame), but at the end of the forecasting period it can only enjoy 55% of the average EU17 income standard. Of course, this scenario does not give any indication as to the further development of the convergence vs. divergence process after 2060, which is beyond the time scope of the forecast.

Table 21
Closing the income gap – scenario 3

Country	GDP per capita growth rate, 2010–2060 (% per year)	Income gap (GDP per capita at PPS, EU17 = 100)						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	57	62	69	75	76	75	77 (2046)
Lithuania	1.7	52	57	62	68	70	68	70 (2048)
Latvia	1.8	49	54	62	67	67	65	68 (2044)
Poland	1.8	57	67	71	75	74	71	75 (2044)
Romania	1.5	42	46	48	50	49	48	50 (2044)
Slovakia	1.8	66	79	87	89	86	83	89 (2038)
Slovenia	1.3	76	81	82	82	80	79	82 (2037)
Hungary	1.4	59	57	60	63	63	62	64 (2045)
Euro zone- EU17	1.3	100	100	100	100	100	100	.

Source: Author's calculations based on data from Eurostat (2013) and the European Commission (2012), accessed Feb. 3, 2013.

One can hope that this depressing scenario, precluding the chance of the EU10 countries bridging their development and income gap to the EU15 within the lifetime of a single 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 reliability of the alarming forecast announced by the European Commission is supported by similar results obtained in another long-term growth projection prepared by the OECD (OECD, 2012). In order to prevent the realization of this scenario, well-coordinated, multidirectional efforts must be made as soon as possible within the framework of economic and social policy by the governments of the countries concerned as well as within the framework of common European policy, aimed at overcoming the emerging threats to development and neutralizing the factors that could hamper future economic growth. In the case of Poland, a complex development program is needed, dedicated to the maintenance and acceleration of economic growth, which should

focus on correcting unfavorable demographic trends, creating better institutional conditions for enterprise development, further expanding and modernizing infrastructure, better utilizing the existing labor and material resources, and promoting education, knowledge and innovation, which are crucial factors of growth in a highly competitive international environment[24].

Conclusions

1. There has been a weak income convergence among the 10 new EU member states. Generally, the GDP growth rates in the 1993–2012 period were negatively correlated with the initial GDP per capita level. Income differences between individual countries diminished, especially after 2000. Poland's relative competitiveness in the EU10 group, measured by real per capita income levels, has improved during the last few years.
2. Poland, similar to other new EU countries, displays income convergence toward the old EU members. EU10 countries grew faster than old EU members but their initial GDP per capita level was much lower. As a result, the income gap between Poland as well as other new EU countries and the EU15 has decreased on the whole, yet it remains considerable. Therefore, the competitiveness gaps in the living standards between the new and old EU member countries cannot be reduced in the short term.
3. The EU27 countries exhibited convergence at the regional level. During 1995–2009, poorer EU regions displayed faster economic growth than more affluent regions. As a result, differences in per capita income levels between regions diminished, especially after 2000.
4. If the EU10 countries maintain their lead in the rates of economic growth over Western Europe, they will gradually approach the income level noted in Western Europe. However, under realistic assumptions as to future growth, most countries in the region will take a long time to catch up with the EU15 in income levels. In the case of Poland, this would take at least about 20 years if the existing income gap is measured at the purchasing power standard.
5. In the light of a recent long-term growth forecast for EU27 countries, one cannot exclude a gradual slowdown in economic growth in EU10 countries in the future, mainly due to unfavorable demographic changes. The result may be a decreased rate of the convergence process and even a complete reversal of this trend, with a further increase in the income gap between the EU10 and Western Europe. To avoid such a scenario, individual governments must make intense efforts as part of their national economic and social policies, in addition to common EU policy measures, to neutralize the emerging threats and sustain or accelerate economic growth.

[24] For more on the implications of this forecast for Poland's future development see: Rapacki, 2012, Matkowski, Próchniak, Rapacki, 2013, Rapacki and Próchniak, 2013.

1.3. Income Inequality and Poverty in Poland

Patrycja Graca-Gelert

This subchapter outlines the main income inequality and poverty trends in Poland compared with other European Union countries. This edition of the report also contains a general analysis of income inequality and poverty in a regional perspective.

Methodological remarks

Poverty and income inequality are complex issues and their analysis as well as the conclusions drawn from it depend to a great extent on the adopted definitions and assumptions. In this subchapter we assume what follows.

1. We refer to disposable income unless specified otherwise.
2. We refer mainly to equivalent income (the modified OECD scale[25]) unless specified otherwise.
3. Three basic inequality measures are used in this subchapter:
   a) the Gini coefficient – one of the most popular income inequality measures ranging from 0 (or 0%, for perfect equality) to 1 (or 100%, for extreme inequality),
   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,
   c) other kinds of quintile share ratios – they show how many times the average income of one quintile group is higher than the average income of another quintile group.
4. Unless specified otherwise, a relative approach to poverty has been adopted – the share of people with an income below some relative poverty threshold is considered as poor, whereby we refer mainly to the poverty line defined as 60% of the median of the equivalent disposable income (after social transfers).
5. The data used throughout this survey come mainly from Poland's Central Statistical Office (*Budżety Gospodarstw Domowych* publications and directly from HBS (household budget surveys) and EU-SILC. Because the findings of household surveys are published with a delay, the analysis of income inequality and poverty was possible only up to 2011, and in some cases only up to 2010.
6. The calculations have been performed using the DAD 4.6. software for distributive analysis (Jean-Yves Duclos, Abdelkrim Araar and Carl Fortin, "DAD: A Software for

[25] 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.

Distributive Analysis/Analyse Distributive," MIMAP Programme, International Development Research Centre, Government of Canada, and CIRPÉE, Université Laval).

Income inequality – regional vs. national view

Since this edition of the report focuses on competitiveness in a regional perspective, it is worth mentioning some of its theoretical aspects in the context of income inequality. Regional inequalities mainly refer to the convergence/divergence of (average) income levels in a group of regions (countries) – a problem discussed in the previous subchapter. In this survey income inequality is defined as disparities in household income unless specifed otherwise.

The relationship between the convergence/divergence of incomes and inequality of household incomes is not clear-cut. In particular, the convergence of average incomes in countries' regions does not necessarily mean that the disparities in household incomes will diminish. The standard deviation of regions' average incomes may decrease despite the increasing variation of household incomes in a country. Similarly, a decrease in income inequality may coexist with the divergence of average incomes.

Table 22 shows the trends in average incomes and income inequality in regions across the EU between 2000 and 2009. Only countries with at least two NUTS2 regions have been considered. It turns out that most EU countries recorded a divergence in average incomes and an increase in income inequality. However, it can be seen that all of the combinations may occur. Moreover, it needs to be emphasized that the convergence/divergence of average incomes and the changes in income inequality do not necessarily imply their linear or monotonic character.

Apart from the relationship between the convergence/divergence of average incomes and disparities in household incomes, we can also consider the contribution of inequalities within regions to income inequality at the country level. For this purpose we need to decompose the analyzed inequality measure showing the disaggregation of total inequality in relevant factors (regions). Because the Gini coefficient has been applied throughout this subchapter, below we present the decomposition components of this measure:

$$G = G_w + G_{bg} = G_w + G_{bn} + G_t,$$

where G, G_w, G_{bg}, G_{bn}, G_t represent, respectively, the total Gini coefficient, the contribution of the Gini inequality within groups to the total Gini coefficient, the gross contribution of the Gini inequality between groups to the total Gini coefficient, the net contribution of the Gini inequality between groups to the total Gini coefficient and the residual term. The residual term equals 0 if the income distributions of individual groups do not overlap. The more the groups' income distributions overlap, the higher the value of the residual term (FAO, 2006, p. 4).

Table 22

Income inequality[a] between regions (NUTS2) and income inequality[b] within EU countries (GINI), 2000-2009[c]

Specification		Income inequality within countries		
		Decrease	Stability[e]	Increase
Income inequality between regions	convergence	Hungary	Greece Slovenia	Austria Denmark Italy
	divergence	Belgium Ireland[d] Netherlands Slovakia	Czech Republic Portugal Spain Sweden United Kingdom	Bulgaria Finland France[d] Germany **Poland** Romania

Notes: [a] Disposable income, purchasing power standard based on final consumption per inhabitant. The trend of income inequality between regions is measured by the direction of change in the standard deviation. [b] Disposable income per equivalent unit. [c] The analysis has been restricted to 2009 because of the problem of data availability concerning household income data by NUTS2 regions. In the case of the Czech Republic, Denmark, and Sweden, household income inequality refer to 2001–2009, and in the case of Slovakia to 2005–2009. Income data by regions in Italy is available for 2000–2006; in the case of France overseas territories are not taken into consideration. [d] Although Ireland and France saw a decrease/increase in household income inequality, income disparities in these countries remained relatively stable throughout the analyzed period. [e] Stability is defined as a change in the value of the GINI coefficient by less than 0.9.

Source: Own calculation based on Eurostat data.

The Gini coefficient is not additively decomposable, which is one of its deficiencies. However, the example of the above decomposition is a very popular one. The presented Gini coefficient decomposition does not go into great detail; for a comprehensive approach see, e. g. Dagum (1997).

This subchapter includes only an analysis of regional inequality in Poland, for regions as well for provinces. Because of problems with the availability of comparable data, an analysis of regional inequality in the European Union could not be performed.

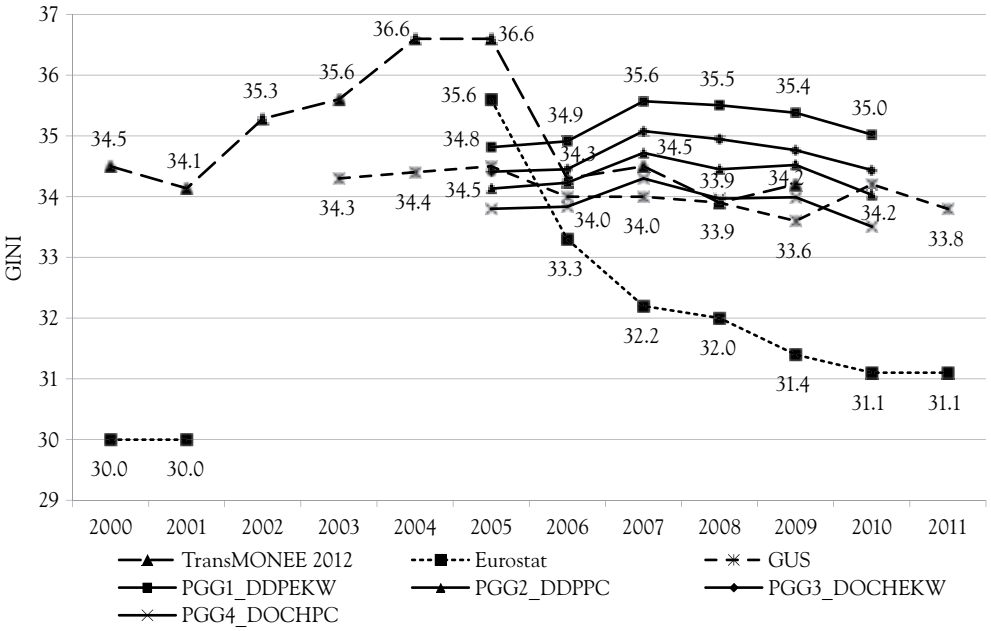
Income inequality and poverty trends in Poland

It is not possible to draw unambiguous conclusions concerning income inequality trends from the available data. One the one hand, Eurostat data indicate a continuous decrease in income disparities since 2005 by 13% of the Gini coefficient (4.5 in absolute terms); on the other hand, alternative datasets show that this decrease was modest (about 2% and 0.7 in absolute terms, according to Poland's Central Statistical Office (GUS); and about 6.5% and 2.4 in absolute terms, according to the TransMONEE database) and not monotonous. Our own calculations (from HBS individual data) of

income inequality – for various income and equivalence scale definitions – yield other conclusions about income inequality trends in Poland as well. The diversity of the findings results from factors including assumptions about the income definition, the reference unit and the equivalence scale, the choice of the data adjustment method and inequality measure, and even the measurement approach within the index chosen.

However, it can be generally said that all the datasets indicate some decrease in income inequality in Poland in recent years.

Figure 10
Income inequality[a] in Poland, 2000–2011



Note: [a] Disposable income in the case of TransMONEE and Eurostat data; available income for GUS data. Per capita income in the case of TransMONEE and GUS data; equivalent income for Eurostat data. The figure shows also the author's calculations of inequality of individual income for the following categories: PGG1_DDPEKW – equivalent disposable income, PGG2_DDPPC – per capita disposable income, PGG3_DOCHEKW – equivalent available income, PGG4_DOCHPC – per capita available income. Data labels for PGG2_DDPPC, PGG3_DOCHEKW and PGG4_DOCHPC are not shown because the aim is only to present the trend and not the values of these categories.

Source: Eurostat; TransMONEE 2012 Database, UNICEF Regional Office for CEE/CIS, Geneva; GUS, 2012, Table 5, p. 275; own calculation based on HBS data.

Table 23 is complementary to Figure 10 and presents income inequality trends in Poland taking into consideration alternative inequality measures: quintile share ratios. The ratio of the fifth and the first quintiles does not indicate that income inequality in Poland has changed unambiguously in one direction since 2006. However, a relatively

steep rise in inequality was seen in 2011 compared with previous years. Yet, this trend is not shown by all of the quintile share ratios. Relative income differences diminished somewhat between the richest and the medium-income group. These changes are opposite of those observed between 2009 and 2010.

Table 23

Average disposable monthly per capita income (in zlotys) in Poland by quintile groups, 2006–2011

Measure	2006	2007	2008	2009	2010	2011
Total	802.43	894.53	1,006.57	1,071.67	1,147.18	1,183.66
I quintile	268.07	308.39	343.15	359.95	398.95	389.25
II quintile	490.16	552.41	631.11	671.72	710.69	739.81
III quintile	674.65	749.4	853.36	911.55	964.34	1,004.32
IV quintile	915.88	1,004.19	1,140.19	1,224.31	1,293.95	1,342.9
V quintile	1,667.26	1,862.22	2,068.89	2,196.16	2,373.77	2,446.12
V quintile / I quintile	6.22	6.04	6.03	6.10	5.95	6.28
III quintile / I quintile	2.52	2.43	2.49	2.53	2.42	2.58
V quintile / III quintile	2.47	2.48	2.42	2.41	2.46	2.44

Source: Calculated from GUS, (2007-2012), *Budżety Gospodarstw Domowych*.

The data on income inequality in individual socioeconomic groups (Table 24) show that the largest income disparities between 2005 and 2011 were observed among farmers. This conclusion results from the data on available per capita income as well as on equivalent disposable income. It also turns out that farmers were the group with the largest variability of income inequality. The lowest income inequality in 2010 was observed among employees or retirees, depending on the chosen income definition. At the same time, income inequality in these groups displayed the smallest changes in the analyzed period.

Income inequality in urban and rural areas was about the same between 2005 and 2011: 32–33% (available per capita income), though somewhat lower in cities.

While Table 24 contains information about inequality within socioeconomic groups, inequality may also be considered between subpopulations. Important information regarding inter-inequality is shown in Figure 11. It can be seen that the relative income situation of farmers improved significantly between 2006 and 2011 to the "medium" position at the end of the analyzed period. However, the ratio of farmers' average income and average total income did not exceed 1. The remaining groups did not see similar changes throughout this period. Retirees are the group with the lowest relative income position, whereas the self-employed are the group with the highest position since 2007.

Table 24

Income inequality in individual socioeconomic groups in Poland, 2005–2011

Households	Income definition	2005	2006	2007	2008	2009	2010	2011
Employees	available per capita	37.1	35.8	35.2	34.0	34.3	34.7	34.6
	disposable equivalent	29.5	29.3	29.1	28.8	28.8	28.7	.
Farmers	available per capita	49.7	49.6	54.8	57.2	53.6	53.3	53.9
	disposable equivalent	59.3	56.3	57.7	63.5	65.4	58.4	.
Self-employed	available per capita	39.7	41.5	41.3	38.7	37.8	37.5	37.3
	disposable equivalent	33.2	35.0	34.0	32.4	31.5	30.9	.
Retirees	available per capita	24.1	24.5	23.6	24.2	24.1	24.9	24.4
	disposable equivalent	28.5	29.5	30.0	30.4	30.5	30.6	.
Pensioners	available per capita	28.1	28.3	28.9	29.4	28.7	29.1	29.2
	disposable equivalent	28.0	28.8	33.1	30.8	29.7	30.0	.
Urban	available per capita	33.3	32.9	32.5	31.5	31.2	32.3	31.7
	disposable equivalent	33.0	33.1	33.7	33.1	32.9	33.0	.
Rural	available per capita	33.6	33.1	34.1	34.3	33.8	33.9	33.7
	disposable equivalent	38.1	38.1	38.7	39.7	39.7	38.6	.

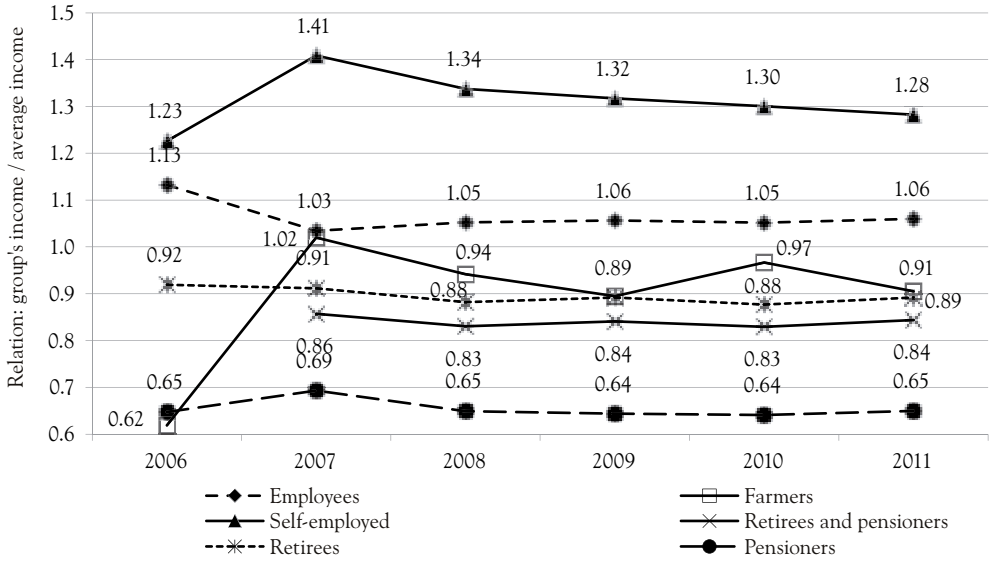
Source: GUS, (2012), Table 5, p. 275; own calculation based on HBS data.

Table 25 supplements the discussion on intra- (Table 24) and inter-inequality (Figure 11) and shows the Gini coefficient decomposition by socioeconomic group. Retirees and pensioners are considered as one group. The decomposition approach has been briefly presented in the previous part of this subchapter.

The second column shows the Gini coefficient for individual socioeconomic groups; the two following columns present, respectively, the relative size of each group and the relative size of their income; and the last two columns yield information on the absolute and relative inequality contribution to total income inequality measured by the Gini coefficient in Poland in 2010. The three last rows of Table 25 contain an important part of the analysis. In relative terms, more than a third of total inequality is explained by income inequality within individual socioeconomic groups and almost 37% of total inequality may be attributed to income disparities between the groups considered. The residual term of about 29% shows the part of total income inequality that results from the fact that the income distributions of the socioeconomic groups overlap.

Figure 11

Relation of socioeconomic groups' income and average income[a] in Poland, 2006–2011 – main trends



Note: [a] Monthly, equivalent disposable income.

Source: Calculated from GUS, (2007-2012), *Budżety Gospodarstw Domowych*.

Table 25

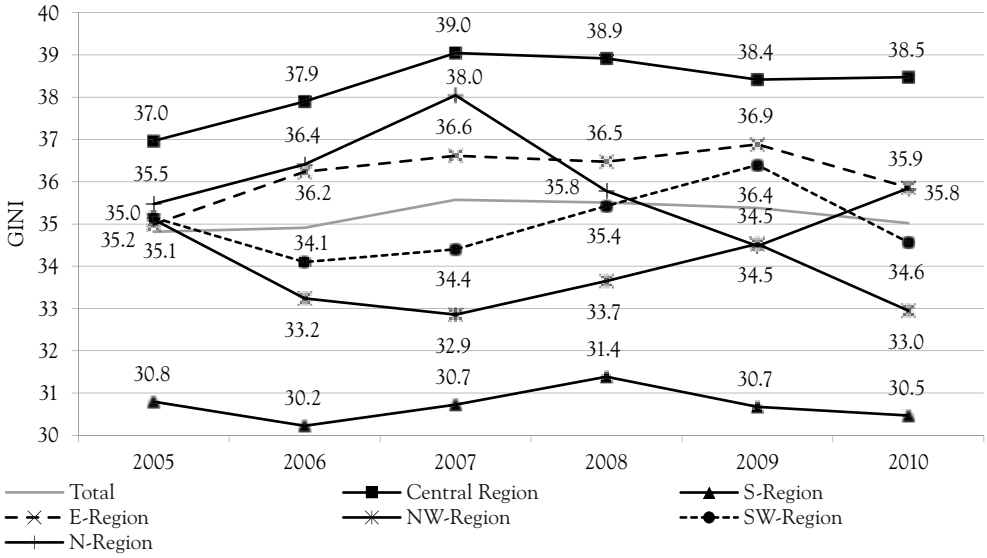
Gini coefficient decomposition by socioeconomic group in Poland, 2010

Specification	Estimated Gini	Population Share	Income Share	Absolute Contribution	Relative Contribution
Employees	0.28682288	0.55061122	0.61747439	0.09751643	0.27845833
Farmers	0.58388394	0.05520382	0.07010400	0.00225964	0.00645239
Self-employed	0.30885464	0.08024366	0.11025058	0.00273241	0.00780240
Retirees and pensioners	0.31260682	0.27558260	0.18032583	0.01553489	0.04435990
Living on other unearned sources	0.40839170	0.03835870	0.02184520	0.00034221	0.00097719
Within-group inequality	-	-	-	0.11838558	0.33805022
Between-group inequality	-	-	-	0.12879327	0.36776939
Overlap inequality	-	-	-	0.10302231	0.29418039

Source: Own calculation based on HBS data.

Interesting conclusions may be drawn from analyzing inequality from a regional perspective. Figure 12 shows income inequality trends in individual regions and Poland between 2005 and 2010. The highest inequality was observed in the Central Region, while the lowest in the Southern Region. The Northern Region experienced the largest income variability in relative terms; however, income inequality was about the same in 2010 compared with 2005.

Figure 12
Regional[a] income inequality in Poland, 2005–2010



Note: [a] The considered regions consist of the following provinces: the Central Region – Mazowieckie and Łódzkie; the S-Region – Śląskie and Małopolskie; the E-Region – Podlaskie, Lubelskie, Świętokrzyskie and Podkarpackie; the NW-Region – Zachodniopomorskie, Lubuskie and Wielkopolskie; the SW-Region – Dolnośląskie and Opolskie; the N-Region – Pomorskie, Kujawsko-Pomorskie and Warmińsko-Mazurskie.

Source: Own calculation based on HBS data.

Table 26 supplements the data analysis from Figure 12 and provides a disaggregation of total income inequality in Polish provinces in 2010. The results were obtained through the decomposition approach explained at the beginning of this subchapter. It turns out that the Central Region contributed the most to total income inequality, which should come as no surprise given this region has the largest population and income among all the regions. The results from the last three rows yield some information on intra- and inter-inequality. The Gini decomposition into two components shows that income inequality between individual regions played the most important role in explaining total income inequality (more than 82%). Yet, subtracting the residual term gives us a contribution of inter-inequality of just above 11%.

Table 26
Gini coefficient decomposition by regions in Poland in 2010

Specification	Estimated Gini	Population Share	Income Share	Absolute Contribution	Relative Contribution
Central region	0.38475910	0.20819429	0.23732965	0.01901121	0.05428654
S-region	0.30465846	0.21136787	0.20417264	0.01314770	0.03754328
E-region	0.35864742	0.17667557	0.15990680	0.01013237	0.02893301
NW-region	0.32954273	0.15592264	0.15510293	0.00796968	0.02275744
SW-region	0.34565931	0.10393960	0.10241970	0.00367970	0.01050740
N-region	0.35842247	0.14390002	0.14106828	0.00727588	0.02077628
Within-group inequality	-	-	-	0.06121654	0.17480394
Between-group inequality	-	-	-	0.03961865	0.11313111
Overlap inequality	-	-	-	0.24936597	0.71206495

Source: Own calculation based on HBS data.

Map 1
Income inequality[a] by province in Poland, 2005 and 2010

Note: [a] The provinces that recorded a decrease in income inequality by 0.3 and more between 2005 and 2010 are marked with light gray, whereas those that saw an increase in income disparities by 0.3 and more are marked with dark gray. In the remaining provinces income inequality remained stable, i.e. changed less than 0.3.

Source: Own calculation based on HBS data.

The disaggregation of the income inequality analysis by provinces yields better information on changes in regional inequality in Poland since 2005. Map 1 clearly shows that income disparities increased in provinces in Central and Eastern Poland, regions that generally noted higher income inequalities than other regions. This trend needs to be evaluated negatively from the perspective of socioeconomic cohesion in Poland.

As in the analysis of Poland's regions, the Gini decomposition has also been applied in the case of provinces. The decomposition results are given in Table 27 and they yield conclusions similar to the regional analysis. In 2010 the largest contribution to total income inequality was in Mazowieckie province (Central Region). However, there is a difference in the contribution of intra- and inter-inequality. The most important factor explaining total income inequality in Poland was income inequality between the provinces, in gross as well as net terms.

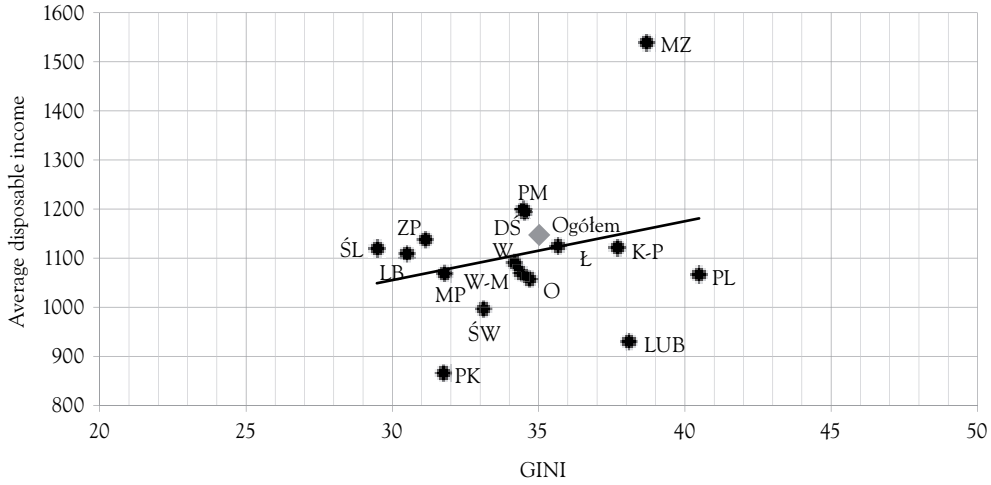
Table 27
Gini coefficient decomposition by province in Poland in 2010

Specification	Estimated Gini	Population Share	Income Share	Absolute Contribution	Relative Contribution
Dolnośląskie	0.34500806	0.07749884	0.07739797	0.00206945	0.00590931
Kujawsko-Pomorskie	0.37698214	0.05365349	0.05253758	0.00106265	0.00303439
Lubelskie	0.38080839	0.05661290	0.04741487	0.00102220	0.00291890
Lubuskie	0.30498898	0.02566537	0.02451374	0.00019189	0.00054793
Łódzkie	0.35651876	0.06904457	0.06392837	0.00157364	0.00449353
Małopolskie	0.31786847	0.08410309	0.08410920	0.00224855	0.00642074
Mazowieckie	0.38694262	0.13914973	0.17340128	0.00933644	0.02666021
Opolskie	0.34696120	0.02644076	0.02502173	0.00022955	0.00065547
Podkarpackie	0.31741819	0.05354545	0.04762627	0.00080947	0.00231144
Podlaskie	0.40481371	0.03261161	0.03257872	0.00043009	0.00122813
Pomorskie	0.34466673	0.05568701	0.05773930	0.00110822	0.00316452
Śląskie	0.29477823	0.12726478	0.12006344	0.00450417	0.01286165
Świętokrzyskie	0.33122047	0.03390562	0.03228694	0.00036259	0.00103538
Warmińsko-Mazurskie	0.34392881	0.03455951	0.03079140	0.00036599	0.00104508
Wielkopolskie	0.34167170	0.08783087	0.09153496	0.00274690	0.00784378
Zachodniopomorskie	0.31117281	0.04242640	0.03905423	0.00051559	0.00147227
Within-group inequality	–	–	–	0.02857737	0.08160274
Between-group inequality	–	–	–	0.05753204	0.16428282
Overlap inequality	–	–	–	0.26409175	0.75411444

Source: Own calculation based on HBS data.

Some worrying conclusions can be drawn from the relationship between income inequality and the average disposable income in individual provinces. A negative relationship would suggest a negative impact on socioeconomic cohesion in Poland. Yet Figure 13 shows that both variables are not clearly correlated and, in addition, the slight positive relation is due to including Mazowieckie province – the wealthiest and one of the most unequal regions – in the analysis.

Figure 13
Income inequality and average disposable income[a] by province[b] in Poland, 2010



Note: [a] Average disposable income is defined as per capita income, whereas income inequality refers to equivalent disposable income. [b] Abbreviations of provinces: DŚ – Dolnośląskie, K-P – Kujawsko-Pomorskie, LUB – Lubelskie, LB – Lubuskie, Ł – Łódzkie, MP – Małopolskie, MZ – Mazowieckie, O – Opolskie, PK – Podkarpackie, PL – Podlaskie, PM – Pomorskie, ŚL – Śląskie, ŚW – Świętokrzyskie, W-M – Warmińsko-Mazurskie, W – Wielkopolskie, ZP – Zachodniopomorskie.

Source: Own calculation based on HBS data and GUS, (2012a), Table 4 (91).

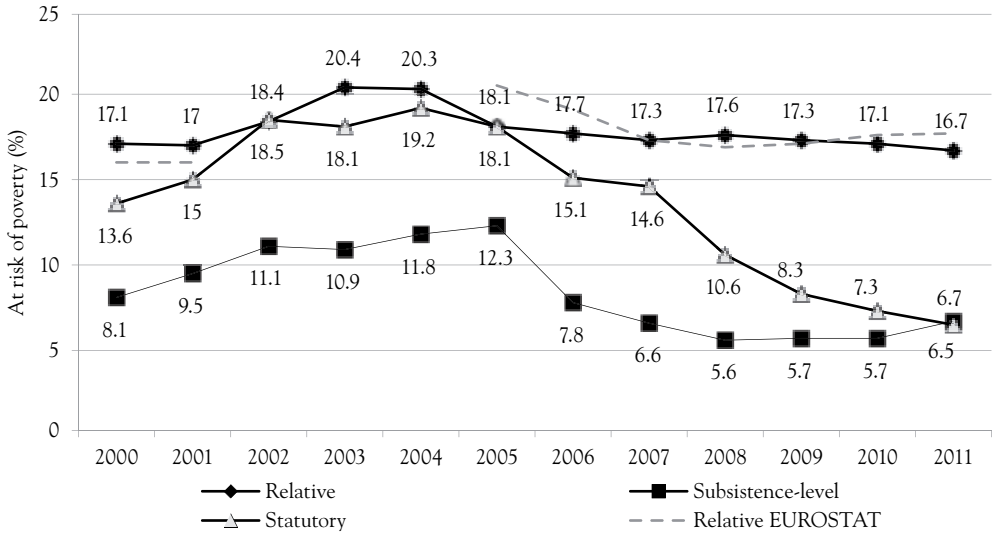
Although the poverty analysis carried out in this subchapter mainly considers poverty, with the poverty line defined as 60% of the median of the equivalent disposable income (after social transfers), the Central Statistical Office uses other definitions. The relative poverty line is determined by 50% of the average monthly household expenditures; the statutory poverty line entitles one to social benefits, and the subsistence-level poverty threshold determines the extreme poverty line (calculated by the Institute of Labor and Social Studies). In addition, the equivalence scale (applied to the relative and extreme poverty lines) differs from the modified OECD equivalence scale[26].

[26] Poland's Central Statistical Office uses the original equivalence scale, which assigns a value of 1 to the household head, 0.7 to each person aged 14 and above, and 0.5 to each child.

Due to these methodological differences between the GUS and Eurostat data – used to compare at-risk-of-poverty rates in EU countries in the next part of this subchapter – Figure 13 also contains Eurostat data on poverty as it was defined at the beginning of this subchapter.

The data in Figure 13 do not yield a clear-cut picture of poverty trends between 2000 and 2011. While it can be generally said that the scope of poverty diminished in Poland after 2005, poverty trends observed in recent years differ depending on the poverty line considered. Data on poverty at the statutory poverty line show that at-risk-of-poverty decreased continuously, which is not surprising given the fact that the nominal statutory threshold has not been adjusted since Oct. 1, 2006. According to the Central Statistical Office (2012e, p. 5), taking into consideration the real statutory threshold, poverty increased by 0.6 p.p. in 2011 compared with from 10.8% to 11.4% in 2010. The relative at-risk-of-poverty rate, meanwhile, decreased in comparison with 2010, from 17.1% to 16.7%. However, Eurostat data show a slight increase in poverty, from 17.6% to 17.7%.

Figure 14
Poverty in Poland at different poverty thresholds, 2000–2011



Source: Eurostat; GUS, (2007-2012), *Budżety Gospodarstw Domowych*.

The data on poverty in individual socioeconomic groups (Table 28) clearly show that farmers were the group with the largest increase in the at-risk-of-poverty rate – at all the poverty thresholds considered – in 2011 compared with 2010. The only groups that saw a decrease in poverty for at least one poverty threshold were employees, retirees and people living on other unearned sources. In the case of this last group, the decrease in poverty was the most substantial and shown by all the poverty lines considered.

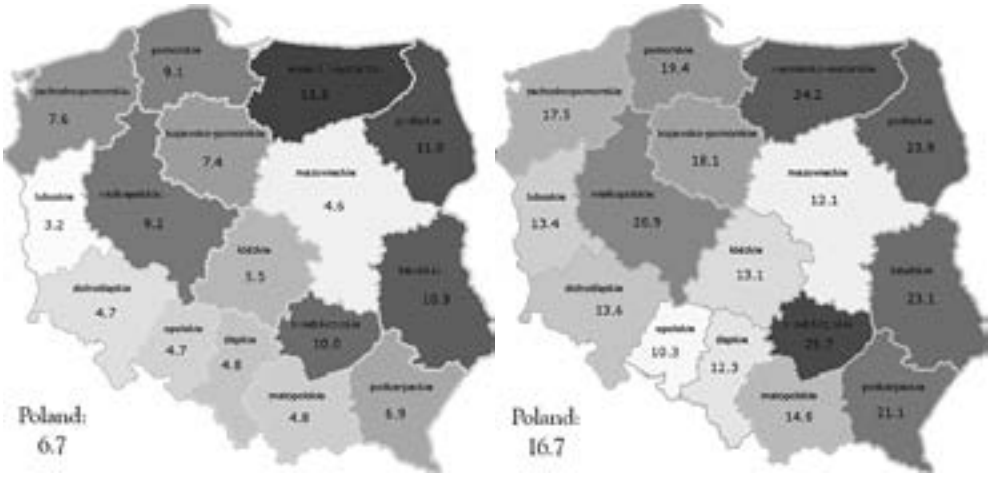
This change should be evaluated as positive from the perspective of preventing social exclusion in Poland.

Table 28
At-risk-of-poverty rate by socioeconomic group in Poland, 2010–2011

Specification		Poverty threshold					
		Subsistence-level		Relative		Statutory	
		2010	2011	2010	2011	2010	2011
Total		5.7	6.7	17.1	16.7	7.3	6.5
Socioeconomic groups	Employees	5.1	5.7	16.3	15.3	6.9	5.8
	Farmers	8.9	13.1	25.9	28.7	12.1	13.4
	Self-employed	2.2	3.4	9.3	9.9	3.3	3.4
	Retirees	3.9	4.6	13.3	12.6	4.1	3.7
	Pensioners	9.6	13.0	25.4	26.4	10.1	10.7
	Living on other unearned sources	22.4	21.9	41.9	41.0	27.0	23.2

Source: GUS, (2012b), Table 2, p. 7.

Map 2
Poverty[a] by province in Poland, 2011



Note: [a] The graph on the right side presents subsistence-level at-risk-of-poverty rates, whereas the graph on the left side shows relative at-risk-of-poverty rates. The darker the color, the higher the at-risk-of-poverty rate.

Source: GUS, (2012b), Map 1, p. 15.

The data on regional poverty in Poland indicate that the distributions of extreme and relative poverty are similar with the exception of the southern and some eastern provinces. The provinces with the lowest at-risk-of-poverty rates in 2011 were Mazowieckie and the southwestern regions, while the highest poverty rates were in provinces such as the Warmińsko-Mazurskie, Świętokrzyskie, Podlaskie and Lubelskie. In general, it may be argued that, with the clear exception of Mazowieckie province, the size of poverty is positively correlated with income inequality.

Table 29, which shows the distribution of poverty by class of locality, yields some information on at-risk-of-poverty from a regional perspective. In 2011 the highest level of poverty was recorded in rural areas, while the lowest in towns with above 500,000 residents. It can be seen that there is a clear correlation between the size of a locality and the size of poverty: the bigger the town, the lower the poverty level.

Table 29
Poverty by class of locality in Poland, 2011

Category		Subsistence-level	Relative	Statutory
Total		6.7	16.7	6.5
Urban	Total	4.2	11.5	4.1
	> 500,000	1.1	3.4	0.9
	200,000–500,000	3.2	9.7	3.2
	100,000–200,000	3.8	11.8	4.3
	20,000–100,000	4.4	13.0	4.6
	< 20,000	7.4	17.5	6.7
Rural		10.9	25.0	10.4

Source: GUS, (2012b), Table 4, p. 12.

Income inequality and poverty in Poland compared with other EU countries

In 2011 income inequality in individual European Union countries measured by the Gini coefficient ranged between 23.8% (Slovenia) and 35.2% (Latvia), while income inequality at the EU level amounted to 30.7%, which was an increase by 0.2 p.p. compared with the previous year. The S80/S20 income quintile share ratio took on values from the 3.5–6.6 range (for the same countries) and amounted to 5.1 for the whole EU compared with 5.0 in 2010. While evaluating income inequality in the EU, two questions need to be taken into consideration. First, the Gini coefficient measures changes across the income distribution spectrum, while the S80/S20 ratio only takes into account changes at the extremes of the distribution. Second, the S80/S20 income

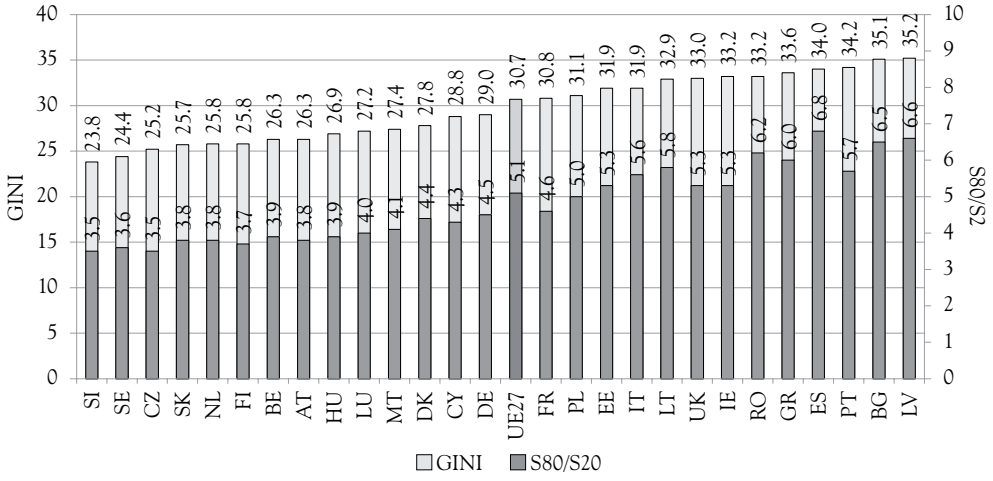
quintile share ratio for the European Union as a whole is the average for the 27 countries weighted with the population size of each EU member. This means that income inequality in the EU measured by the S80/S20 ratio is somewhat understated compared with when it was counted as the ratio of 20% of the population with the highest income and 20% of the population with the lowest income in the European Union.

In 2011 the highest income inequality was observed in countries that record a relatively high level of inequality compared with other EU countries: Latvia, Bulgaria, Portugal, and Spain. Bulgaria is one exception: income inequality in that country increased by more than 10 p.p. between 2005 and 2011. The lowest income inequality was in countries with a traditionally low level of inequality – in three post-socialist countries (Slovenia, the Czech Republic and Slovakia) and one Scandinavian country, Sweden (Figure 15).

In 2011 most EU countries recorded an increase in income disparities. The greatest rise was in Hungary (by 2.8 p.p.) and Bulgaria (by 1.9 p.p.). In 2010 income inequality in Ireland increased considerably as well (by 4.4. p.p.) compared with 2009; however, the unavailability of data for 2011[27] makes a further evaluation of this trend impossible. The greatest decrease in income inequality was noted in Lithuania (by 4 p.p.) and Malta (1 p.p.).

Figure 15

Income inequality (disposable income; Gini coefficient, S80/S20) in 2011[a]; Poland compared with other EU countries



Note: [a] Data for Ireland refer to 2010.

Source: Eurostat.

Eurostat data show that income disparities in Poland did not change in 2011 compared with the previous year and amounted to 33.1% (Gini) and 5.0 (S80/S20),

[27] as of Feb. 2, 2013.

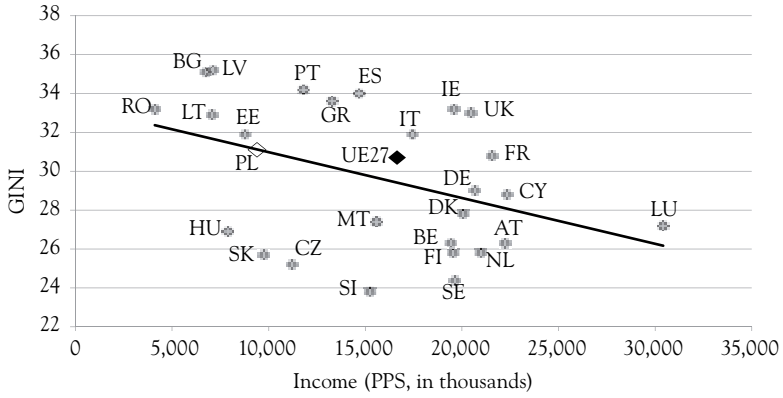
a level similar to that recorded in the EU as a whole. In addition, income inequality in Poland decreased substantially between 2005 and 2001 (by 4.5 p.p.) compared with other EU countries.

As mentioned earlier, a negative correlation between average incomes and income inequality is an unfavorable trend in the context of socioeconomic cohesion in the EU. In general, it can be argued that income inequality is the more harmful, the poorer a population is. While it turned out that such a relationship does not appear in the case of Poland and its regions, it is clearly visible among EU countries. Figure 16 shows that the relationship between average equivalent disposable income (PSN) and income inequality in individual EU countries is negative. The correlation coefficient is –0.42 and statistically significant at $p<0.05$.

The trend in Poland's situation in this context is favorable compared with other EU countries. Poland's relative position regarding income disparities as well as the average disposable income has improved continuously in recent years, yet the improvement was greater in the case of income inequality.

Figure 16

Income inequality and average equivalent disposable income in 2011[a]; Poland compared with other EU countries



Note: [a] Data for Ireland refer to 2010. In the case of the EU27 the average income data refer to 2010.

Source: Eurostat.

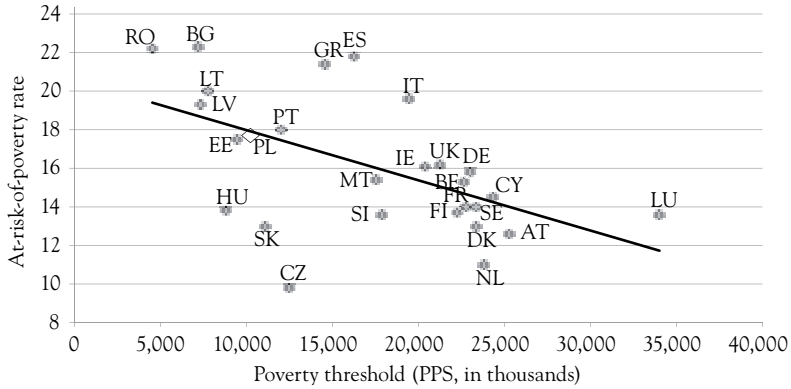
It is difficult to analyze regional income inequality for NUTS2 regions due to problems with the availability of comparable data. For this reason such an analysis is not included.

As mentioned in the methodological remarks, a relative approach to poverty was adopted throughout this survey, with the poverty threshold at 60% of the median of the equivalent disposable income (after social transfers). The at-risk-of poverty rate with this definition is one of the main indicators for monitoring poverty in the EU. In 2011 the poverty rate for the European Union as a whole was the highest since data

on EU poverty has been available. The at-risk-of-poverty rate increased from 16.4% in 2010 to 16.9% in 2011. The highest level of poverty was observed in countries such as Bulgaria (22.3%), Romania (22.2%), Spain (21.8%), and Greece (21.4%). The lowest poverty rates were recorded in the Czech Republic (9.8%), Austria (11%), the Netherlands (12.6%), and Denmark (13%). Poverty increased the most in Estonia (by 1.7 p.p.), Bulgaria (by 1.6 p.p.), and Hungary (1.5 p.p.). The poverty rates diminished in only a few EU countries; the biggest decrease was noted in Latvia (by 2 p.p.). Poland is one of the EU countries with a relatively high poverty rate. The year 2011 was the third consecutive year with a rise in poverty in Poland (by 0.8 p.p. since 2008).

Figure 17

At-risk-of-poverty rates and poverty thresholds in 2011[a]; Poland compared with other EU countries



Note: [a] Data for Ireland refer to 2010.

Source: Eurostat.

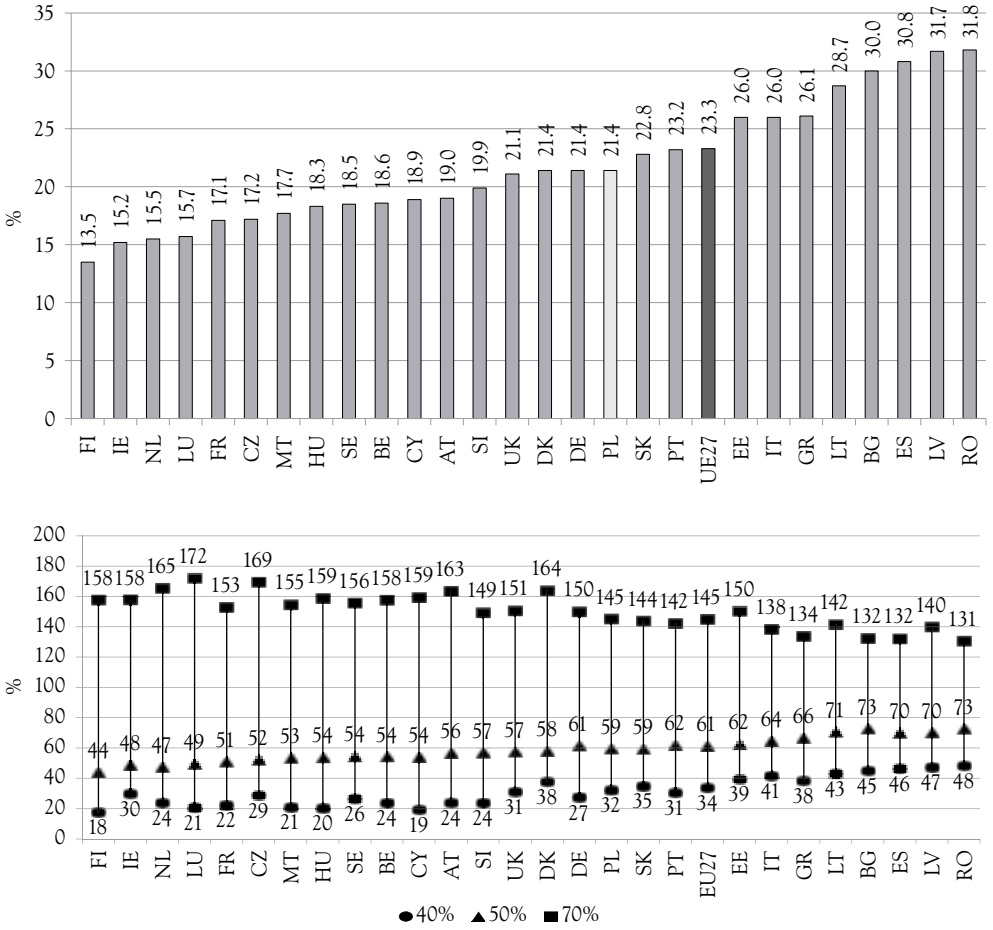
Figure 17, which shows data on the at-risk-of-poverty rates and poverty thresholds[28] expressed in Purchasing Power Standard terms, reveals a clear negative relationship between the extent of poverty and the absolute poverty thresholds. The coefficient of correlation is –0.55 and is statistically significant at $p<0.05$. This relationship needs to be taken into consideration in the comparative analysis of poverty in EU countries. It turns out that the situation of countries with a low absolute poverty threshold accompanied by a high at-risk-of-poverty rate (e.g. Romania and Bulgaria) is far less favorable in terms of the size of poverty than suggested by statistics.

Another important measure of poverty is its depth. One of the ways of measuring poverty depth is to calculate the poverty depth index (the relative poverty gap), which is defined as the difference between the median equivalent disposable income of people below the at-risk-of-poverty threshold and the at-risk-of-poverty threshold, expressed as

[28] The poverty threshold is given for a household consisting of two adults and two children aged below 14.

a percentage of this threshold. The results for individual EU countries are shown in the upper part of Figure 18. Countries with the smallest poverty depth do not necessarily record low poverty rates, e.g. Finland, Ireland or France. However, in the case of a high level of poverty (Romania, Spain, Bulgaria), its depth is also considerable – a trend that needs to be evaluated as unfavorable. While poverty in Poland is above the EU average, the depth of poverty is lower than for the EU as a whole.

Figure 18
Depth of poverty[a] in 2011[b]; Poland compared with other EU countries



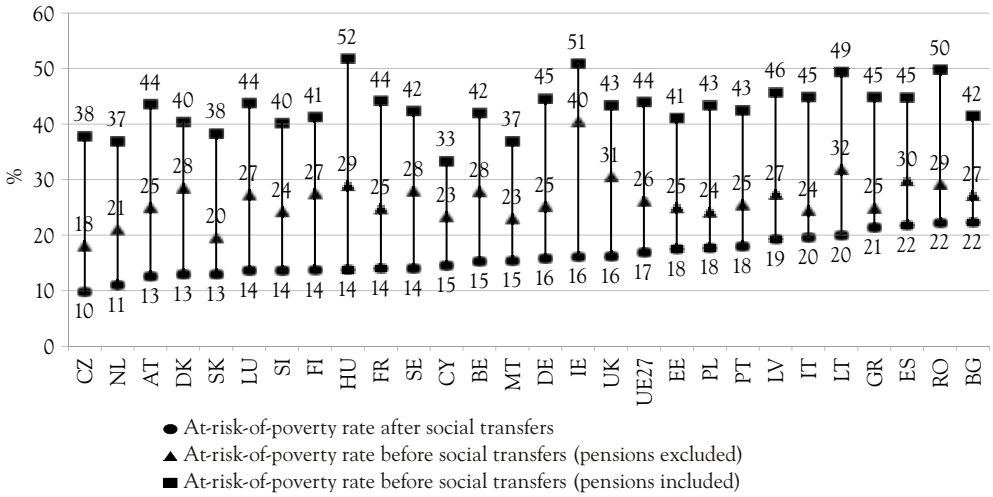
Note: [a] The upper graph shows relative median at-risk-of-poverty gaps, which are measures of poverty depth. The lower graph shows the ratios of the at-risk-of-poverty rates at the 40%, 50% and 70% poverty thresholds and the at-risk-of-poverty rates at the 60% of the median equivalent disposable income poverty threshold. [b] Data for Ireland refer to 2010.

Source: Calculated from Eurostat data.

The bottom part of Figure 18 presents alternative poverty depth measures – the ratios of the poverty rates at 40%, 50%, 70% thresholds and the 60% threshold. These ratios yield some information on the distribution of income around the 60% poverty threshold. For example, in Poland 59% of those at risk of poverty according to the 60% threshold were also at risk of poverty at the 50% poverty threshold. In other words, 41% of people at risk of poverty in Poland at the 60% threshold have an equivalent disposable income between 50% and 60% of the median equivalent income. Similarly, 68% of people at risk of poverty in Poland at the 60% threshold have an equivalent disposable income between 40% and 60% of the median equivalent disposable income.

Figure 19

The impact of social transfers on poverty in 2011[a]; Poland compared with other EU countries



Note: [a] Data for Ireland refer to 2010.

Source: Eurostat.

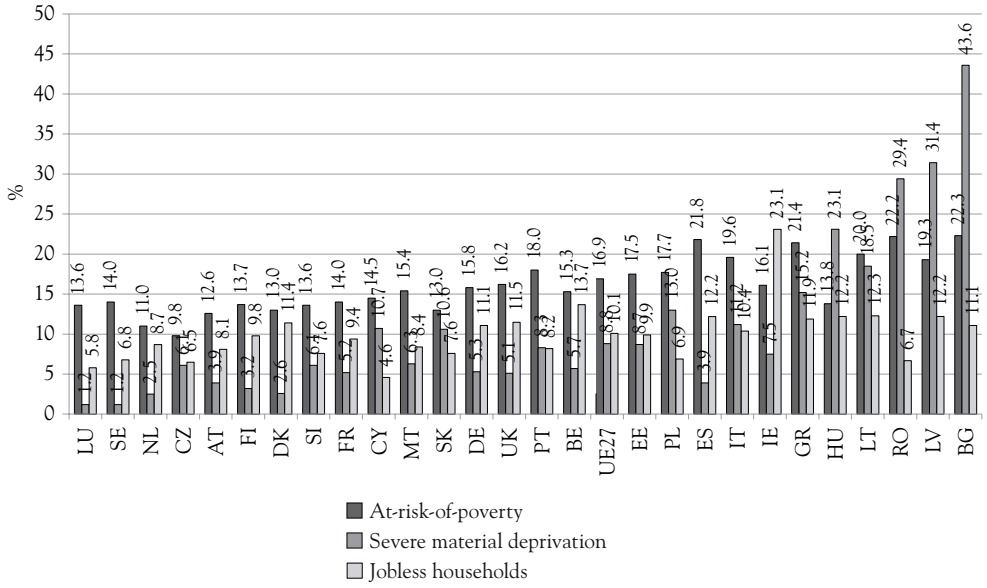
An important piece of information on the competitiveness of individual EU countries from the perspective of poverty is the countries' effectiveness in decreasing poverty through social transfers. Social transfers may be considered either including or excluding pensions. Therefore, Figure 19 shows three poverty measures: before social transfers (pensions included), before social transfers (pensions excluded), and after social transfers. The effectiveness of decreasing poverty at the EU level is as follows. Without social transfers (pensions included) poverty would amount to 44%, while excluding pensions from social transfers would yield a poverty rate of only 26%. It is worth noting that similar poverty rates were observed in the case of Poland. In 2011 the highest at-risk-of-poverty rate before social transfers (pensions included) was recorded in Hungary, Ireland, Romania, and Latvia. In the case of the first two countries, the

effectiveness of decreasing poverty was relatively high. It can be said that the lowest effectiveness in this area was observed in Bulgaria, Spain and Greece.

The long-term EU socioeconomic program known as the Europe 2020 strategy considers three measures to monitor efforts to combat poverty and social exclusion. The first measure is the previously analyzed at-risk-of-poverty rate. The two remaining ones are the severe material deprivation rate and the proportion of people living in household with very low work intensity. The severe material deprivation rate is defined by Eurostat as "the enforced inability 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) a television set, 7) a washing machine, 8) a car, 9) 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."

Figure 20

Three main indicators of the Europe 2020 strategy for promoting social inclusion in 2011[a]; Poland compared with other EU countries



Note: [a] Data for Ireland refer to 2010.

Source: Eurostat.

Figure 20 shows the values of these indicators for each EU country, which have been ranked according to the sum of the three indicators. Obviously, this sum cannot be interpreted as the proportion of people at risk of social exclusion, as the considered

dimensions of social exclusion overlap. The ranking list of EU countries by the sum of the three indicators is to a large extent similar to the rankings of both poverty and income inequality. Compared with other EU members, Poland is somewhat above the EU average (18th place among EU countries), with the at-risk-of-poverty rate at 17.7%, the severe material deprivation rate at 13% and very low work intensity at 6.9%.

While it was not possible to show the data on income inequality in a regional perspective, Table 30 provides some information on regional poverty in individual EU countries. The table shows the at-risk-of-poverty rates in EU countries (the lowest and highest values in the case of countries with several NUTS2 regions and a single value in the case of countries with only one NUTS2 region). The countries with the highest poverty disparities in 2011 were Belgium, Bulgaria, Spain, Poland, Romania, and Italy, while similar poverty rates in NUTS2 regions – excluding the cases with only one NUTS2 region – were recorded in Denmark, Finland, Ireland, and Sweden.

Table 30
At-risk-of-poverty rates in EU countries by NUTS2 regions

Country	Range or value (%)	Year of data availability
Austria	8.5–19.2	2011
Belgium	9.8–33.7	2011
Bulgaria	11.2–31.2	2011
Czech Republic	4.6–17.1	2011
Cyprus	14.5	2011
Denmark	11.8–14.6	2011
Estonia	17.5	2011
Finland	8.5–16.8	2011
France	11.2–19.3	2009
Germany	8.8–22.7	2010
Greece	16.3–24	2010
Hungary	8.3–18.9	2011
Ireland	15.1–16.4	2010
Italy	7.9–44.3	2011
Latvia	19.3	2011
Lithuania	20.0	2011
Luxemburg	13.6	2011
Malta	15.4	2011
Netherlands	8.4–15	2010

Country	Range or value (%)	Year of data availability
Poland	12.8–31.1	2011
Portugal	12.0–21.0	2005
Romania	3.4–32.4	2011
Slovakia	7.2–16.9	2011
Slovenia	10.8–16.9	2011
Spain	8.8–33.8	2011
Sweden	11.0–15.2	2011
United Kingdom	17.3–32.0	2009

Source: Eurostat.

To conclude, it needs to be emphasized once more that the evaluation of income inequality and poverty depends to a great extent on methodological questions: definitions, choice of measures, data adjustment, etc. This problem could be especially seen in the case of the assessment of income inequality trends and changes in poverty size in Poland. And so, according to Eurostat, Poland recorded a large decrease in income inequality at a diminishing rate between 2005 and 2011. Somewhat smaller downward trends were shown by the TransMONEE data, while Poland's Central Statistical Office and the authors' own calculations show a stabilization in income inequality, or only a slight decrease at the most. However, it can be generally argued that recent years have seen some decrease in income disparities, but it lost momentum in 2011. In the case of poverty, similar conclusions can be drawn, despite a substantial divergence of data. The at-risk-of-poverty rate in Poland has diminished in recent years, yet there is some evidence that poverty stabilized or even increased slightly in 2011.

In the case of income inequality and poverty trends in Poland compared with other EU countries, it has to be noted that Poland's situation has generally improved since 2005. The improvement concerns the country's relative position in terms of disposable income as well as poverty depth. It may be argued that Poland's competitiveness in this regard has increased.

No significant changes should be expected in either income inequality or poverty in Poland in the near future. However, in view of the economic slowdown, it is possible that the downward trend in income inequality and poverty will come to an end and that we will see an upward trend. The situation will to a large extent depend on what measures are taken to support socioeconomic cohesion in Poland.

Chapter 2

Competitive Position in External Economic Relations

This chapter presents Poland's role in the international division of labor. In particular, foreign trade performance and foreign investment flows are analyzed, with a special focus on economic ties with other European Union countries, which are Poland's main economic partners.

2.1. Poland's Foreign Trade Performance and Competitiveness

Elżbieta Czarny, Katarzyna Śledziewska

The trade of goods with foreign countries is one of the most important forms of international economic cooperation. In this section, we analyze Poland's foreign trade performance in order to assess the international competitiveness of Polish goods.

The analysis covers the 2008–2012 period. It focuses on the changes that took place in Poland's foreign trade in 2012. We study these changes using a comparative analysis method. The main point of reference for the comparisons is 2011, but we also make comparisons with the first year of the studied period (which also marked the beginning of the latest economic crisis).

While analyzing Poland's foreign trade, we separately examine exports and imports because the country has a non-zero trade balance, which means that its positions in these two types of trade flows, i.e. exports and imports, are different.[1] Separately

[1] Moreover, the values of exports and imports are different because the prices of these two types of trade flows are calculated according to two different methods: Free on Board (FOB) and Cost, Insurance and Freight

we present the value of exports and imports to and from EU member states (EU27)[2] and non-EU countries. This division is justified by the fact that Poland's foreign trade is dominated by EU partners. Another reason is that trade with these two groups of countries is conducted using different rules. Poland, as an EU member, is part of the single European market, where the exchange of goods is not only duty-free, but also free from non-tariff barriers. In trade with non-EU countries, non-tariff barriers exist, although they are sometimes removed because many countries have discriminatory trade liberalization agreements with the EU.

This section begins with an analysis of the value of exports and imports, taking into account the geographical structure of Poland's trade. Subsequently we study Poland's trade with countries that are its main trading partners. The last part of the study focuses on the commodity structure of Poland's exports and imports, in particular on how it is changing. The analysis of the commodity pattern of Poland's exports and imports is supplemented by a study of Poland's revealed comparative advantages in foreign trade. Together the various parts of the study make it possible to assess the level of Poland's dependence on foreign trade. The study of the commodity structure of trade makes it possible to determine to what extent Poland is part of international production networks. We also conduct a study of revealed comparative advantages in order to assess Poland's competitive position in exports compared with other EU member states and non-EU trading partners.

Changes in the value of Poland's exports and imports from 2008 to 2012

From 2008 to 2012, Poland's exports increased by more than 23% (Table 1), while imports increased by 7.5%. Exports to both EU partners (EU27_intra) and non-EU markets (EU27_extra) grew faster than imports to these two groups of countries (Table 2). Both exports and imports grew faster in the case of non-EU partners. Exports to non-EU countries was the fastest-growing type of trade flow at that time (a rise of almost 35%), but this increase was concentrated in the final years of the analyzed period (after a drop of over 22% in 2009, the value of exports increased by 20% in 2010, and then grew by a further 18% in 2011 and almost 19% in 2012).

(CIF). Another reason is that various forms of protection that distort prices are sometimes used. The difference between FOB and CIF prices results from factors including the existence of non-zero transport costs and the issuance of commercial documents, cargo insurance and export credit, as well as the existence of interest on export credit and exchange rates.

[2] Poland's partners from the European Union are defined in the tables as the "EU27," referring to the total number of EU member states. It is necessary to keep in mind, however, that Poland is also part of the EU, which means that the total number of its EU partners is 26. The tables and figures show Poland's trade with EU countries as "EU27_intra," in contrast to trade with non-EU countries, which is defined as "EU27_extra."

Table 1
Poland's exports and imports in 2008–2012 in billions of euros

	Exports					Imports				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
EU27_intra	90.18	77.92	95.31	105.70	108.11	102.01	77.75	95.06	105.85	102.50
EU27_extra	25.72	19.95	25.17	29.86	34.65	39.96	29.40	39.24	45.44	50.07
Total	115.89	97.87	120.48	135.56	142.76	141.97	107.15	134.31	151.29	152.57

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Imports from EU markets increased the least (0.48%) in the studied period: in 2009, an over 23% drop was noted, followed by growth in the next two years (by 16.97% in 2010 and 10.58% in 2011 – see Table 2); in 2012, imports from EU markets decreased again (by almost 3.3%), while imports from non-EU markets rose by more than 12.5%. This means that Poland is increasingly competitive on non-EU markets and that EU membership is not an obstacle to more intense trade with non-EU countries, even though the European Union is a highly integrated group of countries.

Table 2
Increase/decrease of Poland's intra- and extra-EU exports and imports, 2008 = 100

	2008	2009	2010	2011	2012
EU27_intra exports	100.00	86.40	105.70	117.21	119.88
EU27_extra exports	100.00	77.57	97.87	116.12	134.76
EU27_intra imports	100.00	76.22	93.19	103.77	100.48
EU27_extra imports	100.00	73.58	98.20	113.72	125.30

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

The dynamic growth of trade with non-EU countries gives Poland a chance to reduce its dependence on EU trading partners. In 2008, the role of EU markets in Poland's exports was 6 percentage points (p.p.) greater than in imports: EU markets absorbed 77.81% of Poland's total exports and provided 71.85% of Poland's total imports. In 2009–2011, the difference between the role of EU partners in Poland's exports and imports widened further. In 2012, the role of EU markets in Poland's exports was more than 8.5 percentage points (p.p.) greater than in imports. This shows that the competitive position of Polish goods on EU markets has improved.

Table 3

The share of EU partners in Poland's total exports and imports in 2008–2012; %, increase/decrease in p.p.

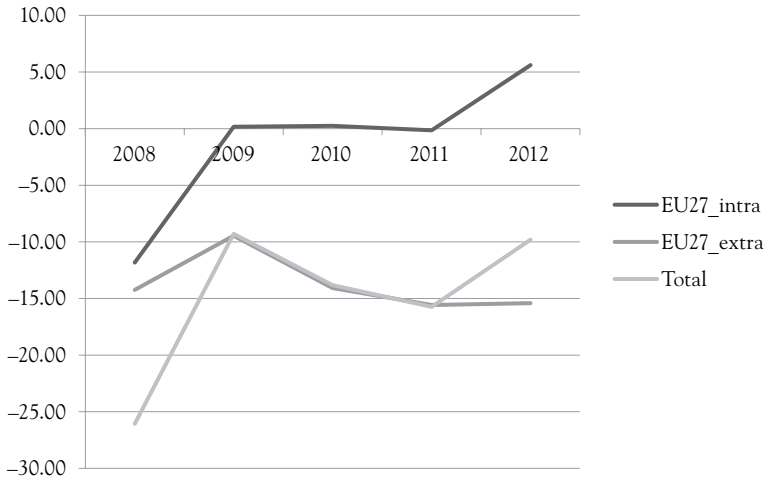
	2008	2009	2010	2011	2012	2012/2008	2012/2011
Exports	77.81	79.62	79.11	77.97	75.73	–2.08	–2.25
Imports	71.85	72.56	70.78	69.96	67.18	–4.67	–2.78

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

In 2008–2012, the role of EU partners in Poland's exports and imports decreased, with a greater drop noted in the case of imports (–4.67 p.p. vs. –2.08 p.p. in exports). In 2012, EU markets accounted for the smallest portion of Poland's trade during the studied period: 75.73% in the case of exports and 67.18% in the case of imports. Nevertheless, EU markets continue to dominate Poland's overall foreign trade, even though its trade with EU countries is growing at a slower rate than trade with non-EU markets – and even though the role of EU markets in Poland's exports and imports is decreasing.

Figure 1

Poland's trade balance in 2008–2012 in billions of euros



Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

In 2008, Poland's exports to non-EU countries accounted for about 22% of the country's total exports. In 2012, the figure rose to around 24%. This means that exports to non-EU countries were barely one-third of exports to EU markets. Non-EU markets accounted for just over 28% of Poland's total imports in 2008. Their share in Poland's

imports was less than one-third of the share of EU partners. In 2012, the share of non-EU markets rose to nearly 33%, or about one-third of Poland's overall imports.

Poland's trade balance confirms that the position of Polish goods on EU markets is improving (Figure 1). This improvement was particularly noticeable in 2012, when Poland's overall trade deficit decreased considerably. This was due to a surplus of € 5.61 billion in trade with EU partners (compared with a deficit of around € 150 million in 2011) and a slight decrease in the deficit in trade with non- EU countries (€ 170 million). In 2009, Poland recorded an even greater improvement in its trade balance in both EU and non-EU markets. However, a significant decrease in the volume of trade was recorded that year due to the economic crisis (Table 1). In 2012, the improvement in Poland's trade balance was accompanied by an increased volume of trade. In 2011, the overall value of trade as well as the value of both types of trade flows (exports and imports) to/from EU and non-EU countries exceeded the pre-crisis (2008) level and then rose further in 2012 (except in the case of intra-EU imports, which shrank by $ 3.35 billion).

The geographical structure of Poland's imports and exports

Below the geographical structure of Poland's foreign trade will be examined in detail, including the value of exports and imports and the role of the country's 10 largest trading partners in its overall trade. The analysis covers those countries that played the greatest role in Poland's exports and imports in 2012.

Table 4

The value of Poland's exports to its 10 largest export markets in 2008–2012, in billions of euros

Country	2008	2009	2010	2011	2012
Germany	29.02	25.58	31.45	35.37	35.86
Britain	6.67	6.28	7.56	8.73	9.61
Czech Republic	6.60	5.72	7.21	8.46	8.96
France	7.19	6.79	8.15	8.30	8.31
Russia	6.04	3.59	5.04	6.08	7.73
Italy	6.93	6.69	7.14	7.24	6.94
Netherlands	4.66	4.12	5.28	5.92	6.38
Ukraine	4.34	2.46	2.99	3.35	4.12
Sweden	3.68	2.62	3.56	3.87	3.78
Slovakia	2.83	2.24	3.26	3.33	3.66
Total	**77.96**	**66.09**	**81.64**	**90.64**	**95.35**

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Germany is Poland's largest trading partner in both exports and imports (Tables 4 and 6). However, that country's role in Poland's exports increased by just 0.08 p.p. between 2008 and 2012, and its role in Poland's imports decreased by about 2.5 p.p. (Table 5). At the same time, a multi-year downward trend was noted in both streams of trade: in 2009, Germany's share in Poland's exports fell by about 1 p.p., and in subsequent years further declines were noted (in imports, Germany's role decreased by 0.46 p.p. in 2009, was unchanged in 2010, and dropped again by 0.37 p.p. in 2011). In 2012, Germany's role in Poland's exports fell again by almost 1 p.p., and its role in Poland's imports dropped by almost 1.7 p.p. These changes were accompanied by a slight increase in the value of exports (by $ 490 million in 2012), and a significant drop in the value of imports (by $ 2.21 billion).

Table 5
Poland's 10 largest export markets by percentage of total exports, 2008–2012

Country	2008	2009	2010	2011	2012
Germany	25.04	26.14	26.11	26.09	25.12
Britain	5.76	6.41	6.28	6.44	6.73
Czech Republic	5.70	5.85	5.98	6.24	6.28
France	6.20	6.94	6.76	6.12	5.82
Russia	5.21	3.67	4.18	4.48	5.42
Italy	5.98	6.83	5.93	5.34	4.86
Netherlands	4.02	4.21	4.38	4.37	4.47
Ukraine	3.75	2.51	2.48	2.47	2.89
Sweden	3.17	2.68	2.96	2.86	2.65
Slovakia	2.44	2.28	2.70	2.45	2.56
Total	**67.27**	**67.53**	**67.76**	**66.86**	**66.79**

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Britain, the Czech Republic, and France fall behind Germany as the three next-largest export markets for Poland. However, throughout the studied period, these three EU countries between them accounted for a smaller percentage of Poland's exports than Germany. Even after adding Russia, which is Poland's fourth-largest export market, Germany's share of Poland's exports was greater.

Among Poland's largest import markets, Russia, the Netherlands, and China are Nos. 2–4 respectively. Of these three only the Netherlands is an EU member state. The combined role of Russia, the Netherlands, and China in Poland's imports is smaller than the role of Germany, though in 2012 the difference was just over 1 p.p. Poland's exports were more diversified geographically than imports in 2012. The country's four

largest trading partners account for more than 50% of Poland's total imports between them, while in exports the five largest markets account for less than half of the Polish goods shipped abroad in terms of value. Notably, Poland's 10 largest import markets account for a much higher value of goods than the 10 largest export markets. Also, the role of the 10 largest import markets in Poland's overall imports is greater than the role of the 10 largest export markets in the country's overall exports. This is further proof that Poland's imports are more concentrated geographically than exports.

Table 6

Poland's 10 largest import markets and the value of Polish imports from these countries in 2008–2012, in billions of euros

Country	2008	2009	2010	2011	2012
Germany	40.55	30.11	37.74	41.95	39.74
Russia	13.71	9.09	13.62	18.08	21.56
Netherlands	7.89	6.07	7.84	8.61	8.61
China	6.28	5.56	6.93	7.43	7.97
Italy	8.93	7.08	7.46	7.97	7.63
Czech Republic	5.76	4.32	5.56	6.20	6.29
France	6.77	4.96	5.87	6.41	6.17
Belgium	4.49	3.61	4.49	4.68	4.80
Slovakia	2.91	2.63	3.45	3.86	4.33
Britain	3.96	3.37	4.01	4.17	3.90
Total	**101.25**	**76.80**	**96.97**	**109.36**	**110.99**

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Both throughout the studied period and in 2012, the role of the Czech Republic, Russia, and Slovakia in Poland's exports increased because of the geographical proximity of these important trading partners. The importance of Britain also increased, most likely due to purchases made by Polish immigrants. The Netherlands, which is traditionally focused on international trade, also gained a larger role.

In both exports and imports, EU countries account for eight of Poland's 10 largest trading partners. In exports, these are Germany, Britain, the Czech Republic, France, Italy, the Netherlands, Sweden, and Slovakia in descending order. In imports, the list opens with Germany and also includes the Netherlands, Italy, the Czech Republic, France, Belgium, Slovakia, and Britain in descending order. Russia is the only non-EU country among the top five partners in both exports and imports. It remains an important trading partner for Poland despite the weakening of political relations between the two countries. China is Poland's fourth-largest import market. Its role

in Poland's imports increased, as did its position on the list of the largest import markets: China moved up from sixth place in 2008 to fourth in 2012. Poland's largest export markets also include neighboring Ukraine, which ranked eighth in both 2008 and 2012.

Table 7
Poland's 10 largest import markets by percentage of total imports, 2008–2012

Country	2008	2009	2010	2011	2012
Germany	28.56	28.10	28.10	27.73	26.05
Russia	9.66	8.48	10.14	11.95	14.13
Netherlands	5.56	5.67	5.84	5.69	5.64
China	4.42	5.19	5.16	4.91	5.22
Italy	6.29	6.61	5.56	5.27	5.00
Czech Republic	4.05	4.03	4.14	4.10	4.12
France	4.77	4.63	4.37	4.24	4.04
Belgium	3.16	3.37	3.34	3.09	3.15
Slovakia	2.05	2.46	2.57	2.55	2.84
Britain	2.79	3.14	2.98	2.76	2.56
Total	**71.32**	**71.68**	**72.20**	**72.29**	**72.75**

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

The commodity pattern of Poland's exports and imports

Foreign trade in the traditional sense of the term is based on the trade of final goods that differ in terms of physical characteristics and purpose. However, due to factors including the growing internationalization of production, intermediate goods with a varied level of processing are increasingly traded today as well. These often cross the borders of different countries many times before the final product emerges. A growing number of goods are subject to international trade in many varieties.

In this section, we examine Poland's trade in final and intermediate goods from various commodity groups. The aim is to identify the country's export specialties and top import items. The study also makes it possible to determine whether Poland is part of international production networks.

Again, we separately analyze imports and exports in Poland's trade with EU and non-EU countries. We use the Broad Economic Categories (BEC) nomenclature developed by the United Nations Statistics Division, which classifies goods by their economic

purpose. The BEC classification is commonly used in international comparisons.[3] The data makes it possible to evaluate the structure of exports in terms of their main end use and level of processing.

We begin the study with an analysis of the intended use of each group of products and their level of processing (Table 8).

Table 8

Breakdown of goods by broad economic categories according to the United Nations' BEC classification; basic classes of goods by main end use and level of processing[a]

Broad economic categories	Main end use	Level of value procesing
Food and beverages, primary, mainly for industry	Producer goods	Intermediate
Food and beverages, primary, mainly for household consumption	Consumer goods	Final
Food and beverages, processed, mainly for industry	Producer goods	Intermediate
Food and beverages, processed, mainly for household consumption	Consumer goods	Final
Industrial supplies not elsewhere specified, primary	Producer goods	Intermediate
Industrial supplies not elsewhere specified, processed	Producer goods	Intermediate
Fuels and lubricants, primary	Producer goods	Intermediate
Fuels and lubricants, processed, motor spirit[b]	Producer goods	Intermediate
Fuels and lubricants, processed, other	Producer goods	Intermediate
Capital goods (except transport equipment), and parts and accessories thereof	Capital goods	Intermediate
Capital goods, parts and accessories	Producer goods	Intermediate
Transport equipment, passenger motor cars	Consumer goods	Final

[3] The values of exports calculated according to the BEC classification are lower than those calculated according to the Harmonized System (HS) and the Standard International Trade Classification (SITC). For example, in 2010, exports from Germany to France totaled $ 111.21 billion according to the BEC classification, $ 120.169 billion according to the HS, and $ 119.629 billion according to the SITC (COMTRADE data, http://wits.worldbank.org/wits/, accessed April 12, 2012). These differences may stem from the exclusion of certain goods from the BEC classification. Another reason may be that the value of exports of goods from various groups (economic categories/industries) is sometimes understated, especially when the value of exports is lower than a minimum level covered by statistics. In such a case, statistics show a stream of trade equal to zero. For many pairs of countries (especially small ones), there is also a lack of data on trade in goods from individual sectors. It is also possible that the information used in the BEC classification is simply more difficult to obtain, so it is sometimes missing from the database. However, since we only analyze the percentage shares of individual groups of goods, we have no problem with the inconsistency of data on the commodity structure of Poland's exports and imports or with general information on the value of Polish exports and imports. In all the tables containing information about the categories of goods in Poland's exports and imports (Tables 11, 14, 17 and 20), we take the sum of the percentage shares of all the categories of goods listed in these tables (19 in total) as 100%.

Transport equipment, industrial	Capital goods	Intermediate
Transport equipment, non-industrial	Consumer goods	Final
Transport equipment, parts and accessories	Producer goods	Intermediate
Consumer goods not elsewhere specified, durable	Consumer goods	Final
Consumer goods not elsewhere specified, semi-durable	Consumer goods	Final
Consumer goods not elsewhere specified, non-durable	Consumer goods	Final

[a] In this part of the study, we exclude "goods not elsewhere specified" (i.e. "goods not elsewhere specified" representing the last rows of Tables 11, 14, 17 and 20). As a result, the percentages in Tables 9, 10, 12, 13, 15, 16, 18 and 19 do not add up to 100, although the difference is small, because the "goods not elsewhere specified" account for a small percentage of Poland's foreign trade; an additional reason is rounding.
[b] The "fuels and lubricants, processed, motor spirit" category is classified as intermediate goods, although some goods in this category are also used for consumption.

Table 8 is helpful in all the analyses conducted later in this section. The table shows how individual groups (categories) of goods are classified. The data in the table indicates that as many as nine of the 18 groups of goods (50%) are intermediate goods. A further two groups, formed by two different kinds of capital goods, are producer goods, and therefore only consumer goods (seven groups) are in fact physical consumption goods.

The commodity structure of Poland's exports and imports in trade with the EU

Intermediate goods (intended for intermediate use, as classified in Table 9) dominate in Poland's exports to the EU throughout the studied period. Their proportion ranges from nearly 47% in 2009, when the global economy was in crisis and international trade declined, to a record 53.61% in 2012.

Table 9

The proportion of various types of goods in Poland's exports to EU markets, %; increase/decrease in p.p.[a]

	2008	2009	2010	2011	2012	2012/2008	2012/2011
Capital goods	10.07	10.84	10.58	10.20	10.89	0.82	0.69
Consumer goods	36.36	42.18	38.80	36.30	35.44	–0.92	–0.86
Intermediate goods	53.49	46.89	50.56	53.40	53.61	0.12	0.21

[a] The three types of goods listed in Tables 9, 12 and 15 were categorized on the basis of analyzing the breakdown of goods shown in Table 8. Since "goods not elsewhere specified" do not belong to any group, the percentages do not add up to 100 (an additional reason is rounding).
Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Assuming that capital goods and intermediate goods are used in the production of final goods, i.e. consumer goods (Table 8), based on the data in Table 9, we can determine the proportion of final and intermediate goods in Poland's exports (Table 10). We are aware that in recent years the share of final goods in global trade has been about one-third the share of intermediate goods (Czarny, Śledziewska, 2012, p. 137).

Table 10

The proportion of intermediate and final goods in Poland's exports to the EU, %; increase/decrease in p.p.[a]

	2008	2009	2010	2011	2012	2012/2008	2012/2011
Final goods	36.36	42.18	38.80	36.30	35.44	–0.92	–0.86
Intermediate goods	63.56	57.72	61.14	63.60	64.50	0.94	0.90

[a] The two groups of goods listed in Tables 10, 13 and 15 were categorized on the basis of analyzing the level of value added shown in Table 8.

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

The proportion of final goods in Poland's intra-EU exports has steadily declined since 2009 (from a record 42.8% in 2009 to 35.44% in 2012). Meanwhile, the proportion of intermediate goods has increased (from 57.72% in 2009 to 64.5% in 2012). Although Poland's intermediate goods exports to EU markets are not even twice as large as the country's final goods exports, the changes in the commodity structure of these exports show that Poland plays a growing role in production networks involving EU member states.

Table 11

Poland's intra-EU exports by major groups of goods, %[a]

	2008	2009	2010	2011	2012
Food and beverages, primary, mainly for industry	0.40	0.70	0.57	0.41	0.56
Food and beverages, primary, mainly for household consumption	1.75	1.68	1.51	1.41	1.55
Food and beverages, processed, mainly for industry	0.55	0.54	0.53	0.58	0.68
Food and beverages, processed, mainly for household consumption	6.55	7.06	6.83	6.94	7.46
Industrial supplies not elsewhere specified, primary	1.87	1.48	1.86	1.91	1.98
Industrial supplies not elsewhere specified, processed	27.05	23.13	25.31	27.73	28.13
Fuels and lubricants, primary	1.06	0.83	0.93	0.87	0.76
Fuels and lubricants, processed, motor spirit	0.17	0.11	0.20	0.26	0.30

Fuels and lubricants, processed, other	3.12	2.21	3.17	3.90	4.09
Capital goods (except transport equipment), and parts and accessories thereof	6.94	7.79	8.03	7.34	8.12
Capital goods, parts and accessories	7.37	6.05	6.25	5.79	5.64
Transport equipment, passenger motor cars	6.63	8.40	6.17	5.53	4.17
Transport equipment, industrial	3.13	3.05	2.55	2.86	2.78
Transport equipment, non-industrial	0.39	0.25	0.24	0.23	0.23
Transport equipment, parts and accessories	11.91	11.83	11.74	11.96	11.48
Consumer goods not elsewhere specified, durable	10.12	12.50	11.70	10.09	9.52
Consumer goods not elsewhere specified, semi-durable	5.15	5.41	5.46	5.40	5.45
Consumer goods not elsewhere specified, non-durable	5.76	6.87	6.89	6.70	7.06
Goods not elsewhere specified	0.08	0.10	0.06	0.10	0.06

[a] The percentages do not add up to 100 due to rounding.

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Processed industrial supplies, not elsewhere specified, dominate in Poland's exports to EU markets. After a decline in 2009, their proportion has increased steadily (Table 11 and Figure 2). In 2008–2012, the increase was 1.08 p.p., with 0.4 p.p. in 2012 alone. Transport equipment, parts and accessories are No. 2 among Poland's intra-EU exports (11.48% in 2012), but their share decreased slightly both in 2012 and throughout the studied period.

Consumer goods also figure prominently in Poland's exports to EU markets (35.44% in 2012 – Table 9), with durable consumer goods accounting for the largest portion of these exports (9.52% – see Table 11). Consumer goods together with food for household consumption (7.46%) are responsible for the relatively big role of final goods in Poland's intra-EU exports.

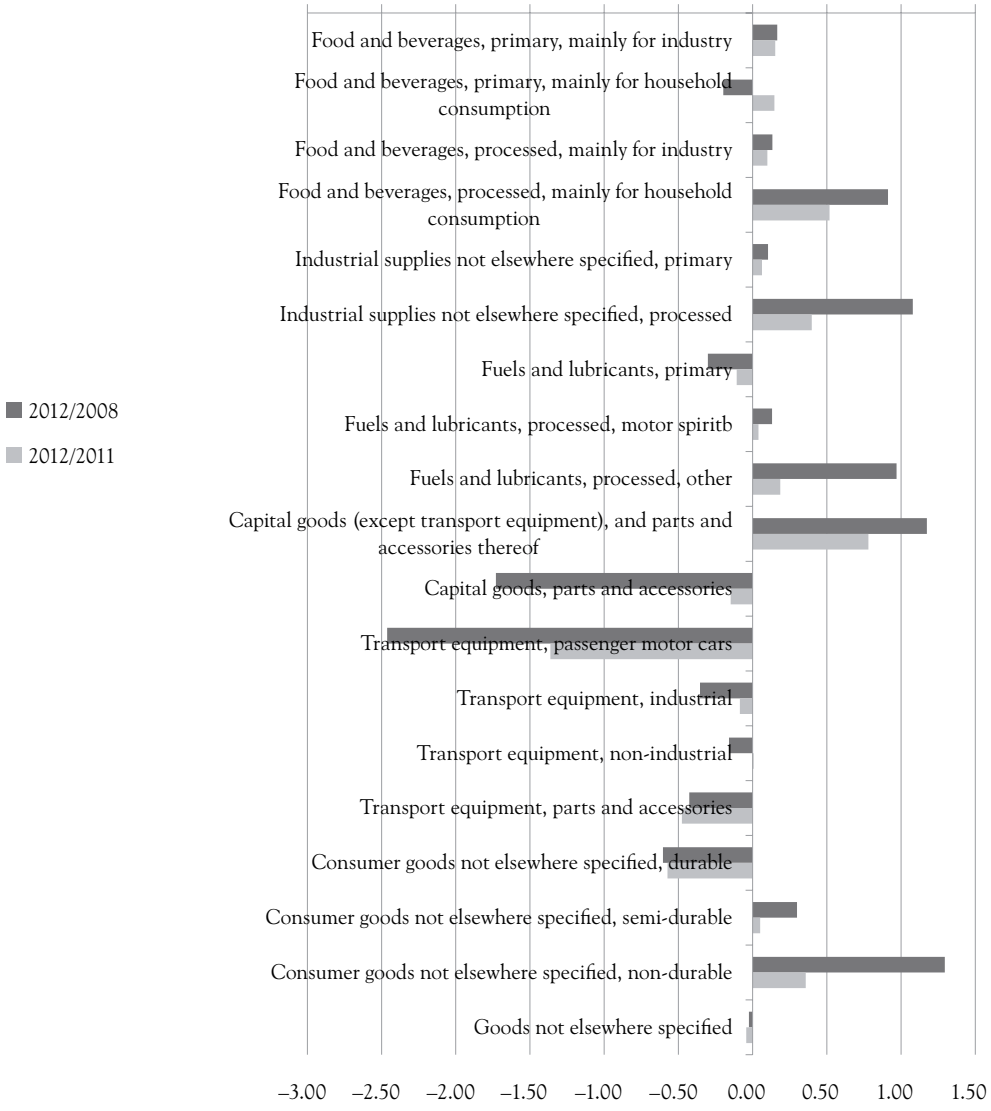
Non-durable consumer goods made the fastest inroads into Poland's intra-EU exports in the studied period; in 2012, their share was 1.3 p.p. higher than in 2008. This is good news because consumer goods are among Poland's top exports in trade with its EU partners. Capital goods were the runner-up in terms of how much their role increased (by a record 0.78 p.p. in 2012). Capital goods also play an important role in Poland's exports, especially those to non-EU markets. Third place went to processed industrial supplies, which are the most important group of goods in Poland's intra-EU exports.

Poland's imports from EU markets are even more strongly dominated by intermediate goods than exports. In 2012, intermediate goods accounted for 59.15% of Poland's imports from EU markets, a decrease by 1.01 p.p. from 2011 (Table 12). The role of capital goods in Poland's intra-EU imports is also much greater than in exports (16% in 2012 vs. 10.89% in exports). This means that Poland depends far more on its EU partners for the supply of producer goods than fellow EU member states depend on Polish intermediate goods. On the other hand, Poland is a relatively large supplier of

consumer (final) goods: these goods constitute 27.77% of Poland's total imports, while in exports the figure was nearly 11 p.p. higher).

Figure 2

Changes in the percentage share of major groups of goods in Poland's exports to EU markets in 2008–2012; increase/decrease in p.p.



Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Table 12

The proportion of various types of goods in Poland's intra-EU imports; increase/decrease in p.p.

	2008	2009	2010	2011	2012	2012/2008	2012/2011
Capital goods	18.40	16.08	15.51	15.88	16.00	–2.40	0.12
Consumer goods	23.13	26.29	25.54	23.83	24.77	1.63	0.94
Intermediate goods	58.36	57.56	58.88	60.16	59.15	0.79	–1.01

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Table 13

The proportion of intermediate and final goods in Poland's intra-EU imports, %; increase/decrease in p.p.

	2008	2009	2010	2011	2012	2012/2008	2012/2011
Final goods	23.13	26.29	25.54	23.83	24.77	1.63	0.94
Intermediate goods	76.76	73.63	74.38	76.04	75.15	–1.61	–0.89

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Overall, the breakdown of Poland's imports of final and intermediate goods from EU markets (Table 13) more closely resembles the breakdown of global exports than the structure of Poland's intra-EU exports. In each studied year, the percentage share of intermediate goods in Poland's overall imports was about three times greater than the role of final goods.

Table 14

The proportion of major groups of goods in Poland's imports from EU markets, %[a]

	2008	2009	2010	2011	2012
Food and beverages, primary, mainly for industry	0.64	0.68	0.61	0.82	0.96
Food and beverages, primary, mainly for household consumption	1.64	1.86	1.95	1.83	1.94
Food and beverages, processed, mainly for industry	0.89	0.94	0.98	1.10	1.15
Food and beverages, processed, mainly for household consumption	3.63	4.65	4.20	4.25	4.67
Industrial supplies not elsewhere specified, primary	1.53	1.66	1.76	1.98	2.12
Industrial supplies not elsewhere specified, processed	34.05	33.40	35.04	35.97	35.79

Fuels and lubricants, primary	0.34	0.30	0.45	0.48	0.23
Fuels and lubricants, processed, motor spirit	0.38	0.31	0.26	0.36	0.32
Fuels and lubricants, processed, other	3.17	2.58	2.13	2.33	1.96
Capital goods (except transport equipment), and parts and accessories thereof	14.75	13.90	13.35	12.96	13.17
Capital goods, parts and accessories	9.73	9.88	9.76	8.83	8.87
Transport equipment, passenger motor cars	4.39	4.13	3.84	3.28	3.45
Transport equipment, industrial	3.66	2.18	2.16	2.92	2.84
Transport equipment, non-industrial	0.11	0.11	0.09	0.08	0.10
Transport equipment, parts and accessories	7.63	7.81	7.89	8.28	7.77
Consumer goods not elsewhere specified, durable	2.93	3.25	2.86	2.64	2.77
Consumer goods not elsewhere specified, semi-durable	3.97	4.88	5.12	4.88	4.94
Consumer goods not elsewhere specified, non-durable	6.47	7.43	7.48	6.87	6.90
Goods not elsewhere specified	0.10	0.08	0.07	0.13	0.08

[a] The percentages do not add up to 100 due to rounding.

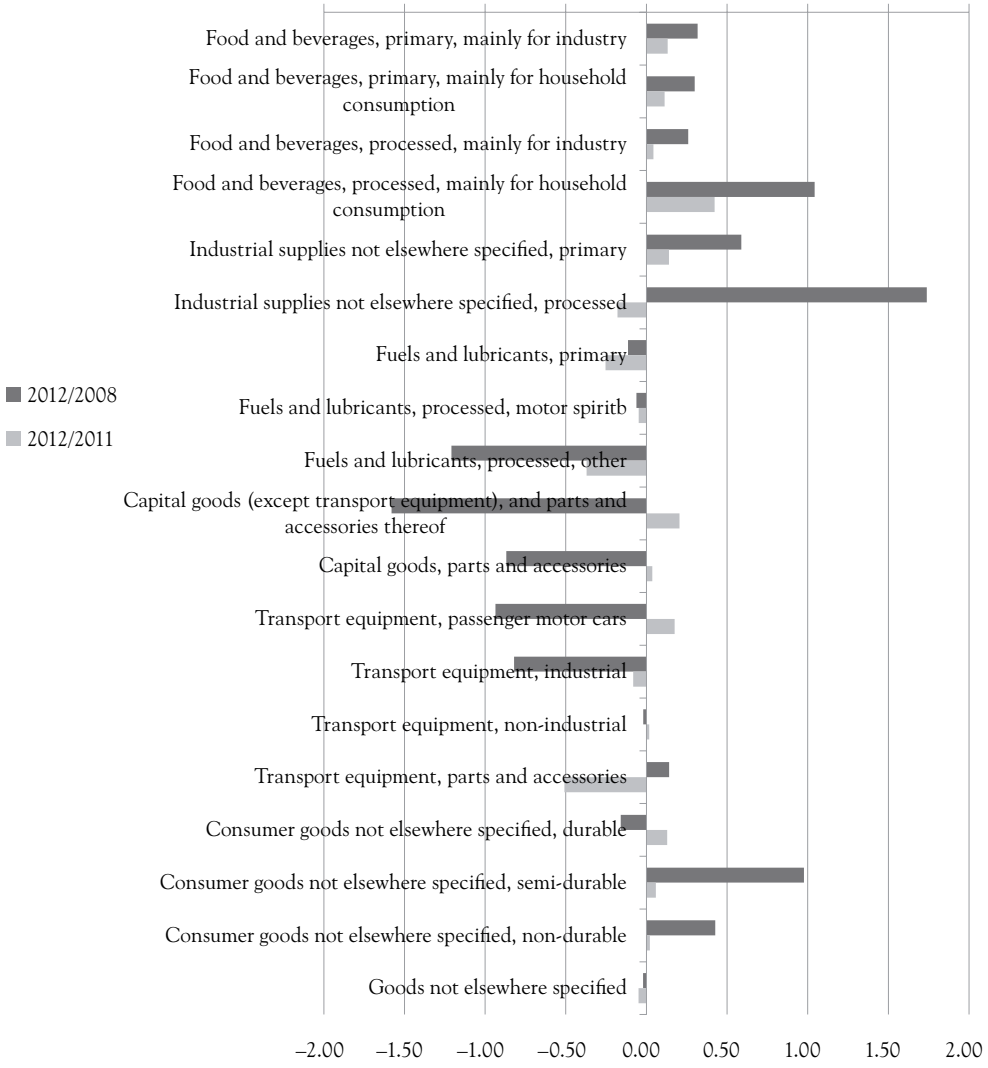
Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

As in the case of Poland's intra-EU exports, the country's intra-EU imports are dominated by processed industrial supplies. This means that intense intra-industry trade is at work concerning these products in Poland's commerce with its EU partners. However, the percentage share of processed producer goods in Poland's imports from EU markets has been consistently higher than the corresponding figure for exports (35.79% vs. 28.13% in 2012). Further down the list are capital goods (13.17%, barely one-third the level of processed industrial supplies); "capital goods, parts and accessories" (8.87%); and "transport equipment, parts and accessories" (7.77%).

The percentage share of capital goods and their parts and accessories in Poland's imports increased in 2012, yet it declined in the studied period as a whole (Figure 3). In other words, 2012 marked a reversal in a downward trend that held until 2011. On the other hand, the percentage share of processed industrial supplies and of "transport equipment, parts and accessories" in Poland's imports dropped slightly in 2012, while increasing in the studied period as a whole.

Figure 3

Changes in the percentage shares of major groups of goods in Poland's imports from EU markets in 2008–2012; increase/decrease in p.p.



Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

The commodity structure of Poland's exports and imports in trade with non-EU partners

The commodity pattern of Poland's exports to non-EU countries (EU27_extra exports) differs from the corresponding breakdown of the country's intra-EU exports. Even though Poland's exports to non-EU countries are dominated by intermediate goods, in recent years the share of these goods has been about 6 p.p. lower than in exports to EU markets. In 2012, intermediate goods accounted for 47.87% of Poland's overall exports to non-EU countries (Table 15). The proportion of consumer goods has been consistently lower than in Poland's intra-EU exports. The greatest difference between the two types of trade flows was noted in 2009, at almost 12 p.p. (see data in Tables 9 and 15), when Poland's crisis-stricken EU partners bought a particularly large amount of Polish consumer goods, attracted by factors including value for money. In 2012, the difference between the two types of trade flows narrowed to just over 5 p.p.

Table 15

The proportion of various types of goods in Poland's exports to non-EU countries, %; increase/decrease in p.p.

	2008	2009	2010	2011	2012	2012/2008	2012/2011
Capital goods	21.93	21.35	19.69	22.04	21.42	–0.51	–0.62
Consumer goods	28.16	30.43	31.77	29.96	30.41	2.25	0.44
Intermediate goods	48.80	46.73	47.86	47.76	47.87	–0.93	0.11

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Table 16

The proportion of final and intermediate goods in Poland's exports to non-EU countries, %; increase/decrease in p.p.

	2008	2009	2010	2011	2012	2012/2008	2012/2011
Final goods	28.16	30.43	31.77	29.96	30.41	2.25	0.44
Intermediate goods	70.73	68.08	67.55	69.79	69.29	–1.44	–0.50

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

In turn, capital goods account for a relatively large portion of Poland's exports to non-EU countries (consistently more than twice as large as in intra-EU exports). This means that Poland is relatively well positioned on non-EU markets. Poland's

intermediate goods exports to non-EU markets are more than twice as high as final goods exports (with a record ratio of 2.5 noted in 2008 – Table 16). Thus, while capital goods account for a significant portion of Poland's extra-EU exports, Poland's position in intermediate goods exports continues to diverge from the global average.

Table 17

The proportion of major groups of goods in Poland's exports to non-EU countries, % [a]

	2008	2009	2010	2011	2012
Food and beverages, primary, mainly for industry	0.37	1.09	0.37	0.20	0.37
Food and beverages, primary, mainly for household consumption	1.06	1.99	1.97	1.97	2.50
Food and beverages, processed, mainly for industry	0.80	0.91	0.98	1.12	1.12
Food and beverages, processed, mainly for household consumption	5.22	5.70	6.51	6.59	6.92
Industrial supplies not elsewhere specified, primary	1.22	1.14	1.33	1.46	1.57
Industrial supplies not elsewhere specified, processed	26.15	24.82	24.79	24.56	23.57
Fuels and lubricants, primary	0.11	0.32	0.16	0.14	0.26
Fuels and lubricants, processed, motor spirit	0.19	0.35	0.37	0.36	0.70
Fuels and lubricants, processed, other	2.60	1.52	2.03	2.93	2.43
Capital goods (except transport equipment), and parts and accessories thereof	10.67	10.57	9.59	10.82	11.03
Capital goods, parts and accessories	7.58	8.77	8.70	7.86	8.41
Transport equipment, passenger motor cars	2.88	2.08	2.97	3.21	2.34
Transport equipment, industrial	11.25	10.78	10.09	11.21	10.39
Transport equipment, non-industrial	0.28	0.15	0.22	0.22	0.24
Transport equipment, parts and accessories	9.80	7.81	9.13	9.13	9.44
Consumer goods not elsewhere specified, durable	6.43	6.11	6.35	5.74	5.77
Consumer goods not elsewhere specified, semi-durable	3.25	3.41	3.63	3.47	3.60
Consumer goods not elsewhere specified, non-durable	9.03	10.98	10.11	8.76	9.04
Goods not elsewhere specified	1.12	1.49	0.68	0.24	0.30

[a] The percentages do not add up to 100 due to rounding.

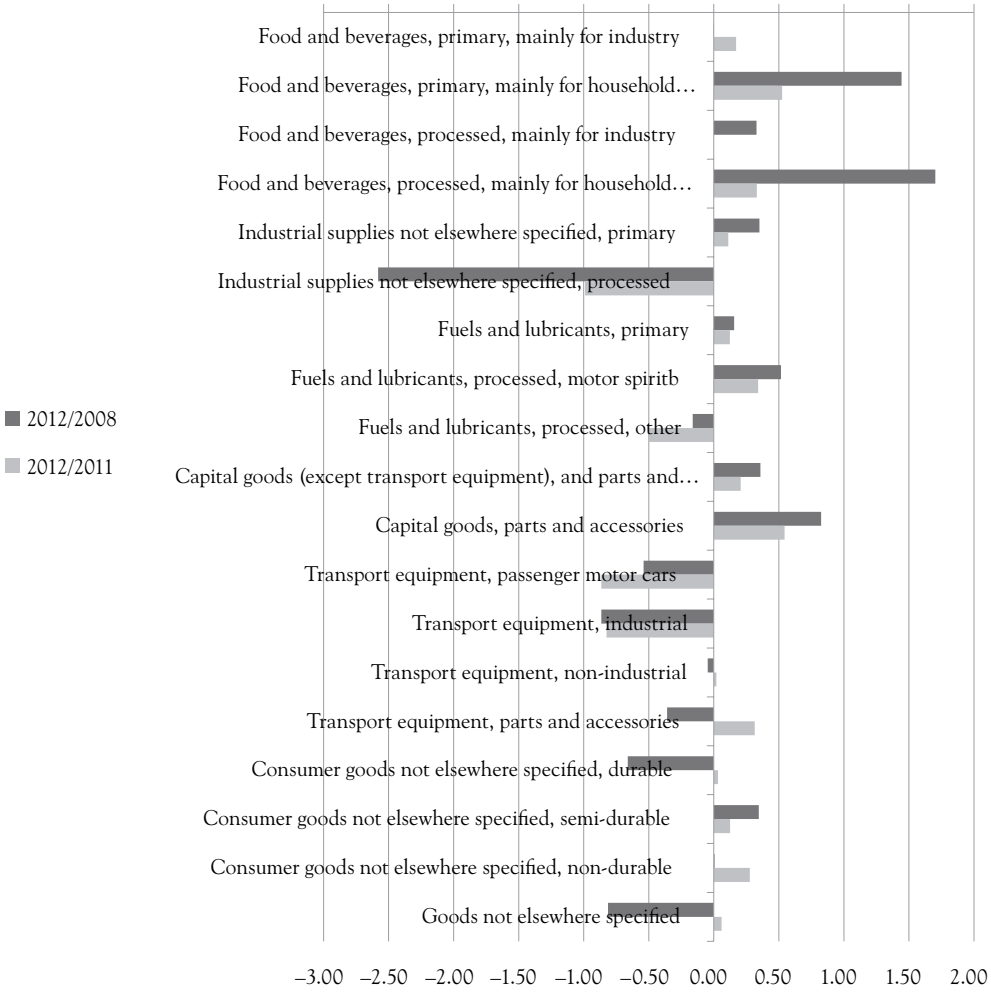
Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

A detailed study of the breakdown of Poland's exports to non-EU countries reveals that processed industrial supplies account for the biggest chunk of these exports (as in the case of intra-EU exports). However, this figure is lower than in intra-EU exports (23.57% in 2012 – Table 17). The next two places are occupied by products other than in intra-EU exports, which confirms that Polish capital goods have a relatively good position on non-EU markets: "capital goods (except transport equipment), and parts

and accessories thereof" account for 11.03% of Poland's overall exports to non-EU countries, and "transport equipment, industrial" claims 10.39%. "Transport equipment, parts and accessories" ranks fourth, with 9.44%. This category of goods is also important in Poland's intra-EU exports (it is the No. 2 export item in Poland's intra-EU trade). Further down the list are non-durable consumer goods (9.04%), among which products sold to neighboring Russia and Ukraine appear to play an important role.

Figure 4

Changes in the percentage shares of major groups of goods in Poland's exports to non-EU countries in 2008–2012; increase/decrease in p.p.



Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Transport equipment for industrial use accounts for a much larger portion of Poland's extra-EU exports than in the case of intra-EU exports (in 2012, the difference was 7.61 p.p.). The same is true of capital goods (a difference of nearly 3 p.p.) and non-durable consumer goods (almost 2 p.p.). Passenger cars account for a smaller chunk of Poland's extra-EU exports than in the case of intra-EU exports. The role of passenger cars in Poland's exports to both groups of countries decreased last year.

Processed industrial supplies took the greatest fall in the studied period when it comes to their role in Poland's exports to non-EU countries. In 2008–2012, their share of Poland's extra-EU exports decreased by around 2.6 p.p., with a 1 p.p. drop in 2012 alone. This is especially worrying because processed industrial supplies are Poland's most important export item. The good news is that capital goods steadily increased their role in Poland's extra-EU exports throughout the studied period, including in 2012. This was a relatively large increase. A greater rise was only recorded in the case of "capital goods, parts and accessories" (0.55 p.p. in 2012), which also constitute an important item among Poland's exports, as well as in the case of unprocessed food and beverages for household consumption (0.52 p.p. in 2012, and 1.44 p.p. in the 2008–2012 period). However, unprocessed food and beverages for households play a relatively small role in Poland's extra-EU exports, at 2.5% in 2012 (Table 17 and Figure 4).

Poland's extra-EU imports – as in the case of other streams of trade studied in this chapter – are dominated by intermediate goods. The proportion of these goods, after a decline in 2009, is rising steadily (from 62.74% in 2009 to 72.81% in 2012; an overall increase of more than 10 p.p. between 2009 and 2012 – Table 18). On the other hand, Poland's consumer goods imports from outside the EU are shrinking. In 2012, this group of goods accounted for only 10.6% of Poland's total extra-EU imports, down from a record 14.93% in 2009. Capital goods imports also declined in the studied period, though far less dramatically than consumer goods imports.

Table 18

The proportion of various types of goods in Poland's extra-EU imports, %; increase/decrease in p.p.

	2008	2009	2010	2011	2012	2012/2008	2012/2011
Capital goods	16.59	22.14	20.41	16.95	16.27	–0.32	–0.68
Consumer goods	14.25	14.93	12.58	11.29	10.60	–3.64	–0.68
Intermediate goods	68.98	62.74	66.87	71.61	72.81	3.83	1.20

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

The domination of intermediate goods in Poland's extra-EU imports is even clearer when the proportions of final and intermediate goods are compared (Table 19). Intermediate goods imports are not only growing but their ratio to final goods is increasing

as well (5.7 in 2008 and 8.5 in 2012). This is partly due to a declining percentage of final goods in the analyzed imports.

Table 19

The proportion of intermediate and final goods in Poland's extra-EU imports, %; increase/decrease in p.p.

	2008	2009	2010	2011	2012	2012/2008	2012/2011
Final goods	14.25	14.93	12.58	11.29	10.60	–3.64	–0.68
Intermediate goods	85.57	84.89	87.28	88.56	89.08	3.51	0.52

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Table 20

The proportion of major groups of goods in Poland's extra-EU imports, %[a]

	2008	2009	2010	2011	2012
Food and beverages, primary, mainly for industry	0.61	0.52	0.43	0.62	0.64
Food and beverages, primary, mainly for household consumption	0.67	0.79	0.85	0.74	0.54
Food and beverages, processed, mainly for industry	0.40	0.50	0.47	0.58	0.68
Food and beverages, processed, mainly for household consumption	1.70	2.04	1.79	1.69	1.60
Industrial supplies not elsewhere specified, primary	4.59	2.88	3.54	4.06	3.60
Industrial supplies not elsewhere specified, processed	19.96	17.65	17.71	19.02	18.81
Fuels and lubricants, primary	29.35	24.15	27.80	32.73	34.51
Fuels and lubricants, processed, motor spirit	0.02	0.00	0.00	0.00	0.00
Fuels and lubricants, processed, other	3.13	3.03	3.36	3.55	3.11
Capital goods (except transport equipment), and parts and accessories thereof	12.65	17.42	15.41	12.48	11.14
Capital goods, parts and accessories	7.08	9.92	9.76	6.97	7.80
Transport equipment, passenger motor cars	2.67	1.87	1.41	0.85	0.81
Transport equipment, industrial	3.94	4.72	5.00	4.47	5.12
Transport equipment, non-industrial	0.28	0.23	0.16	0.11	0.10
Transport equipment, parts and accessories	3.84	4.10	3.79	4.08	3.66
Consumer goods not elsewhere specified, durable	2.17	2.33	1.86	1.59	1.67
Consumer goods not elsewhere specified, semi-durable	4.00	4.67	3.84	3.75	3.66
Consumer goods not elsewhere specified, non-durable	2.75	3.00	2.67	2.55	2.22
Goods not elsewhere specified	0.18	0.19	0.14	0.16	0.32

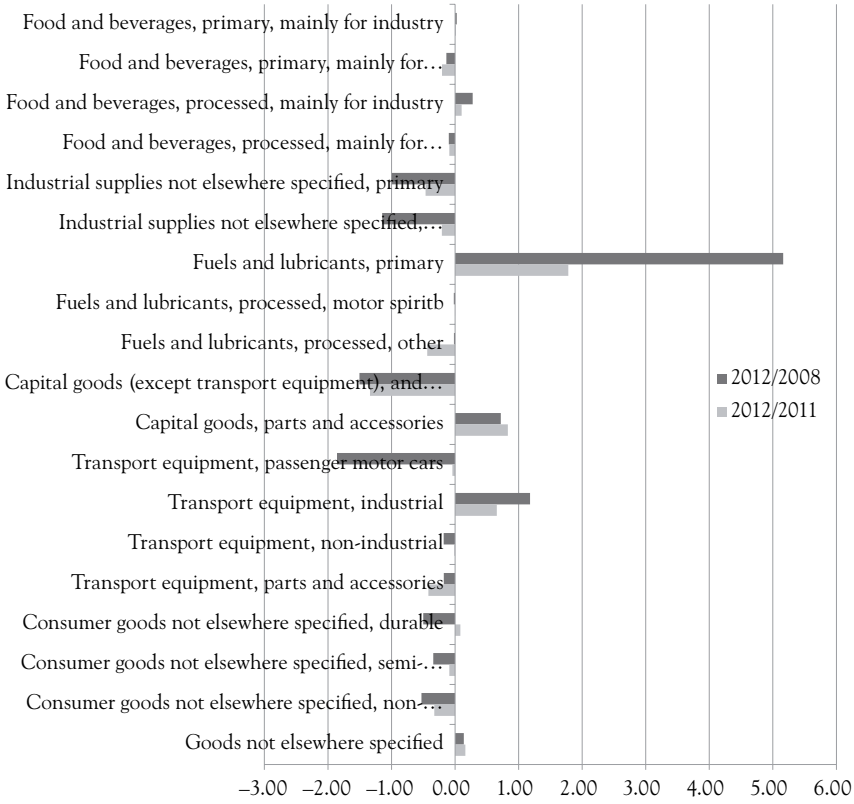
[a]The percentages do not add up to 100 due to rounding.

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

That Poland's extra-EU imports are dominated by intermediate goods is further confirmed by the commodity breakdown of exports. Imports are dominated by unprocessed fuels and lubricants, whose share rose from 24.15% in 2009 to 34.51% in 2012. Processed industrial supplies are No. 2 and capital goods are No. 3. Since processed industrial supplies and capital goods also top the list among Poland's exports, the country can develop intra-industry trade in the case of these two types of goods, at least with some of its trading partners. Moreover, processed industrial supplies have a consistently higher share in intra-EU imports than in extra-EU imports (14 p.p. higher in 2008 and around 17 p.p. higher in 2012).

Figure 5

Changes in the percentage shares of major groups of goods in Poland's extra-EU imports in 2008–2012; increase/decrease in p.p.



Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

The commodity structure of Poland's extra-EU imports is highly concentrated. In 2008, the three largest groups of goods accounted for nearly 62% of Poland's overall

extra-EU imports; in 2012 the figure grew to 64.5% (the figures would be 69% and 72.3% respectively if "capital goods, parts and accessories," which are No. 4 on this ranking list, were considered as well). In Poland's extra-EU exports, the shares were 48% (57.87%) and 45% (54.43%) respectively, while in intra-EU imports they were 57.83% (65.6%) and 58.53% (66.16%) respectively.

Poland's revealed comparative advantages in foreign trade

This analysis of changes in the structure of Poland's exports is supplemented by a study of Poland's revealed comparative advantages, using the Revealed Comparative Advantage Index (RCA) developed by B. Balassa. The index measures relative export specialization. We will determine Poland's comparative advantages in the export of goods classified into the previously analyzed commodity categories in the case of both EU and non-EU countries. The RCA index takes positive values. An RCA index greater than 1 means that Poland has a comparative advantage in the export of goods belonging to a specific category, compared with the corresponding exports of other EU countries in intra-EU and extra-EU trade.

Poland's comparative advantages are measured according to the following formula:

$$RCA^{PL}_{iEUintra} = \frac{x^{PL}_{iEUintra} / X^{PL}_{EUintra}}{x^{EU}_{iEUintra} / X^{EU}_{EUintra}}$$

where:
X – exports,
PL – Poland,
EU – European Union,
i – group of goods according to the BEC classification,
intra EU – EU internal market,
extra EU – non-EU countries.

The findings of the study of Poland's comparative advantages in intra-EU trade are shown in Table 21.

In intra-EU trade, Poland in 2012 had comparative advantages in the export of processed foods and beverages for household consumption (1.23); transport for industrial use (1.09); and in "transport equipment, parts and accessories" (1.58). But the greatest comparative advantages were noted in the export of durable consumer goods (3.08), semi-durable consumer goods (1.08), and non-durable consumer goods (1.03). That means in intra-EU exports, Poland has comparative advantages in the export of consumer goods compared with the exports of other EU countries selling their goods on the internal EU market. In 2012, Poland's RCA index increased significantly in the export

of food, fuels and lubricants, and non-durable consumer goods. By contrast, Poland's competitive position deteriorated in the export of passenger cars and durable consumer goods. In 2012, Poland had a comparative advantage in the export of groups of goods whose shares in Poland's exports reached 44%. The pattern of Poland's comparative advantages has been changing since 2008: The country has a growing comparative advantage in the export of non-durable consumer goods; fuels and lubricants; capital goods (excluding parts and accessories for transport equipment – in the export of which Poland's comparative advantage is falling); food (excluding primary food for household consumption); and consumer goods (except durable goods).

Table 21
RCA indices in Poland's intra-EU trade in 2008–2012

	2008	2009	2010	2011	2012
Food and beverages, primary, mainly for industry	0.54	0.84	0.72	0.49	0.61
Food and beverages, primary, mainly for household consumption	1.00	0.81	0.75	0.77	0.83
Food and beverages, processed, mainly for industry	0.84	0.77	0.79	0.80	0.90
Food and beverages, processed, mainly for household consumption	1.20	1.11	1.17	1.19	1.23
Industrial supplies not elsewhere specified, primary	0.88	0.78	0.78	0.75	0.80
Industrial supplies not elsewhere specified, processed	0.93	0.84	0.88	0.94	0.96
Fuels and lubricants, primary	0.39	0.37	0.36	0.30	0.21
Fuels and lubricants, processed, motor spirit	0.40	0.32	0.50	0.53	0.61
Fuels and lubricants, processed, other	0.74	0.69	0.85	0.87	0.81
Capital goods (except transport equipment), and parts and accessories thereof	0.55	0.62	0.66	0.62	0.68
Capital goods, parts and accessories	0.96	0.81	0.81	0.77	0.79
Transport equipment, passenger motor cars	1.10	1.36	1.07	0.98	0.79
Transport equipment, industrial	1.04	1.19	0.99	1.12	1.09
Transport equipment, non-industrial	0.96	0.64	0.72	0.74	0.77
Transport equipment, parts and accessories	1.67	1.68	1.64	1.61	1.58
Consumer goods not elsewhere specified, durable	3.07	3.32	3.32	3.19	3.08
Consumer goods not elsewhere specified, semi-durable	1.04	0.97	1.05	1.06	1.08
Consumer goods not elsewhere specified, non-durable	0.81	0.79	0.87	0.96	1.03
Goods not elsewhere specified	0.18	0.21	0.17	0.31	0.20

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

Table 22 contains the results of the analysis of Poland's comparative advantages in extra-EU trade compared with other EU member states measured by the following equation:

$$RCA^{PL}_{iEUextra} = \frac{x^{PL}_{iEUextra} / X^{PL}_{EUextra}}{x^{EU}_{iEUextra} / X^{EU}_{EUextra}}$$

Table 22
RCA indices in Poland's extra-EU trade in 2008–2012

	2008	2009	2010	2011	2012
Food and beverages, primary, mainly for industry	0.68	2.20	0.75	0.37	0.79
Food and beverages, primary, mainly for household consumption	2.13	3.68	3.61	3.69	4.46
Food and beverages, processed, mainly for industry	1.76	1.82	1.91	2.05	2.00
Food and beverages, processed, mainly for household consumption	1.46	1.44	1.69	1.69	1.69
Industrial supplies not elsewhere specified, primary	0.50	0.46	0.45	0.48	0.54
Industrial supplies not elsewhere specified, processed	1.03	0.98	0.97	0.95	0.96
Fuels and lubricants, primary	0.17	0.57	0.40	0.40	0.71
Fuels and lubricants, processed, motor spirit	0.09	0.22	0.20	0.16	0.30
Fuels and lubricants, processed, other	0.71	0.51	0.60	0.76	0.53
Capital goods (except transport equipment), and parts and accessories thereof	0.59	0.60	0.56	0.62	0.65
Capital goods, parts and accessories	0.67	0.77	0.82	0.79	0.87
Transport equipment, passenger motor cars	0.54	0.47	0.52	0.53	0.36
Transport equipment, industrial	2.38	2.44	2.22	2.65	2.26
Transport equipment, non-industrial	0.60	0.41	0.60	0.63	0.75
Transport equipment, parts and accessories	1.50	1.15	1.29	1.30	1.29
Consumer goods not elsewhere specified, durable	2.16	2.02	2.19	2.11	2.02
Consumer goods not elsewhere specified, semi-durable	0.94	0.97	1.12	1.06	1.07
Consumer goods not elsewhere specified, non-durable	1.30	1.26	1.25	1.20	1.24
Goods not elsewhere specified	1.25	1.35	0.72	0.29	0.36

Source: Own calculations based on data from the Eurostat Comext database, (http://epp.eurostat.ec.europa.eu/newxtweb/; accessed March 21, 2013).

In 2012, groups of goods in which Poland had comparative advantages in extra-EU trade accounted for 49% of Poland's exports, 5 p.p. more than the corresponding share of these groups of goods in intra-EU trade. This means that a bigger portion of Poland's extra-EU exports have comparative advantages than in the case of intra-EU exports.

In 2012, Poland had the greatest comparative advantages in the export of transport equipment for industrial use (2.26) and in the export of parts and accessories for transport equipment (1.29), consumer goods (durable – 2.02, semi-durable – 1.07, and non-durable – 1.24), as well as processed food for industry (2.00) and processed food for households (1.69). Poland's advantage in 2012 increased primarily in the export of unprocessed foods as well as lubricants and fuels. Poland's advantage has increased the most in these commodity groups since 2008. On the other hand, the country's advantage in the export of transport equipment for industrial use and passenger cars is falling.

A comparison of Poland's RCA indices in intra- and extra-EU exports reveals that Poland has relatively greater advantages in exporting durable consumer goods, passenger cars and processed fuels and lubricants to EU markets. But in extra-EU trade, Poland has a greater comparative advantage in the export of food and beverages and in transport equipment for industrial use.

Most of the commodity groups in which Poland has comparative advantages represent Poland's export specialization. It seems, however, that Poland is not capitalizing on its advantage in the export of food, because this item has been sidelined when it comes to the overall picture of Poland's exports.

Summary

The geographical structure of Poland's foreign trade is changing, but these changes are gradual. The role of EU markets in Poland's imports is falling faster than in Poland's exports. As a result, Poland's trade balance is improving.

In trade with EU partners, decreased consumer goods exports have been accompanied by a decreasing role of final goods exports. Despite this, the share of intermediate goods in Poland's intra-EU exports is almost twice as large as the corresponding share of final goods, and this proportion shows an upward trend. Among producer supplies, intermediate goods exports are the most important. Among these processed industrial supplies are the No. 1 item in Poland's exports. Of considerable importance are also exports of parts and accessories for transport equipment and exports of other capital goods. On the other hand, the role of transport equipment – which has been one of Poland's key exports since the transition in the early 1990s – is falling.

Intermediate goods make up a much larger portion of Poland's intra-EU imports. In 2012, their share was over 75%, which means it declined by around 0.9 p.p. year-on-year (the decline was more than neutralized, however, by a 0.94 p.p. increase in the share of final goods.)

In intra-EU trade (compared with other EU countries), Poland has a comparative advantage in the export of food, transport equipment and consumer goods (especially durable consumer goods). Among these product groups, durable consumer goods account for more than 10% of Poland's intra-EU exports, while the shares of other groups of goods range between 2.5% and 9.5%.

In extra-EU exports, the share of intermediate goods is relatively stable and reaches 70%. It is therefore greater than in intra-EU exports. In extra-EU imports, the share of intermediate goods is falling, although they continue to play a big role, accounting for 75% of Poland's total imports from non-EU countries.

The commodity structure of Poland's imports from non-EU countries is the most strongly concentrated. It is dominated by intermediate goods, especially unprocessed fuels and lubricants.

2.2. Poland's Investment Attractiveness

Tomasz M. Napiórkowski[4]

The relationship between competitiveness and foreign direct investment (FDI) is one of interdependence. On the one hand, investors look for competitiveness among their targets. According to an OECD study entitled *Main Determinants and Impact of Foreign Direct Investment on China's Economy*, "one of the most important factors to attract [foreign direct investment] … is the advantage in competitive production factors" (OECD, 2000). Here, competitiveness precedes foreign investment. On the other hand, foreign direct investment, for example via spillovers, can "bring new firm specific skills and new industries to countries that lack them or preserve the rents on workers' skills in sectors where domestic firms have lost their firm specific advantages" (M. Blomström, D. Konan and R.E. Lispey, 2000). Here, foreign investment brings competitiveness to the home country. Regardless of which takes precedence, there is a strong relationship between the two.

This section of the report aims to analyze trends in the FDI stock coming in and out of Poland. This analysis is conducted in two steps; first, general values are analyzed and then, Poland's inward and outward FDI is compared to those of the EU10 group as a whole (Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia), as well as those of the European Union (EU) as a whole and the global total. Subsequently, we explore how Poland's inward FDI impacts each of the country's 16 regions. This part of the discussion is divided into two

[4] The author is a recipient of the *Stypendia – dla nauki, dla rozwoju, dla Mazowsza* scholarship granted by the Warsaw School of Economics and financed by the European Union through its European Social Fund.

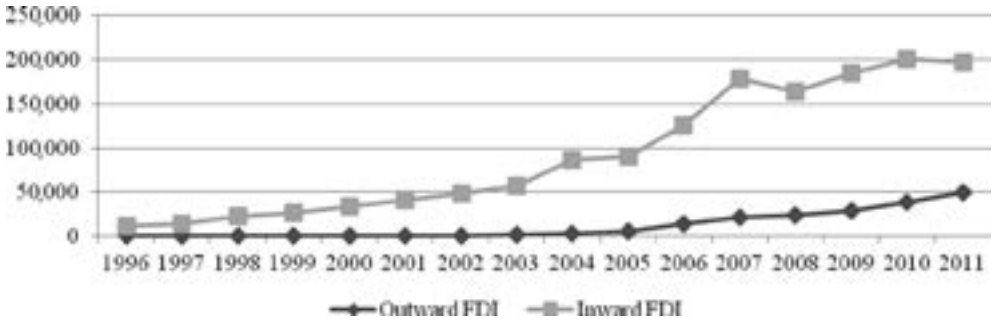
sections. In the first one, a general econometric model is constructed based on panel data to see how selected determinants impact inward FDI in selected Central European countries over a decade and a half. In the second part, the inverse is studied; that is, how inward FDI impacts selected macroeconomic variables at the regional level. This is done using the combined results of the analysis of Pearson correlation coefficients and of the Granger causality test.

FDI inward and outward stock: Poland, EU10, EU and the world compared

Without a doubt, Poland is becoming an increasingly prominent player in the FDI game. By sheer numbers (see Figure 6), the inward FDI stock has increased from just $ 11,463 million in 1996 to $ 197,538.48 million in 2011, with a slowdown in growth between 2004 and 2005 and a fall between 2007 ($ 178,407.8 million) and 2008 ($ 164,306.5 million) that was soundly reversed the following year ($ 185,201.9 million).

Poland's outward FDI activity is significantly less than the country's inward FDI stock, yet it continues to exhibit strong growth, especially since 2005. Before that, outward FDI increased from $ 735.2 million in 1996 to $ 3,351.1 million in 2004 and then jumped to $ 6,307.6 million in 2005 and $ 50,044.5 million in 2011.

Figure 6
Poland's outward and inward FDI stock (U.S. dollars at current prices and current exchange rates in millions)



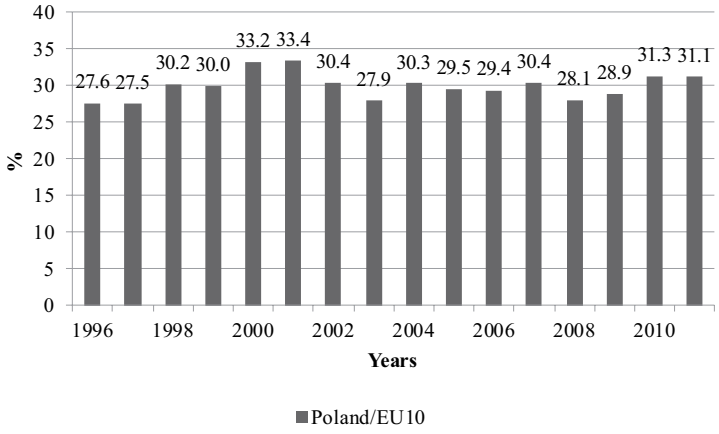
Source: Author's graph based on data from UNCTAD, UNCTADstat.

To put the opening statement in perspective, we will look at how FDI going into (Figure 7) and out of Poland (Figure 8) has changed in relation to EU10 members, the EU as a whole, and the global total.

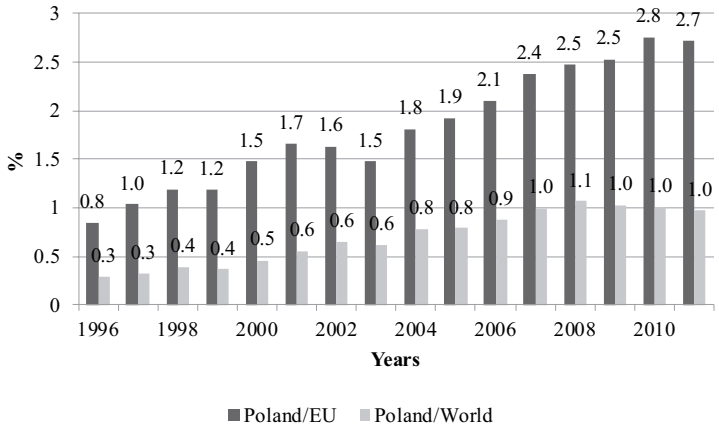
Figure 7

Poland's inward FDI stock expressed as a percentage share of the EU10 (7a), EU27 and the global total (7b)

7a



7b



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

In relation to other EU10 countries, Poland's inward FDI stock increased gradually from 27.6% of the EU10 total in 1996 to 31.1% in 2011. However, unless decision makers take action to increase Poland's attractiveness to foreign investors (by getting rid of red tape, for example), this positive trend may soon change into a negative one if neighboring economies (the Czech Republic, for example) beat Poland to exogenous funds.

The situation is a bit more optimistic when comparing Poland to the EU as an aggregate. There the shift in Poland's importance as a recipient is much more evident; Poland's share in the total inward FDI stock invested in the EU increased from 0.8%

in 1996 to 2.7% in 2011. When it comes to the world as a whole, Poland rose from 0.29% of the global total in 1996 to 0.97% in 2011.

The first observation is that, across all the series, investment to Poland has been impacted by the economic crisis that had its beginnings in the late 1990 s. This is especially evident from the fact that all the series are in a dip in 2003. The differences are in which year each of the series started its decline. Poland's inward FDI stock in relation to the EU10 and the EU27 has declined since 2002 while its relationship to the global total registered a one-year drop in 2003. The extent of the dip differs, with the biggest being in the Poland/EU10 series and the smallest in the Poland/world one. A further factor is the impact of the crisis that began in the United States in 2007. The relation to the EU as a whole did not see a decline but only a leveling-out of the trend. This can be attributed to the fact that Poland has been resilient to the crisis, especially when compared with such EU members as Greece, Italy or Spain. In the case of the EU10, the story is a bit different. In 2008 the value fell to 28.1%, nearly its level in 1996. The following year brought some recovery and the series surpassed its pre-crisis level in 2010. Yet, Poland appears to be leveling out on, or even losing, its competitive edge in terms of attracting foreign investors. The story is even bleaker on the world stage; the share of world FDI going to Poland has been in a steady decline since 2008.

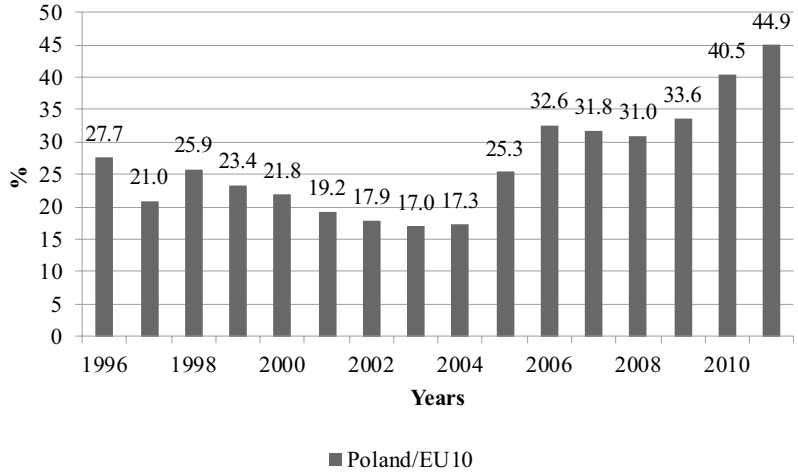
Even though the flows to Poland from abroad are increasing, Poland's competitive advantage in attracting FDI is threatened by its fellow EU10 members. Thus, it is imperative that action be taken to make Poland a more attractive location for exogenous investment.

Let us now move to the analysis of the FDI stock coming from Poland (Figure 8).

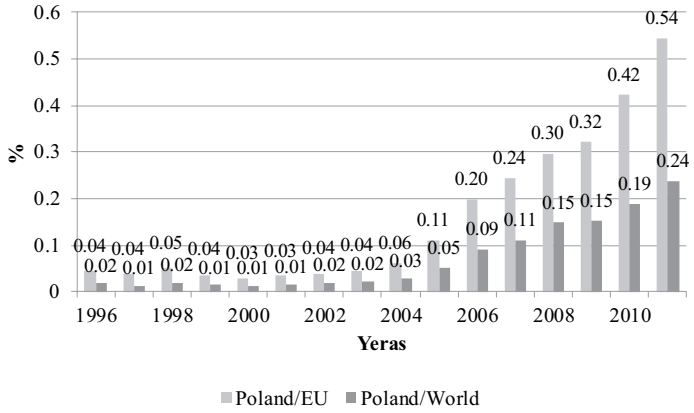
Figure 8

Poland's outward FDI stock expressed as a percentage share of the EU10 (8a), EU27 and the global total (8b)

8a



8b



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

When looking at Poland as a foreign investor, it is clear that throughout the three comparative series, its role is increasing, in contrast to its role as FDI recipient. Initially, the share of Poland's FDI in overall outward FDI for the EU10 as an aggregate decreased from 25.9% in 1998 to 17.07% in 2003. After that, an impressive jump in the series took place, elevating Poland's role in the group to 32.6% in 2006 and eventually to 44.9% in 2011. A parallel, smoother, trend can be seen when comparing Poland to the EU. The biggest jump was from 0.06% in 2004 to 0.54% in 2011. The smoothest line connects points describing Poland's outward FDI as a percentage of the world's outward FDI. Here, Poland has also been establishing its small but increasing role on the world's arena as its outward FDI value doubled in the initial stage and then increased tenfold in later stages (0.02% in 1996, 0.03% in 2004 and 0.2% in 2011).

Overall, the biggest increases in Poland's outward FDI stock were recorded after 2004. In recent years, the country's investment abroad has continued to grow despite the latest financial and economic crisis.

The key conclusion is that Poland is more quickly evolving along the FDI path than other EU10 countries.

While it is still a strong net recipient of FDI, Poland's movement towards becoming a net investor is more expedient than those of other EU10 countries. On the other hand, even though it is a powerhouse in the EU10 in terms of FDI, Poland's role in the EU27 and the world as a whole is still small, albeit growing.

Macro to regional – a look at the determinants of inward FDI

The idea behind this research is to take a look at how incoming foreign direct investment impacts the development of Poland's 16 regions. Unfortunately, such work requires detailed data on FDI being directed at each of the regions separately, which,

after contacting institutions responsible for FDI data in Poland – i.e. National Bank of Poland and the Central Statistical Office (GUS) – proved to be unattainable. The research was handled in the following way to resolve this problem. First, the overall attractiveness of Poland as a destination for FDI will be examined (in combination with other Central European countries due to data series that are too short for an individual country study) using an econometric model with determinants suggested by previous reports on the topic.[5] This procedure will provide an overall setting and show how selected series impact the amount of FDI directed at selected host countries. Second, FDI will be explored from the other side, namely its benefits to the host country. Here, the correlation coefficient will be calculated and the Granger causality test will be applied between inward FDI to Poland and such macroeconomic variables as GDP and employment for each of the 16 regions.

Macro view: data and model

The data were collected for seven countries – Bulgaria, the Czech Republic, Hungary, Poland, Romania, Slovakia, and Slovenia – that form a group of comparable economies. This is because of similarities in the history of the region as well as in the individual countries' international economic status (here proxied by their European Union membership). When examining the size of the economy (expressed as each country's gross domestic product), Poland is the obvious outlier, while the variable stays more homogenous in the rest of the group. Interestingly, when adjusting the size of the economy for its population, Slovakia and Slovenia are the outliers. All in all, it can be concluded that this group is adequate, as confirmed by other researchers (Carstensen and Toubal, 2003).

In the proposed econometric model, which describes FDI determinants, the dependent variable is a country's FDI stock according to UNCTAD data expressed in millions of U. S. dollars at current prices and exchange rates. As mentioned earlier, due to the overwhelming number of possible determinants of FDI (a problem and its seriousness having been expressed in the literature by Blonigen and Piger, 2011), there is significant subjectivism when deciding upon which explanatory variables should be included in the model. The solution to this problem takes two stages. First, a group of three staple economic concepts (size of the economy, its openness to trade, and the cost of the factor of production), is forced into the model. Second, a set of additional economic concepts, well established in the literature, is added. That set is comprised of a variables controlling for the quality of the factor (in this case labor), the size of the financial market and the tax (here understood as another cost) level.

[5] The literature provides more than 50 different variables and their permutations, so the FDI determinants were selected on the basis of a largely subjective decision made by the author.

The staple group is first represented by GDP (Bevan and Estrin, 2000; data coming from the World Bank, WB, and recorded in constant 2000 USD, *GDP*),[6] then by the ratio of the sum of exports and imports to a country's GDP (Kerr and Peter, 2001; multiplied by 100%, WB, constant 2000 USD, *((X+M)/GDP) *100*). Lastly, the factor cost, the cost of labor, is expressed with the unit labor cost (ULC) index (Carstensen and Toubal, 2003; OECD, 2005 = 100[7], *ULC/96.0227*). In the model, ULC is divided by the mean of all of its observations for all cross-sections allowing for conclusions regarding changes to the status quo. The theory and previous literature suggest that coefficients assigned to the first two explanatory factors should be positive (suggesting a positive, direct, relationship between them and the dependent variable; $\beta_{GDP} > 0$, $\beta_{((X+M)/GDP) * 100} > 0$) while an increase in the value of ULC is expected to cause a decrease in the inward FDI ($\beta_{ULC/96.0227} < 0$) as it has been proven in existing literature.

The quality-of-labor economic concept is injected into the model with the use of total enrolment in secondary and separately tertiary education (Nunnenkamp, 2002a; UNESCO, both public and private, full and part time, *2EDU* and *3EDU* respectively). The first hypothesis is that secondary education should actually be negatively correlated with inward FDI ($\beta_{2EDU} < 0$) as host countries are seen as low-cost-of-labor manufacturing centers by investors; hence, they are not interested in well-qualified labor as much as they are interested in the cost of it. There is no specific hypothesis regarding the tertiary education component ($\beta_{3EDU} \neq 0$).

The investment environment is represented by the size of the financial market (Buch, Kokta, Piazolo, 2001; WB, money and quasi money, M2, as a percentage of GDP,[8] *FINSIZE*) and the adjusted top statutory tax rate on corporate income (Carstensen and Toubal, 2003; European Commission's *Taxation Trends in the European Union Data for the EU Member States, Iceland and Norway* report, percentages, *TAX*). The hypotheses for these independent variables are different. As the financial market increases in size (and it is, for example, easier to make investments due to existing instruments required for the functioning of a larger system), the explored dependent variable is expected to increase ($\beta_{FINSIZE} > 0$). However, as taxes increase (and eat into profits), investment from abroad is hypothesized to decrease ($\beta_{TAX} < 0$).

This leads to the following structural equation (Eq. 1) of the FDI model:

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6 (Reference; source of data, units, representation in the model in Equation 1).

7 Data was not available for the entire series for all of the members of the group. As a result, an assumption was made that the percentage changes in Romania (for the years 1996, 1997, 1998 and the 2007–2010 period) and in Bulgaria (for 1996 and the 2008–2010 period) were same as those in Poland. This adjustment only considers 11 of 105 observations; hence, even if proven to be faulty, it should not have a significant negative impact on the model as it does not create outliers.

8 Data was unavailable for Slovakia for the last two years of the time frame. This issue was resolved with an assumption that the rate of change for 2009 is the same as the one between 2007 and 2008 with a parallel adjustment for 2010.

Equation 1

The structural equation of the FDI model

$$FDI_{it} = \beta_0 + \beta_1 GDP_{it} + \beta_2 \left[\left(\frac{X+M}{GDP} \right) \times 100 \right]_{it} + \beta_3 \left(\frac{ULC}{96.0227} \right) + \beta_4 2EDU_{it} + \\ + \beta_5 3EDU_{it} + \beta_6 FINSIZE_{it} + \beta_7 TAX + \delta_i + \gamma_t + \varepsilon_{it},$$

where FDI_{it} is the dependent variable with the subscript i denoting the host country (cross-section) and t representing the year of an investment (period). β_n ($n = 1, 2, \ldots, 7$) represent coefficients of specific determinants used (β_0 being the constant). At the end-tail of the equation, the last three terms designate time period (δ_t) and cross-section (γ_t) fixed effects (introduced in order to capture year- and country-specific information not extracted with the used determinants[9]) and an error term (ε_{it}). As far as the interpretation of coefficients is concerned, the task is straightforward due to the full linear form of the model. That is, *ceteris paribus*, a one-unit increase in the independent variable will change the dependent variable by its β units.

Additionally, in order to see how, if at all, the results of the model presented in Eq. 1 would change if the author was to control for the differences between host countries in terms of population, a second, parallel model (given in Equation 2) was estimated.

The coefficients for these econometric models are estimated with the EViews 7 software package by the employment of the Ordinary Least Squares (OLS) method (this was one of the approaches used by Leitão, 2010, where the author, despite stating that FDI to Canada is dynamic in nature and applying the General Method of Moments, concluded that his OLS model results were also robust).

It is crucial to note that a direct comparison between the two models is impossible because the models are designed to explain two different dependent variables.

Equation 2

The structural equation of the FDI/POPULATION model

$$\left(\frac{FDI}{POPULATION} \right)_{it} = \alpha_0 + \alpha_1 \left(\frac{GDP}{POPULATION} \right)_{it} + \alpha_2 \left[\left(\frac{X+M}{GDP} \right) \times 100 \right]_{it} + \alpha_3 \left(\frac{ULC}{96.0227} \right) + \\ + \alpha_4 \left(\frac{2EDU}{POPULATION} \right)_{it} + \alpha_5 \left(\frac{3EDU}{POPULATION} \right)_{it} + \alpha_6 FINSIZE_{it} + \alpha_7 P$$

[9] The validity of the use of the specified fixed effects has been confirmed with the Redundant Fixed Effects – Likelihood Ratio test with three null hypotheses: 1) H_0: Cross-section Fixed Effects are redundant, 2) H_0: Period Fixed Effects are redundant and 3) H_0: Cross-section/Period Fixed Effects are redundant. P-values for all the tests < 0.0001; therefore, suggesting the rejection of all the nulls; all the while recognizing that the literature (Wooldridge, 2010) suggests the use of a Hausman procedure that was impossible for the software to conduct due to a requirement that the number of cross sections for random effects must be greater than the number of coefficients for between-estimators.

The results for both models are presented in Table 23.

Table 23
Results obtained for the FDI (left) and the FDI/POPULATION (right) models

Dependent Variable: FDI			
Variable	Coefficient	Std. Error	Prob.
C	–48258.98	25717.2	0.0644
GDP	1.28E-06	1.81E-07	0.0000
((X+M)/GDP) * 100	548.5097	67.05823	0.0000
ULC/96.0227	–11550.49	5632.731	0.0437
2EDU	–0.034413	0.010768	0.0020
3EDU	0.006338	0.006683	0.3458
FINSIZE	182.1256	100.7289	0.0745
TAX	–656.1321	185.2888	0.0007
Dependent Variable: FDI/POPULATION			
Variable	Coefficient	Std. Error	Prob.
C	–0.007118	0.002955	0.0184
GDP/POPULATION	1.41E-06	2.29E-07	0.0000
((X+M)/GDP) * 100	5.42E-05	7.59E-06	0.0000
ULC/96.0227	–0.001592	0.000503	0.0022
2EDU/POPULATION	0.002997	0.020294	0.8830
3EDU/POPULATION	–0.023712	0.017082	0.1691
FINSIZE	5.51E-06	1.01E-05	0.5876
TAX	–8.42E-05	2.58E-05	0.0017

Source: Author's own calculations obtained with EViews 7 software.

Both models were estimated using the White (diagonal) coefficient covariance method.[10]

In both models, the residuals were found to be normally distributed based on the probability of the Jarque-Bera test (H_0: Residuals are normally distributed); the significance level (p-value) is 0.7304 (FDI) and 0.5902 (FDI/POPULATION) respectively.

Table 24 shows the two vital statistics describing the significance of the models, namely the R-squared and the F-statistic.

[10] As noted by Prof. Bob Reed from the University of Canterbury.

Table 24
Descriptive statistics for the FDI (left) and the FDI/POPULATION (right) models

Dependent Variable: FDI			
R^2	0.9777	F-statistic	125.0696
Adjusted R^2	0.9699	Prob (F-statistic)	0.0000

Dependent Variable: FDI/POPULATION			
R^2	0.9637	F-statistic	75.7591
Adjusted R^2	0.9510	Prob (F-statistic)	0.0000

Source: Author's own calculations obtained with EViews 7 software.

The results show that both models are statistically significant (Prob. (F-statistic) < 0.0001) and the values of R^2 and the Adjusted R^2 are close to 1.

In terms of statistical significance, in the FDI model, the coefficient assigned to the tertiary enrolment explanatory variable was found to be insignificant (at the 5% level of significance with a p-value of 0.3458). In the parallel model, the coefficients for enrolment in both levels of education, secondary and tertiary, and the size of the financial market were found to be lacking in their respective statistical significance (the p-values are 0.8830, 0.1691 and 0.5876 respectively). This means that they do not determine the amount of incoming FDI.

When interpreting the coefficients (*ceteris paribus*), let us first take a look at the unadjusted model (FDI).

The coefficient of the *GDP* independent variable is found to be statistically significant (p-value < 0.0001) and, as expected, positive. The size of the coefficient, compared with other coefficients in the model, is very small; an increase by $ 1 in the host's GDP will result in only a $ 1.28 increase in inward FDI. In line with our hypothesis, the openness of the host economy to trade also has a positive and statistically significant impact on FDI. A 1% increase in the openness to trade will increase the dependent variable by $ 548.71 million. The hypothesis that the cost of labor in the host country is of great significance can also be validated with the proposed econometric model. An increase by one index unit in the ULC (p-value = 0.0437) will decrease inward FDI by $ 11,550.49 million. In turn, enrollment in secondary education is not important for investors: the higher the enrollment in secondary education, the lower the expected investments. This confirms that the examined countries are chiefly seen as manufacturing spots and any factors that could increase the costs (for example, a better educated labor force or, as will be seen later, taxes) are seen as negative factors. The coefficient of the size of the financial market has been found to be statically significant (yet at a 10% level of significance with p-value = 0.0745). Notably, as *M2* (expressed in relation to the host's *GDP*) increases by one unit, investors will channel $ 182.13 million more into the host country. Lastly, as taxes (costs on profits, p-value = 0.0007) increase by 1% (unit), the explained variable will decrease by $ 656.13 million.

Now let us move to the analysis of the model adjusted for the population (FDI/POPULATION). As in the unadjusted model, the coefficients assigned to the variables

representing the staple economic concepts have been found to have the expected signs and be statistically significant at a 5% level of significance. As the *GDP/POPULATION* (p-value < 0.0001) increases by one unit, inward FDI per capita in the host country will go up by $ 1.41. With a one-unit increase in openness (p-value < 0.0001), the dependent variable will increase by $ 54.20. Inward FDI per capita will decrease by $ 1,592 when the cost of labor increases by one unit. An increase in taxes by 1% will reduce inward FDI per capita by $ 84.20.

Regional perspective: data, correlations and causation

When looking at the benefits of inward FDI, it is important to understand some thoughts put forward by previous researchers. Ellen R. McGrattan points out that the theory "predicts that the economic effects in a host country of increased foreign direct investment … are positive, but empirical studies have been unable to provide conclusive evidence" (2011). Further into her work, the author states that "benefits to FDI openness are large … [as] … GDP and employment eventually rise above trend once the transition period has passed" (2011). In addition to the direct impact inward FDI has on the macroeconomic descriptors of the host country (for example capital formation, employment and the volume of investment; Blomström, Konan, Lipsey, 2000 and Nair-Reichert, Weinhold, 2001), the indirect impacts represented by technology spillovers (Blomström, Konan, Lipsey, 2000), wages, and productivity (Lipsey, 2002) must be considered. As in the case of changes in the macroeconomic condition of the host, spillover effects do not happen automatically (for example, "the capability of local firms to absorb superior technology and knowledge appears to be a decisive determinant of whether or not the potential for spillovers will be realized" – Nunnenkamp, 2002b). According to Lucyna Kornecki, high foreign capital inflows play a vital role in Central and Eastern European economies and have become an important indicator of the advancing globalization processes in these countries (Kornecki, 2008).

In examining the impact of FDI on the development of Poland's regions, let us now look at the correlation between the country's FDI performance and selected macroeconomic indicators describing the development of all 16 provinces. We will also administer Granger causality tests in this context (Nair-Reichert, Weinhold, 2001).

As already mentioned, this is not an ideal methodology. For example, it would be better to look at inward FDI on a region-by-region basis, but this is impossible at this point due to the unavailability of detailed data. Data for region-level variables has been collected from GUS on an annual basis for the years from 2002 to 2010.

The set of macroeconomic variables begins with the obvious inclusion of GDP_R (in PLN million, subscript *R* will allow us to distinguish region- from macro-level variables) and $UNEMPLOYMENT_R$ (in percentages). Investment ($INVESTMENT_R$, in thousands of PLN) is represented by the value of investment outlays. Shifting to spillovers, productivity will be represented by the ration of GDP_R to $POPULATION_R$ following

the thinking that the higher the ratio the greater is the portion of GDP_R in a specific region produced by one person assigned to that region. This is not ideal, but must suffice due to the lack of data. Average monthly gross wages and salaries (excluding those in businesses with fewer than nine employees) are used to compute $WAGES_R$ (PLN). Unfortunately, there was no direct or substitute data available for the examination of the technology spillover.

The obtained correlations are presented in Table 25.

Table 25

Correlations between inward FDI to Poland and region-level macroeconomic variables

		GDP_R	$UNEMPLOYMENT_R$	$INVESTMENT_R$	GDP_R/ $POPULATION_R$	ULC_R
FDI	Pearson Correlation	0.2250	–0.8710	0.3110	0.6010	0.7520
	Sig. (2-tailed)	0.0070	0.0000	0.0000	0.0000	0.0000
	N	144	144	144	144	144

Source: Author's own calculations obtained with SPSS 19 software.

The Pearson correlation coefficient (PCC) between FDI and GDP_R, as expected, is positive (0.225) and significant (p-value = 0.007). By contrast, the relationship between FDI and the unemployment rate in a region is negative (PCC = –0.871, p-value < 0.0001). The remaining series ($INVESTMENT_R$, $GDP_R/POPULATION_R$ and ULC_R) appear to move directly with FDI (PCCs equal to 0.311, 0.601 and 0.752 with p-values < 0.0001). The strongest relationship is exhibited by the $UNEMPLOYMENT_R$ and FDI pair followed by the relationships between FDI and ULC_R, $GDP_R/POPULATION_R$, $INVESTMENT_R$ and lastly GDP_R.

Since the correlation only gives an insight into the relationship between two examined series and not the causality (FDI impacting GDP_R or GDP_R impacting FDI) between them, this researcher finds it interesting to take a separate look at Granger causality (GC) tests where the null hypothesis states that *X* (a specific independent variable) does NOT Granger-cause *Y* (dependent variable). The results of this test are presented in Table 26.

The analysis of the Prob. column in Table 26 leads to the conclusion that all the null hypotheses assigned to the relationship between explored region variables and inward FDI can be rejected with a p-value equal to 0.05 as the decisive threshold. Hence, it can be said that the dependent variable impacts the region-specific series.

Table 26
Results of the Granger Causality tests

Pairwise Granger Causality Tests	Lags: 2	
Null Hypothesis:	F-Statistic	Prob.
FDI does not Granger-cause GDP_R	16.9175	4.00E-07
FDI does not Granger-cause $UNEMPLOYMENT_R$	7.50776	0.0009
FDI does not Granger-cause $INVESTMENT_R$	6.86092	0.0016
FDI does not Granger-cause $GDP_R/POPULATION_R$	25.2374	1.00E-09
FDI does not Granger-cause ULC_R	64.2215	5.00E-19

Source: Author's own calculations obtained with EViews 7 software.

Summary and conclusions

Starting with the macroeconomic models, the first conclusion is that *GDP* (be it adjusted or not adjusted for the population of the host country) plays a limited role in attracting FDI. This can be explained by that fact that the researched countries are seen as manufacturing and not as consumption centers. In other words, following T. Ozawa's findings (1992), inward FDI is factor-driven, and not yet market-driven. The host economy's openness to trade is in both cases seen by investors as a positive factor. Following the manufacturing hypothesis, increases in *ULC* (hence in costs of production) will result in decreases in investment. Another similarity is seen in the examination of the negative impact that an increase in taxes has on the dependent variable. On the other hand, differences are seen in the role of education. In the unadjusted model, the coefficient of enrolment in secondary education is negative and statistically significant, unlike in the adjusted model. The coefficient of enrolment in tertiary education was found to be statistically insignificant. It is positive in the adjusted model and negative in the unadjusted model. The last difference is in the coefficients of the *FINSIZE* variable. In the unadjusted model this coefficient has a positive and a significant impact on inward FDI, while in the adjusted model its significance has been strongly rejected.

The combined PCC and GC test results show that inward FDI positively impacts a region's GDP. In terms of unemployment, PCC and GC point to a significant, negative and very strong impact of FDI on unemployment. Significantly, in terms of spillovers, following the quoted literature, higher FDI Granger-causes higher investment (weak), productivity (strong), and wages (strong).

In terms of human resources, policy makers should focus on controlling increases in costs of labor[11] as the cost of labor is a strong factor attracting FDI. Another area

[11] Unless there is a strong shift in the quality of the resource or the level of advancement in the work performed, i.e. a shift from low-tech to high-tech industries.

that needs attention by policy makers is the financial/investment climate. The macro model shows that the overall financial and investment environment matters to investors and that regions gain from foreign investment because FDI tends to stimulate domestic investment.

2.3. Balance of Payments, Official Reserve Assets and External Debt

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. Hong Kong, which tops the 2012 competitiveness league table compiled by the Swiss-based International Institute for Management Development (IMD), owes its position to factors including foreign trade, foreign investment and the quality of its public and financial sectors. In the case of the United States, which is No. 2 on the IMD 2012 list, foreign trade is also the key factor behind the country's competitive position (IMD, 2012, pp. 94 and 290). In the case of Poland, too, exports and foreign direct investment are factors strengthening the international competitive position of the Polish economy.

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 over the past several years (IMD, 2012, p. 219),[12] although it has consistently shown a growing current-account deficit in its foreign trade (Table 27).

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, although the balance on goods, the most important component of the current account, was continually negative. In the early 1990s, the positive balance on services and current transfers neutralized the negative balance on goods. But from 1996 onward, these surpluses were insufficient and the current account showed a chronic deficit. Between 1996 and 2012 the current-account deficit grew almost sixfold; in other years, this increase was

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

smaller. Poland continues to import more goods than it sells abroad, and 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 trade deficit has the greatest impact on the current-account deficit.

Table 27
Poland's balance of payments in 1995–2012 – the current account, in millions of euros

	1995	1998	2000	2003	2006	2010	2011	2012
Current account	659	–6,154	–11,181	–4,878	–10,425	–18,129	–17,977	–13,480
Balance on goods	–1,274	–11,446	–13,327	–5,077	–5,829	–8,893	–10,059	–5,313
Balance on services	2,736	3,759	1,546	193	582	2,334	4,048	4,816
Balance on income	–1,544	–1,050	–815	–2,196	–7,728	–14,415	–16,381	–17,082
Balance on current transfers	741	2,583	1,415	2,175	2,550	2,845	4,415	4,099

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

In explaining the reasons for and the implications of the trade deficit for a country's economy, references are made to the so-called absorption approach or monetary approach when it comes to balance-of-payments theories. In the case of an economy such as Poland's, both of these approaches are only partially useful. It is sometimes an oversimplification to merely say that a country imports more goods than it exports because there is a shortage of domestic products or that these products are less attractive to domestic consumers or more expensive than their similar foreign counterparts. The exchange rate, for example, is important for the prices of imported goods (Table 28). A continuously strong national currency promotes imports while discouraging exports.

Table 28
NBP exchange rates

Year	Euro	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

Source: GUS, 2012, p. 43.

If we take the level of export and import prices in 2005 as 100, the terms-of-trade index in 2005–2011 promoted exports because it stood at 1.10[13]. Since the pricing trends for Polish products sold abroad are relatively favorable, the current-account deficit can be provisionally attributed to the strength of the Polish currency. The relatively stable exchange rate is due to a constant surplus in the supply of capital from abroad. This surplus supply of foreign currency strengthens the domestic currency because the Polish financial market is credible – it 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.

Table 29

The terms-of-trade index in Poland's foreign trade

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

Source: GUS, 2012, p. 41.

However, this problem requires a deeper analysis in terms of macroeconomic variables. Witold M. Orłowski has a theory on why Poland's foreign trade shows a current-account deficit. Under his theory, households, businesses and the public sector all displayed a low saving rate – each for different reasons – at a time of economic reforms in Poland. In macroeconomic terms, this was reflected by a violation of the I = S balance between investment and savings (investment I was not equal to savings S). Investment was higher than domestic savings in Poland: $I > S_k$. The difference was $I - S_k = S_z$. If, however, the level of investment were equal to that of domestic and foreign savings S_o ($I = S_o$), then the missing amount $S_o - S_k = S_z$ was covered with imports. The difference corresponded to the budget deficit, which was different each year because the savings rate varied. Moreover, Orłowski argues that until 1995 there was no trade deficit because domestic savings exceeded the country's investment needs, as reflected by the budget surplus. When the national budget began to be financed by deficit spending, the balance of trade began to show a deficit as well (Orłowski, 1999, pp. 19–34). A key macroeconomic cause behind the deficit is a shortage of domestic savings and the necessity of financing the gap from external sources.

[13] Own calculations based on GUS data for IMD competitiveness reports.

When there is a trade deficit, it is financed from foreign savings (S_z). 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. Changes in expectations about the rate of return may lead to panic on the foreign exchange market that may provoke financial crises, exchange rate upheavals, and a reduction in the country's foreign exchange reserves, and may even ruin the financial system – as exemplified by the currency crises in Asia and Latin America in the late 1990 s.

Table 30

Poland's balance of payments in 1995–2012 – the financial and capital accounts, in millions of euros

	1995	1998	2000	2003	2006	2010	2011	2012
1. Capital account – balance	220	58	39	–40	1,666	6,453	7,254	8,545
2. Financial account – balance	6,085	11,845	11,191	7,707	10,586	30,936	22,019	16,234
3. Balancing transactions	–441	–462	755	–1,682	204	–7,767	–6,602	–2,562
4. Official reserve assets	–6,523	–5,285	–804	–676	–2,031	–11,493	–4,694	–8,737

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

The financial account of Poland's balance of payments (Table 30) confirms that the current-account deficit is financed from external funds. This is explained in greater detail by an analysis of Poland's international investment position between 1995 and 2012 (Table 31).

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 have similar indicators of net international investment position relative to GDP in 2011. For example, in the Czech Republic the indicator was –47.7%, and Romania reported –60.5%.

Table 31

Poland's balance of payments in 1995–2012 – the country's international investment position, in millions of euros

	1995	1998	2000	2003	2006	2010	2011	2012
TOTAL ASSETS	24,949	32,877	48,195	46,430	86,610	139,628	150,977	166,566
1. Polish direct investment abroad	421	997	1,095	1,700	10,933	33,264	38,420	43,615
2. Polish portfolio investment abroad	1,512	937	1,692	3,285	10,515	11,085	8,262	9,871
3. Other investment	11,338	6,735	15,883	14,351	30,910	22,130	23,740	25,956
4. Financial derivatives	0	0	0	0	419	3,158	4,833	4,547
5. Official reserve assets	11,678	24,208	29,525	27,094	36,833	69,991	75,722	82,577
TOTAL LIABILITIES	46,287	68,657	107,492	120,951	215,990	373,657	369,827	422,803
1. Foreign direct investment in Poland	6,121	19,231	36,792	45,896	95,554	161,396	153,349	174,839
2. Foreign portfolio investment in Poland	7,317	11,694	19,410	27,271	64,411	95,732	96,369	128,911
3. Other foreign investment	32,849	37,732	51,290	47,784	55,555	11,756	114,442	113,853
4. Financial derivatives	0	0	0	0	470	4,773	5,667	5,200
Net international investment position	–21,338	–35,780	–59,297	–74,521	–129,680	–230,029	–218,850	–256,237

Source: National Bank of Poland data – www.nbp.pl.

As shown by the data in Table 31, Poland's liabilities increased particularly strongly 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 nongovernmental 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 32

The breakdown of Poland's foreign debt in 2009–2012 – as of the fourth quarter of each year in millions of euros

	2009	2010	2011	2012
Total debt	194,396	237,359	248,085	276,101
of which: non-government sector and non-banking sector	87,508	98,407	103,220	109,095
– Long-term debt	145,821	179,545	192,537	223,153
– Short-term debt	48,575	57,814	55,548	52,948

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 32). The data also show that the government sector and the non-government and non-banking sector strongly contribute to the growth of Poland's foreign debt.

Table 33

Poland's foreign exchange reserves in 2008–2012 Polish – as of December, in millions of euros

	2008	2009	2010	2011	2012
Total reserves	44,138	55,221	69,991	75,721	82,577
of which: currency reserve	40,637	48,387	60,974	67,162	72,871

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

Poland's foreign exchange reserves increased in 2008–2012 (Table 33). A particularly pronounced increase was noted in currency reserve assets. In 2012, according to data from December of that year, the overall reserves totaled € 82,577 million. This amount consisted of € 72,871 million in foreign currency, € 4,175 million worth of monetary gold, € 1,313 million worth of Special Drawing Rights (SDR), a € 1,023 million IMF reserve, and other items totaling € 3,195 million (NBP, 2013).

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 these reserves continue to grow, but the breakdown of the debt creates doubts. The non-banking sector, chiefly the government sector, is becoming indebted for long-term periods on the debt securities market instead of direct investment. As the history of financial turbulence shows, the debt securities market is the most unstable. A guarantee of security is the country's economic growth, which in the case of Poland is still in place despite the downturn, so the risk is manageable for now.

PART II

DETERMINANTS OF POLAND'S COMPETITIVENESS IN 2012

Chapter 3
Assets and Their Productivity

This chapter discusses the main aspects of the qualitative factors determining the competitiveness of the Polish economy, such as economic policy and quality of institutions.

The review of Poland's economic policy in 2012 is followed by an assessment of recent developments in the Polish financial system, in which efficiency is essential for competitiveness. The last section of this chapter focuses on the business environment and the quality of national institutions.

3.1. Human Resources

Mateusz Mokrogulski

The main objective of this subchapter is to evaluate trends in the development of human resources in Poland in 2012 as one of the factors behind the competitiveness of the economy. The analysis covers the key elements that determine the state of and changes in human resources in the economy, such as demographic trends, employment and unemployment, wage formation, and labor productivity. Where appropriate statistical data were available, the analysis also covers the regional aspect.

Demography

In 2012, the increasingly negative demographic trends that were first observed at the beginning of 2010 continued. According to preliminary data released by the Central Statistical Office (GUS), at the end of 2012, the country's population totaled 38.542 million, compared with 38.538 million at the end of 2011, which shows that real population growth was only slightly positive. Preliminary data show that the number of live births totaled 389,700, compared with 388,400 in 2011. The lowest number of live

births, 351,100, was recorded in 2003. Births then rose until 2009, with an especially high birth rate in 2008. The significant decrease in the number of live births in 2010 and 2011 did not continue in 2012. The permanent residence migration balance was –5,700, much worse than 2009–2011 average. According to GUS estimates, at the end of 2011, 2.06 million Poles were living abroad on a temporary basis, an increase of 60,000 from the end of 2010. A record year in this respect was 2007, when 2.27 million people were abroad. As in previous years, in 2011, the most popular countries for Poles seeking temporary emigration were Britain (625,000), Germany (470,000), and Ireland (120,000). In 2011, a significant increase was noted in the number of Poles living in Britain and Germany. Beginning May 1, 2011, the German, Austrian, and Swiss labor markets opened to Polish workers. At the same time, the Netherlands (95,000) and Norway (56,000) gained importance among the favorite destinations of Polish people looking for work abroad. On the other hand, the number of Polish citizens living in Spain and Ireland declined in the analyzed period as a consequence of severe economic crises affecting those countries. According to GUS estimates, around 306,000 Poles were living outside Europe on a temporary basis. According to a European Job Vacancy Monitor survey, in Q1 2012, among those most frequently employed were sellers and tertiary-sector workers, clerks, experts and technical staff. For the last two groups, a year-on-year increase was observed, compared with Q1 2011. At the same time, there was a significant decrease in the number of newly employed workers, especially in agriculture and primary education. To sum up, in 2012, the demand for labor was substantially reduced, and there were far fewer job vacancies than before the 2008 crisis.

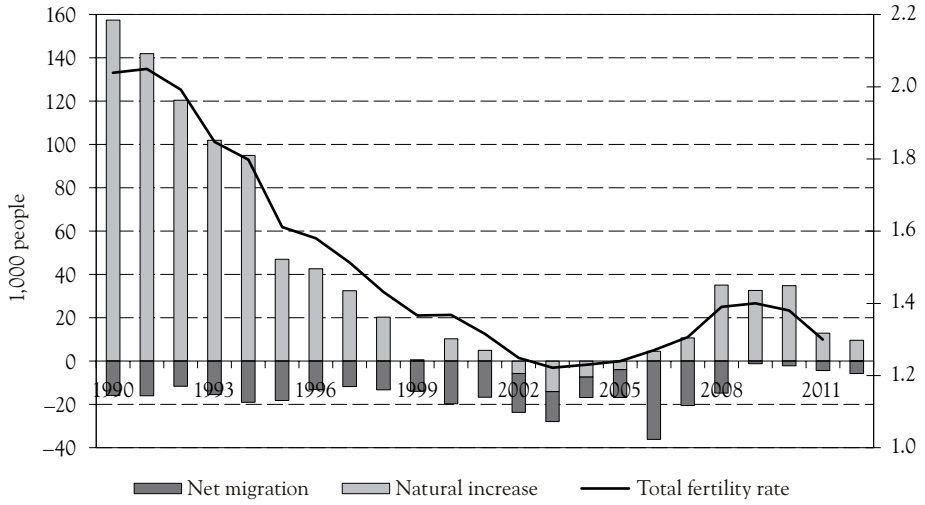
The fertility rate stood at 1.30 in 2011, compared with 1.38 in 2010 and 1.22 in 2003. This means that every 100 women from the 15–49 age group accounted for 130 newborn babies. After a period of gradual growth in 2004–2009, the fertility rate decreased slightly in 2010 and is still distinctly below a level guaranteeing stable demographic development, i.e., 2.10–2.15. Among EU countries, only Hungary and Romania have lower fertility rates, while the EU27 average is 1.57 (Table 1). The negative trends do not result from the fact that starting a family is not important for Poles. According to a study by the Warsaw-based Center for International Relations, Polish women living in Britain had statistically more births than women in Poland. The analysis shows that in England and Wales, the average fertility rate among women born outside Britain but now living there stood at 2.48. Polish women had the second-largest number of births, after Pakistani women and ahead of those from India and Bangladesh (Iglicka, 2010). In previous years in Britain, the fertility rate was influenced by an extensive use of family policy measures. These include a tax credit that depends on the family's income. If one of the parents works at least 16 hours a week, another tax credit is available. At the same time, every family is eligible for an untaxed yearly credit of £1,055.60 for the first child and £696.80 for each subsequent child. On the other hand, taxpayers in Poland are entitled to a tax credit of ZL1,112.04 for each dependent child. However, the upper limit is determined by the amount of tax due. Notwithstanding, despite the negative trend in fertility in 2012, Poland recorded positive population growth, with the number

of births outnumbering deaths by 9,600, down from 12,900 in 2011 and 35,100 in 2008 (a record year in this respect).

Life expectancy continued to rise; in 2011 it stood at 72.4 years for men and 80.9 years for women, a rise from 72.1 and 80.6 years respectively in 2010. With the less favorable demographic trends, the age structure of the population worsened. Residents aged 60–65 and older represented 17.8% of Poland's population in 2012, compared with 17.3% in 2011 and 14.8% in 2000. Statistically speaking, for every 1,000 working-age individuals, there were 565 non-working-age people (including 279 at retirement age and 286 under 17 years). At the same time, the percentage of the youngest population group is falling gradually. In 2012, those aged up to 17 represented 18.3% of Poland's population (18.5% in 2011 and 24.4% in 2000). On the other hand, the number of pensioners is decreasing gradually. In December 2012, it stood at 7,343,500, compared with 7,372,500 in December 2011. In the coming years, the aging of the population will pose a serious problem to Poland as well as several other economies.

Figure 1

Natural increase, net migration (left axis), and total fertility rate (right axis) in Poland, 1990–2012



Source: GUS

Internal migration is an interesting demographic trend in Poland. In 2005–2011, the number of people in provinces with the largest cities rose significantly. The greatest increase was recorded in Pomorskie province, where the average annual rate of population growth in the studied period was 3.84%. Tangible increases were also noted in Mazowieckie, Małopolskie, and Wielkopolskie provinces, at 2.48%, 2.47% and 2.46% respectively. The population in Podlaskie, Lubelskie and Świętokrzyskie provinces

remained relatively unchanged (0.11%, – 0.36% and –0.54% respectively), while the number of people living in Łódzkie province decreased by 1.70%. The city of Łódź, the capital of Łódzkie province, is the third-largest city in Poland by population. The steepest decline was recorded in Opolskie and Śląskie provinces, at 3.19% and 1.27% respectively. Notably, there was an insignificant increase in migration to the largest Polish cities (with 500,000 or more inhabitants); the number of people moving to Warsaw and Cracow grew by just 0.64% and 0.33% respectively. In the coming years, Poland's population is expected to continue moving to large urban centers and their environs.

Table 1

Key demographic data: Poland vs. selected European Union countries in 2011

Country	Population (as of Jan 1, 2012)	Natural increase	Net[a] migration	Old-age dependency ratio[b]	Total fertility rate	Marriages	Divorces
	1,000					per 1,000 inhabitants	
Poland	38,538.4	12.9	–4.3	19.4[a]	1.30	5.4	1.7
Czech Republic	10,505.4	1.8	16.9	23.4[a]	1.43	4.3	2.7
Slovakia	5,404.3	8.9	3.0	17.8	1.45	4.7	2.1
Hungary	9,957.7	–40.7	12.8	24.6[a]	1.23	3.6	2.3
Lithuania	3,007.8	–6.7	–38.2	26.9	1.76	6.3	3.4
Latvia	2,041.8	–9.7[a]	–23.1	27.7[a]	1.34	5.2	4.0
Estonia	1,339.7	–0.6	0.0	25.5[a]	1.52	4.1	2.3
Germany	81,843.7	–189.6	281.8	31.2	1.36	4.6	2.3
France	65,327.7[a]	253.0[a]	67.2	26.7[a]	2.00	3.6	2.0
Spain	46,196.3	84.5[a]	–41.2	25.8[a]	1.36	3.4	2.2
Ireland	4,582.8	45.7[a]	–33.6	17.9[a]	2.05	4.3	0.7
Britain	62,989.6	255.6[a]	218.6	25.3[b]	1.96	4.5[d]	2.1[d]
Sweden	9,482.9	21.8	45.5	29.2	1.90	5.0	2.5
Romania	21,335.8[a]	–55.2	–2.8	21.5[a]	1.25	4.9	1.7
Bulgaria	7,327.2	–37.4	–4.8	27.8	1.51	2.9	1.4
EU27	502,663.6[a]	407.5[a]	886.7	26.2[ac]	1.57	4.4[d]	1.9[e]

[a] Preliminary data. [b] Data for 2012; The old-age dependency ratio is the ratio between the total number of people aged 65 and over and the number of those aged 15–64. [c] Data for 2011. [d] Data for 2010. [e] Data for 2009.

Source: Eurostat.

Despite the continued growth of the post-working-age population, Poland performs well compared with other EU countries in terms of the old-age dependency ratio (Table 1).

The indicator is lower than both the EU average and the ratios for certain Central and Eastern European countries, for example the Czech Republic and Hungary. However, in the coming years, the number will continue to grow (in 2000, it stood at 17.6%) due to factors including a continually low fertility rate, which has decreased since 2010. At the same time, the number of marriages per 1,000 inhabitants in Poland is lower than in previous years, but still one of the highest among EU member states (the only countries ahead of Poland are Cyprus, Lithuania, and Malta with 7.9, 6.3 and 6.1 respectively). The relative number of divorces in Poland is also far below the EU27 average.

Employment and unemployment

The year 2012 was a time of deterioration on the labor market. Employment in the enterprise sector steadily decreased throughout the year, with a year-on-year drop of 0.5%. Information on employment in the enterprise sector included only businesses with nine or more employees. Average employment in the economy provides more reliable information; in Q3 2012, average employment fell by 0.1%, with the greatest increases recorded in the following sectors (according to the Polish Classification of Activities – PKD):

- financial and insurance activities (4.2%),
- information and communication (3.6%),
- professional, scientific and technical activities (3.4%),
- transport and storage (2.6%),
- construction (2.5%),
- mining and quarrying (2.4%).

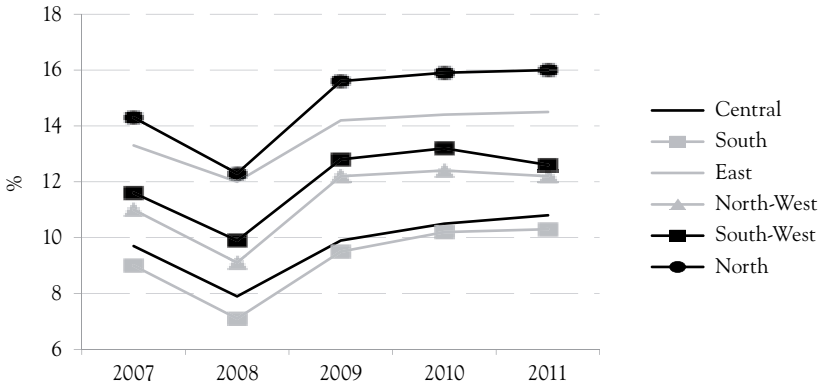
At the same time, employment dropped in the "electricity, gas, steam and air-conditioning supply" sector (6.4%), "real estate activities" (4.1%), and "accommodation and food service activities" (3.7%). The demand for labor varied across the economy and the data show that the crisis has had an asymmetric influence on the Polish labor market.

Although in Q1 2012, the unemployment rate remained relatively stable compared with the same period in 2011, in Q2 2012 it increased substantially. The negative trend continued in Q4 2012. Unemployment gained momentum in February (13.4%, the same level as in February 2011) and then began falling due to seasonal factors. In 2011 the downward trend was much stronger than in 2012, which means that the impact of seasonal factors decreased. In August 2012, joblessness started to increase again. At the end of 2012, the indicator was 13.4%, vs. 12.5% a year earlier and an all-time low of 9.5% at the end of 2008. The number of long-term unemployed remained stable at a relatively high level (53%–56%), while at the end of 2010 it accounted for 46.4% of all unemployed. Those laid off during the financial and economic crisis (mostly poorly qualified employees) had serious problems finding other jobs. That negative trend may contribute to continued structural unemployment, an unfavorable process in a market economy. Moreover, the crisis made the labor market more rigid, leading to serious

problems for people seeking employment for the first time. According to labor force statistics,[1] the unemployment rate for those aged 15–24 rose to 27.4% in Q4 2012 from 26.4% in the corresponding period of the previous year. At the same time, the unemployment rate increased significantly among individuals with a tertiary education (from 5.2% to 5.7%) as well as among those with a lower secondary, primary and incomplete primary education (from 16.9% to 18.7%). At the same time, the number of individuals looking for a job for 13 months or longer increased sharply, a trend that corresponds with the aforementioned data on registered unemployment. In 2013, a gradual exacerbation on the market should be expected, mostly as a consequence of the projected economic slowdown. However, due to the several-month lags that usually occur between fluctuations in the real product in the economy and trends on the labor market, changes on the labor market will not be immediately observable.

The unemployment rate in Poland is diversified in geographical terms (Figure 2). It is the lowest in the southern region and the highest in the northern region. In subregional terms, the indicator was the lowest in the largest cities, including Poznań, Warsaw, Cracow and the Gdańsk-Sopot-Gdynia Tricity, where it ranged between 3.6% and 5.4% in 2011; Łódź was not among the cities with the lowest unemployment rates. The highest unemployment rates (between 20% and 25%) were recorded in the Ełckie, Radomskie, Stargardzkie, Włocławskie and Grudziądzkie subregions.

Figure 2
Unemployment rate in Poland, by regions[2]



Source: GUS.

[1] According to labor force statistics, the overall unemployment rate was 10.1% in Q4 2012 vs. 9.7% in Q4 2011.

[2] Central region: Mazowieckie, and Łódzkie provinces; South region: Małopolskie and Śląskie provinces; East region: Lubelskie, Podkarpackie, Podlaskie, and Świętokrzyskie provinces; North-West region: Lubuskie, Wielkopolskie, and Zachodniopomorskie provinces; South-West region: Dolnośląskie and Opolskie provinces; North region: Kujawsko-Pomorskie, Pomorskie, and Warmińsko-Mazurskie provinces.

Despite the partially adverse labor-market trends – which were recorded in most economies worldwide – Poland still has a competitive advantage over Western European countries in terms of labor costs. The need to curb expenses in the wake of the economic crisis may force foreign enterprises to relocate their service centers to countries where wages are lower. This is unlikely to fully offset the negative implications of the crisis for the Polish labor market. Unless the global economy is on a sustainable growth path, the unemployment rate in Poland will be much higher than prior to the financial and economic crisis. The negative trends could be observed throughout 2013.

Business sentiment research by the National Bank of Poland (NBP)[3] shows that in Q1 2013 most enterprises planned to fire rather than hire workers (14.7% vs. 9.8% of the companies surveyed respectively), especially in publicly owned companies. The net employment indicator decreased year on year. Foreign-owned enterprises had planned to increase employment significantly, but the expectations were downgraded compared with the corresponding period of the previous year. The employment forecasts for industry, services and construction were negative. In the construction sector, projections have been revised recently due to a widespread failure of construction companies involved in infrastructure projects. While in 2012 forecasts for large companies (with 2,000 and more employees) were far more negative than those for small and medium-sized companies, in Q1 2013 layoffs are planned in both groups. In the last three years, prospects for export-oriented companies have been more optimistic than those for companies oriented toward the domestic market. This marks a reversal of a trend that began in 2008, but indicators are still negative for both groups. Thus, the data provided by enterprises should be considered negative. Polish enterprises are no longer optimistic about their future financial position; such transitory optimism was observed after the first wave of the global financial and economic crisis. Therefore, the assumption that the unemployment rate will remain high in 2013 is realistic, the NBP's research shows. However, demand for labor is expected to drop at a varying rate across the economy.

A Manpower Employment Outlook Survey for Poland has yielded comparable findings.[4] In the survey, 9% of 750 employers questioned declared an intention to expand their staff, 15% were planning layoffs, and 73% did not intend to make any personnel changes. Compared with Q1 2012, the expectations deteriorated, with a negative net employment projection.[5] In five of the 10 sectors surveyed,[6] more employers planned to increase rather than reduce employment in Q1 2013. Growing optimism could be observed

3 The NBP research is carried out every quarter. This subchapter contains the results of a survey carried out in Q4 2012, but refers to activities planned for Q1 2013.

4 The survey is conducted in 42 countries and includes the opinions of over 65,000 directors of human resources departments. This subchapter contains the results of the report in which employers formulate their expectations for Q1 2013.

5 The data used in the analysis are subject to seasonal adjustment.

6 The sectors included in the research are construction; electricity, gas and water supply; finance, insurance, real estate and business services; wholesale and retail trade; public-sector institutions; mining and quarrying; industry; restaurants and hotels; agriculture, hunting, and forestry; and transport, storage, and communications.

among transport, storage and communication companies, where the net employment forecast stood at +11% (marking no substantial change both on a quarterly and yearly basis), and among wholesale and retail trade companies, where the net employment forecast stood at +11% (an increase of 7 p.p. qoq and a decrease of 2 p.p. yoy). On the other hand, the worst expectations regarding future trends are formulated by employers from the mining and quarrying, construction and manufacturing sectors, where the net employment forecasts are –7%, –6% and –6% respectively (down by 2 p.p., 4 p.p., 3 p.p. qoq and by 17 p.p., 24 p.p., 10 p.p. yoy respectively). The indicators for electricity, gas and water services are –5% (up by 8 p.p. qoq and 5 p.p. yoy). When it comes to the finance, insurance, real estate and business services sectors, the forecast is relatively neutral (providing for a decrease of 8 p.p. qoq and 12 p.p. yoy). This marks a change from previous employment trends. The indicators for mining-and-quarrying and construction in particular could mean a breakdown or even a reversal in the positive trend.

With regard to other countries, the demand for labor is rising in Romania, Norway, Sweden, and Britain. The net employment forecast for Britain is at a four-year high. Employers in Greece, Spain and Italy, countries with a significant foreign debt in relation to GDP and hard hit by the financial and economic crisis, are the most reluctant to create new jobs. At the same time, the employment forecast for Slovenia has worsened significantly.

In 2012, Poland's unemployment rate was lower than the EU27 average, marking a change from the previous year when both indicators were the same. The highest unemployment rate was recorded in countries most severely hit by the crisis (Table 2). These were Spain (25.0%), Greece (24.0% – Dec. 2011 to Nov. 2012 average), Portugal (15.9%), Latvia (14.9%), and Ireland (14.8%). Germany saw a slight recovery on its labor market, and in the Netherlands a significant rise in unemployment was recorded (before the crisis, unemployment was not a problem in that country). According to a January 2013 forecast by the European Commission the average unemployment rate in the European Union will be 11.1% in 2013, followed by 11.0% in 2014. For the United States, the expected figures are 7.6% and 7.0% respectively, while Poland's estimates are 10.8% and 10.9%.

After a few years of improvement, Poland has stabilized among other EU member states in terms of cross-country data on the employment rate. In 2012, Poland's employment rate was 60.2%, less than the EU27 average of 64.6%, but a substantial improvement over Q1 2004, the quarter preceding Poland's entry into the European Union. Poland had the lowest employment rate at that time (50.5%), while the EU27 average was close to its 2012 value. At the moment, Poland's indicator is higher than those of Hungary, Slovakia, Spain, and Ireland. Similarly, the number of economically active people in the 55–64 age group rose in the analyzed period; the employment rate in that group went up from 25–26% to almost 40%. However, in Poland, this indicator is still lower than in other EU27 countries, with the exception of Slovenia, Malta, Greece, and Hungary. As the number of people eligible for transition state pensions was significantly reduced and the retirement age is now being gradually increased, the employment rate in the 55–64 age group is expected to rise again.

Table 2

Employment rate in Q3 2012 and unemployment rate in 2012 (average): Poland vs. selected countries

Country	Employment rate (%) 15–64 years				Unemployment rate (%)		
	Total	Women	Men	55–64 years	Total	Under 25 years	Long-term[a]
Poland	60.2	53.4	67.1	39.6	10.1	26.5	4.0
Czech Republic	67.1	58.6	75.3	50.4	7.0	19.5	3.0
Slovakia	60.1	52.7	67.2	43.0	14.0	34.5	9.2
Hungary	58.2	53.0	63.6	37.8	10.9	28.1	4.7
Lithuania	63.3	62.9	63.7	53.1	13.3	26.4	6.3
Latvia	64.5	62.6	66.7	54.6	14.9	28.4	6.4
Estonia	68.1	64.7	71.8	61.3	10.0[a]	20.3[a]	5.1
Germany	73.2	68.1	78.1	62.1	5.5	8.2	2.5
France	64.4	60.3	68.6	45.0	10.2	24.7	4.1
Spain	55.6	50.6	60.5	44.3	25.0	53.2	11.2
Ireland	59.0	55.0	63.2	48.8	14.8	30.6	9.0
Netherlands	75.3	70.7	79.9	59.0	5.3	9.5	1.7
Britain	70.5	65.2	75.7	58.3	7.8[a]	20.4[a]	2.8
Denmark	72.8	70.4	75.3	60.5	7.5	14.1	2.0
Romania	60.8	53.8	67.8	42.9	7.0	22.7	3.2
Bulgaria	60.6	58.0	63.1	47.0	12.2	27.9	6.5
EU27	64.6	58.9	70.4	49.5	10.5	22.9	4.6
United States	66.6[b]	62.0[b]	71.4[b]	60.0[b]	8.1	16.2	2.8[b]

[a] Data for Q3 2012. [b] Data for 2011.

Source: Eurostat.

Education and wages

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

data. Nevertheless, lifelong learning and education are equally important because human capital accumulated in employees needs to be improved on an ongoing basis. If an employee is oriented toward career development and frequent improvement in professional skills, the probability of becoming unemployed during an economic slowdown, or economically inactive just before retirement, is lower.

Table 3

Education and labor costs[7] in Poland compared with selected other EU countries (data on unit labor costs in real terms, Q3 2012)

Country	Tertiary education	Lifelong learning	Unit labor costs growth (%, yoy)	Hourly labor costs[d]		Minimum wages[c]	
	% of population (aged 25–64)			EUR	PPS	EUR	PPS[b]
Poland	23.7	4.5	–1.3[a]	7.46	11.92	377	654
Czech Republic	18.2	11.4	1.8	9.68	13.44	312	425
Slovakia	18.8	3.9	–2.4	8.25	11.59	338	467
Hungary	21.1	2.7	1.8	7.22	11.02	341	545
Lithuania	34.0	5.7	–1.6	5.45	8.58	290	440
Latvia	27.7	5.1	–4.4	5.74	8.28	287	384
Estonia	36.8	12.0	1.4	n/a	n/a	320	n/a
Germany	27.3	7.8	1.8	29.20	28.02	-	-
France	29.8	5.5	0.4	33.15	29.64	1,430	1,298
Spain	31.6	10.8	–3.4	20.25	20.94	753	775
Luxembourg	37.0	13.6	–1.1	32.46	27.07	1,874	1,524
Britain	37.0	15.8	1.9	19.20	19.15	1,264	1,153
Sweden	35.2[a]	25.0	2.3	35.99	29.46	-	-
Romania	14.9	1.6	–1.3	4.20	7.17	157	274
Bulgaria	23.4	1.2	0.8	3.10	6.13	159	321
EU27	26.8	8.9	1.0	n/a	n/a	-	-

[a] Preliminary data. [b] Estimates. [c] Data for 2013. [d] Data for 2010.

Source: Eurostat.

Labor costs in Poland are still low compared with Western Europe and are similar to those in Slovakia and Hungary, but slightly lower than in Czech Republic in pur-

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

chasing power parity (PPS) terms. In 2012, wage pressure was much weaker than in 2011 as wages and salaries rose by 3.5% in nominal terms and 0.1% in real terms, compared with 5.6% and 1.4% respectively in 2011. In 2012, the purchasing power of wages fell, and such a trend was not observed in the first wave of the global financial and economic crisis. What is more, it is possible to assume that wages in the public sector increased more dramatically than in the enterprise sector (for the fifth consecutive period). Typically, in times of economic slowdown, wages in the public sector tend to grow faster than in the private sector. In Q3 2012, gross wages grew at a varying pace across the economy. In industry, they went up by 2.6% (with a 3.3% increase in manufacturing) and in trade by 2.7%. In construction, wages went down by 1.7%. Wages soared in education (5.3%), administrative and support service activities (5.2%), and in transportation and storage (5.1%). In addition to construction, a negative result was recorded in mining and quarrying (–2.5%), while the wage level in financial and insurance activities remained unchanged.

The NBP's business sentiment research shows that 10.0% of enterprises were considering whether to offer pay raises to their employees in Q1 2013. This percentage is lower than the average for the 2005–2012 period. The weighted average growth was 4.5%. On the other hand, 4.3% of enterprises were thinking of cutting pay. The local government and foreign-owned companies were most frequently considering pay raises. Those planning to offer pay raises also declared an intention to hire new workers, while enterprises planning to cut pay were at the same time thinking of reducing employment. According to 70% of companies, wage growth was commensurate with the increase in labor productivity in Q4 2012; 22.5% of those surveyed said wages had risen at a slower pace than productivity, which is the highest showing since Q4 2009.

The analysis of wages on a regional basis[8] reveals an asymmetry of distribution. In Mazowieckie province, wages are far above the national average, and in Śląskie province they are higher, too. In other provinces, wages are lower than the national average, especially in Podkarpackie, Świętokrzyskie, and Lubelskie provinces (by 15.3%, 14.3% and 13.7% respectively).

Labor productivity

Labor productivity has grown slowly but steadily in Poland since 2007.[9] Currently, Poland is among countries where labor productivity tends to stay at a low level. In 2011, lower figures were only recorded in Lithuania, Latvia, Estonia, Bulgaria, and Romania (Table 4). As another economic slowdown is currently hitting the Polish economy, accompanied by a recession in the eurozone, labor productivity in the country is expected to increase slowly and the process of catching up with Western Europe will

[8] On the basis of a detailed GUS study, as of October 2010.

[9] Data for 2012 were not yet available.

continue. It is important that the rising inflationary pressure does not automatically contribute to excessive rises in real wages, which could occur under highly adaptive inflationary expectations. Such a scenario would mean further unwillingness to create new jobs on the part of employers, who would rather be focused on cutting labor costs. The data in Table 3 show that, while in the vast majority of EU27 countries unit labor costs increased in 2012, in Poland they dropped. Especially strong declines occurred in Latvia, Slovakia, and Spain, all of which experienced a severe economic recession. The decrease in unit labor costs in Poland in 2012 should be interpreted as a positive trend, especially as the Czech Republic and Hungary, as well as Germany and France, reported an increase in unit labor costs.

Table 4

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

Country	2001	2002	2003	2004	2005[a]	2006	2007	2008	2009	2010	2011
Poland	56.3	59.0	60.3	61.9	61.8	61.2	62.3	62.4	65.5	67.4	68.8
Czech Republic	67.9	67.7	71.2	73.0	73.1	74.0	76.3	74.1[a]	75.9	73.8	74.1
Slovakia	60.8	62.9	63.7	65.8	68.8	71.7	76.5	79.8	80.0	81.2	80.1
Hungary	61.5	64.8	66.0	67.1	67.7	67.8	66.6	70.7	72.4	70.9	71.1
Lithuania	47.4	48.6	52.6	53.9	55.0	56.8	59.6	62.1	58.0	62.5	64.8
Latvia[a]	41.6	42.8	44.2	45.9	47.8	48.9	51.4	51.6	52.8	53.7	62.4
Estonia	48.4	51.3	55.0	57.7	60.8	62.4	66.7	65.8	65.1	68.4	68.0
Slovenia	76.2	77.6	78.9	81.6	83.3	83.4	83.2	83.8	80.5	79.3	80.6
Germany	106.2	106.0	107.9	107.7	108.6	108.8	108.4	108.0	104.3	106.1	106.6
France	119.6	120.1	116.3	115.5	116.5	115.4	115.6	115.4	117.3	116.5	116.6
Ireland	129.2	135.0	137.8	137.0	135.7	136.1	137.1	127.9	134.4	138.9	142.7
Britain	112.0	112.1	112.9	114.3	113.8	113.1	110.6	107.5	105.9	105.9	104.1
Luxembourg	163.0	164.2	168.2	170.6	170.3	179.6	180.0	168.6	161.2	167.1	169.0
Romania	25.7	29.4	31.3	34.6	36.1	39.7	43.4	49.2	49.4	48.5	49.2
Bulgaria	32.2	34.0	34.8	34.8	35.8	36.4	37.5	39.6	40.0	41.2	44.3
United States	140.9	140.9	142.6	143.5	144.4	140.6	139.4	138.1	140.9	142.9	143.6[b]

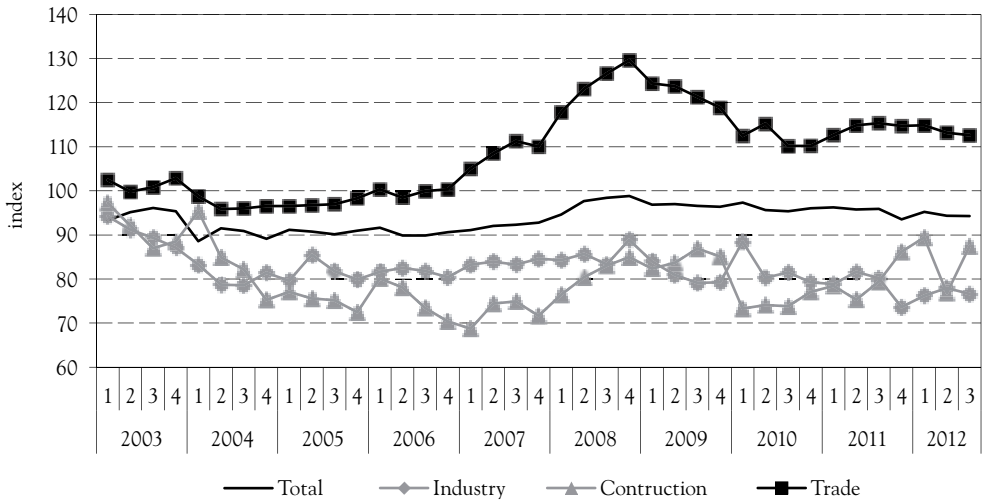
[a] Break in series. [b] Forecast.

Source: Eurostat.

Nominal unit labor costs in the economy did not change markedly in 2012 in comparison with 2011 (Figure 3). They leveled off at roughly 94% of their 2002 value. Labor costs did not vary significantly in the main sectors of the Polish economy. The trade sector, which is a service sector, is only to a limited extent subject to international

competition. In industry and construction, unit labor costs remain at levels significantly lower than those in 2002 (at 77% and 87% of their past values respectively). As the indicator is not growing, it can be expected that the current labor market trends will entail disinflationary processes. However, pricing processes in Poland are strongly dependent on trends in the world economy, where there is a high uncertainty. Another risk factor is the exchange rate of the Polish zloty with respect to the core markets' currencies, especially the euro and the U. S. dollar. The stabilization in overall unit labor costs is a positive sign for the Polish economy.

Figure 3
Growth of seasonally adjusted unit labor costs in Poland (2002 = 100)



Source: Own calculations based on GUS data.

Conclusion

The year 2012 was a time of deterioration for the Polish labor market; demographic trends worsened. An economic slowdown in Poland was accompanied by a double-dip recession in the eurozone. Despite a temporary increase in unemployment, Poland still has a visible competitive advantage over Western European countries in labor costs. Investment in education is particularly important during a period preceding a rise in demand in the economy, as it helps adjust to new market expectations when the global economy enters a sustainable recovery phase. It is necessary to be aware that human capital can be developed through both education and lifelong learning.

3.2 Physical Capital and Infrastructure

Ireneusz Bil, Piotr Maszczyk

Investment

Contrary to pessimistic expectations voiced last year by the European Commission and a large number of independent economists, 2012 did not mark a negative change in investment in Poland, albeit the rate at which the value of investment outlays grew dropped significantly compared with the previous year. Investment outlays totaled ZL66.3 billion as of the end of the third quarter last year, 4.4% more than in the same period of 2011. Preliminary data released by the government's Central Statistical Office show that investment outlays in all of 2012 approached ZL100 billion, 0.6% over the previous year. This increase, though symbolic, should be treated as a positive trend, despite the fact the total amount of investment outlays was substantially lower than during the 2007–2008 period. Cumulative growth for 2011 and 2012 was in double digits, yet total investment outlays were much lower than four and five years earlier.

This remarkable deceleration in the growth of investment outlays and gross fixed capital formation in the Polish economy in 2012 contributed to a significant drop in GDP growth (to 2%, down from 4.3% in 2011, according to preliminary data by the Central Statistical Office). Poland's GDP growth was relatively moderate in 2011 compared with the 2006–2008 period and it decelerated further last year. To a large extent, investment outlays grew at a slower rate due to much slower economic activity in the country. Because of a specific feedback mechanism, 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.

The prime factor behind the continued positive investment pattern in 2012 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 2012 increased by ZL68.6 billion to ZL190 billion (to compare, in 2011 this expenditure rose by ZL57.3 billion). In 2012, businesses, institutions, and individuals benefiting from EU funds spent more than 30% of all structural and cohesion funds allocated to Poland under the 2007–2013 financial perspective.

Another important driver behind the increasing amount of investment was the relatively moderate course of the financial crisis in Poland, at least compared with the rest of the EU. Between 2008 and 2012 the Polish economy expanded by almost 18%, while the average cumulative growth rate in the EU as a whole was negative at –0.5%.

However, the crisis led to a general decline in confidence among both households and enterprises, triggering a decreased propensity to consume and invest. The rate at which investment grew fell in 2008, followed by a significant drop in investment outlays in 2009 and 2010. 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 worse climate and started to lend money to enterprises planning investment projects. Notably, the non-financial sector recorded substantial financial results, which enabled it to finance investment projects with its own funds.

The most important factor that led to a considerable deceleration in the rate at which the value of investment outlays grew was a significant drop in the FDI inflow to Poland. Preliminary data by the Polish central bank (NBP) show that foreign direct investment in Poland decreased by almost 35% yoy in 2012, totaling $ 9 billion (down from $ 13.6 billion in 2011 and $ 9.7 billion in 2010). Additionally, this decreased FDI inflow was accompanied by an increased outflow of foreign capital, amounting to $ 4 billion in 2012. It seems obvious that, with its decreasing GDP growth rate, Poland is losing its main selling point in terms of FDI: strong domestic demand and growing private consumption during the global crisis. In recent years Poland has stood out in terms of FDI compared with other countries in Central and Eastern Europe, but the situation is changing and the data illustrating the changing pattern of FDI inflows and outflows for Poland are roughly the same as in the case of other Central and Eastern European countries. Still, UNCTAD data show that foreign direct investment in Poland since the beginning of the transformation process was three times larger than in the Czech Republic or Hungary and 10 times larger than in the Baltic states. The problem is that foreign investors are increasingly aware of various obstacles and barriers to investment in Poland. That could mean Poland's strong position on the international investment scene will not last much longer. In 2011, Poland ranked ahead of Germany and Britain and was only outperformed by global economic powerhouses such as China and the United States. In 2012, Poland lost its enviable position.

A comparison of Poland's investment statistics with those of the Czech Republic, Slovakia, and Hungary – Poland's main competitors in the region as far as foreign capital absorption is concerned – shows that although the level and growth of capital formation in all the Central and Eastern European countries that have joined the EU is chiefly determined by external factors, there are significant differences between them[10]

In 2012, investment in the Czech Republic was projected to decrease by around 5.2%, which – as in Hungary – marked the continuation of a prolonged negative trend. Due to this trend, the Czech economy has been unable to return to its 2008 investment level. After a nearly 24% drop in 2009 and relatively moderate growth in 2010

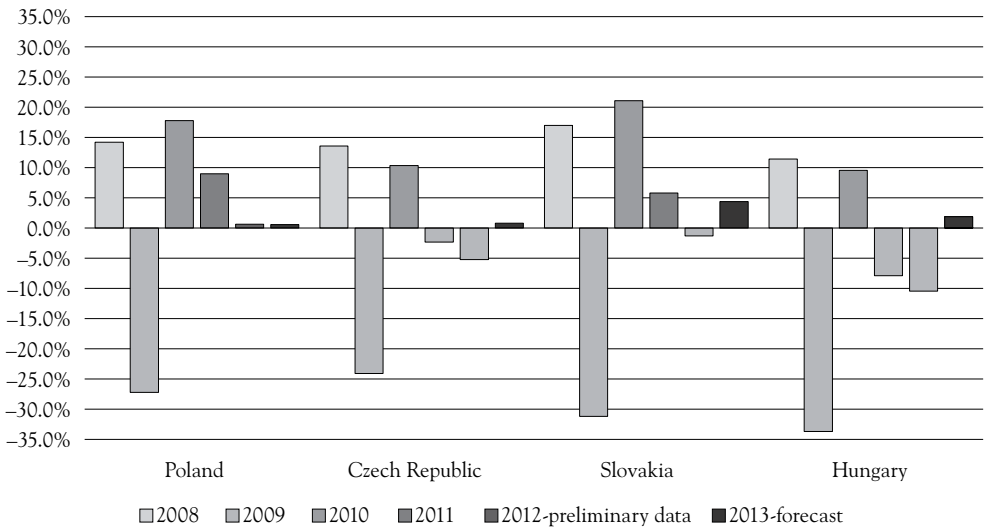
[10] The data on investment outlays in the Czech Republic, Hungary, and Slovakia for 2008–2013 come from the Eurostat website: http://epp.eurostat.cec.eu.int.

compared with the rest of the analyzed group, investment outlays in the Czech economy are now steadily decreasing.

Data on investment outlays and their growth show that, in the analyzed group of countries, the Slovak pattern is the closest to that of Poland, although the 1.3% drop in investment in Slovakia could mean a future change in this pattern. Along with Poland, Slovakia was the only country that managed to maintain positive investment growth in 2010 and 2011. However, Slovakia's 2011 growth rate was lower than Poland's. While the Slovak investment growth path was similar to that of Poland until 2011, last year marked a major change: endogenous factors influencing investment outlays not only offset the negative influence of external problems, but resulted in higher investment outlays than in the previous year. It is worth adding that Slovakia, much as Poland, struggled with a negative growth rate in investment in 2002 and 2003, while in 2004 investment outlays in that country increased by less than 3%. Thus, an investment-friendly policy pursued by the Slovak government, based on adopting the single European currency, reducing taxes and increasing investment, proved to be successful. However, the decline in investment outlays in 2012, after a prolonged growth trend, could mean that the positive impact of all these factors is beginning to peter out. Nevertheless, the European Commission expects Slovakia to report the fastest growth in investment in 2013.

Figure 4

A comparison of investment growth in Poland, the Czech Republic, Hungary, and Slovakia, 2008–2013



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

Hungary was the only country in the group that not only failed to change its unfavorable investment climate in 2012, but also recorded a double-digit negative growth

rate for investment. Capital outlays in Hungary were projected to decline by 10.4% in constant prices. Notably, in times of relatively good economic trends, the Hungarian growth rate for investment is the lowest among Central European countries, and when the situation gets worse, the decrease in this part of aggregate demand in Hungary is usually the most severe. This was chiefly because Hungary had increasing difficulty ensuring financial discipline, which, together with a rapid depreciation of the national currency, led to a serious slump in the public finance sector. The misguided fiscal policy negatively influenced the growth of the Hungarian economy and created an unfavorable investment climate in the medium term.

The chart below compares the growth of investment outlays in Poland and other new EU member states in 2007–2012, with some estimates for 2013.

The future path of investment growth: tentative estimates

Considering the factors that led to the significant drop in the growth of the value of investment in Poland in 2012, it is risky to offer even a rough forecast for 2013. Taking into account some discouraging data published in February on a possible slowdown in the country's GDP growth to below 1%, it is likely that investment in Poland will decline in 2013, after moderate growth in 2011 and 2012. Such outlooks are popular among independent economists who expect this part of aggregate demand to decline by around 5%. Due to the recession predicted by the European Commission in most EU countries and with the growing unemployment rate in Poland, aggregate demand is unlikely to grow more than 1%–2%, so the projected growth rate for investment outlays is negative.

However, estimates released by the European Commission suggest that investment outlays in Poland will grow at an annual rate of 0.5% in 2013, almost the same as in 2012. The projections for other Central and Eastern European countries are also optimistic; Slovakia's growth rate is estimated at a healthy 5%.

In analyzing the probability of a negative scenario from a drop in investment outlays, two key factors should be taken into consideration. First, the negative scenario is more likely because the inflow of financial transfers from the EU budget began to decrease in the second half of 2012, as did the amount of investment related to the Euro 2012 soccer tournament. According to most independent economists as well as government officials, most of the growth in investment outlays over the past three years or so has been generated by the public sector, chiefly via EU funds. But this positive climate will likely turn negative in 2013. Most of the funds allocated to the enterprise sector have 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. Due to the short-run strategy introduced by the Polish government for the public finance sector in 2012 (calling for lowering the deficit below 3% of the GDP and thus bringing down the public debt level), local governments will no longer be able to freely

incur debts to carry out projects co-financed by the European Union. This practice was particularly widespread in the case of projects financed under the Infrastructure and Environment Operational Program. As a result, the high ratio of absorption in the public sector will decrease significantly together with the value of Polish investment. In addition, with the EU's current financial framework drawing to a close, the number of different inspections and investigations carried out by European institutions will grow and the consequences of such actions could be negative. Even if Poland regains access to this part of structural funds later this year, the total amount of financing absorbed and used by the Polish economy will decrease. In the worst-case scenario, this could mean that Poland will be forced to pay back part of the funds transferred to beneficiaries.

Secondly, the negative scenario is more likely due to the productivity of capital in Poland. The trend on the supply side, in particular the productivity of capital since the mid-1990 s, shows that the rapid growth of investment was correlated with the high rate of GDP growth. Ever since the growth of fixed capital investment in Poland started to decelerate at the end of 1997, GDP growth has slowed as well. When fixed capital outlays began to grow again at the end of 2001, the same trend was noted for GDP. The most peculiar situation emerged during the 2001–2003 period, when, together with the decreased investment outlays and reduced employment, the GDP growth rate remained positive chiefly thanks to total factor productivity (TFP). During this period, capital and labor were utilized so effectively that GDP continued to grow despite a decrease in these two factors of production. The same situation will probably occur in 2013. A look at the supply side of the economy reveals that, even though the projected rate of GDP growth is low, it can only be achieved if total factor productivity increases. In such a case, both employment and gross fixed capital investment will decrease. This suggests that the high rate of fixed capital investment growth in the Polish economy leads to higher TFP growth in the medium and long term. This correlation indicates 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. It is worth noting that in the case of the Polish economy, capital and labor create a substitutive relationship, while in Western European countries they are in a complementary relationship, as indicated by analyses of the impact of capital and labor on GDP growth. Taking into account the expected moderate growth of the Polish economy and rising unemployment in 2009, it is probable that the only growth factor on the supply side will be TFP, while capital outlays and the number of people working will decrease.

This negative factor could have even worse consequences in the long run. So far the Polish economy, with its emerging "model of capitalism" and institutions supporting the development of the market, has managed to develop without any significant investment in projects related to innovation. 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 of innovation) and low costs, which has functioned relatively well in Poland so far, could end quickly with production reallocated to countries with cheaper labor. The growing outflow of FDI reflected by the aforementioned central bank data can be treated as the first sign of such a trend. What the Polish economy really needs in such a case 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 (universities, investment funds, venture capital, business angels etc.) have to be financed – at least in part and in the first few years – from public sources, including EU funds.

Factors influencing the value of investment in the Polish economy were analyzed in detail in the previous edition of our report. In the case of one of these factors, EU funds, our expectations were too pessimistic, and – as we pointed out in the first part of this chapter – an extremely high level of absorption of structural and cohesion funds helped the Polish economy keep the positive trend in investment in 2012. Another factor, nature of capital, was crucial as a variable that significantly decreased the growth of investment.

While analyzing the probability of the positive scenario (under which the positive trend from the previous year and the moderate growth of investment would continue in 2013), two key factors should also be taken into consideration. The first factor is expansionary monetary policy, which will probably lead to a lowering of the central bank's interest rates. The declining growth rate of the Polish economy, together with the expected appreciation of the Polish currency, should keep inflation under control and establish a favorable climate, especially in the second and third quarters, for decreasing the central bank rates by at least 50–75 basis points. Obviously, the banking sector does not have to transfer the monetary stimulus from the central bank to the economy. But it is easy to change such a situation, for example by having the banking supervision authorities apply administrative methods, combined with financial aid, to change the structure of the credit portfolio in favor of enterprises. This would help increase the amount of credit available to the corporate sector. The decreasing cost of money, coupled with credit expansion resulting from either voluntary moves or policies imposed by the banking supervision authorities, may lead to easier access to funds for enterprises. This should boost the overall level of investment in the country, especially in the third and fourth quarters of 2013.

Paradoxically, the positive scenario is more likely due to a significant drop in the FDI inflow in Poland in 2012. It is widely expected that in 2013 the amount of FDI will remain unchanged or even increase slightly over 2012. According to the Polish Informa-

tion and Foreign Investment Agency (PAIiIZ), foreign direct investment in Poland will reach $ 10 billion in 2013, an increase by 10% yoy. While this is much less than during the peak period of 2006–2008, or even 2011, this moderate growth will add to the positive trend in investment in Poland. Of course, this fact cannot change the generally negative, long-run evaluation of Poland as a destination for foreign direct investment. 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. Sagging GDP growth, combined with the continued existence of administrative barriers, underdeveloped transport infrastructure, an incoherent and incomprehensible system of public financial support for direct investment as well as the increasingly outdated model of the Polish economy, relying on cheap labor as the main factor designed to draw investors, 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 of the labor cost due to higher average taxation. Poland should be an especially interesting place for an additional transfer of capital in 2013 for international companies, which 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 resistance from workers in plants slated for closure and the policies of governments in Western European countries worried about social unrest (due to developments such as group layoffs, one case in point being Italian automaker Fiat, which plans to lay off about 1,500 workers in its auto plant in the southern Polish city of Tychy). The governments of Italy, France, and Germany, which offer generous package deals to support industries such as the automobile sector, could limit access to this aid.

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 some kind of baseline scenario in which no unexpected positive or negative trends will emerge either in Europe or worldwide during 2013. 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 Iran, North Korea, and Syria on the other. The same situation would occur if the trouble within the eurozone increased and the crisis spilled over from Greece to Spain or Italy. In such a situation, all European countries would be hit by a recession, and investment outlays (together with FDI) in Poland would drop significantly.

On the other hand, if the political and economic situation in Greece improves and there is a relatively swift positive change in the business climate across the European

Union, mainly the eurozone, economic growth in Germany and other countries that are Poland's most important foreign trade partners will pick up (there are some signs of such a possibility, because some initial data from the German economy released in February 2013 seem to be very optimistic). As a result, Poland's own investment outlays and GDP will be higher than expected. However, such a scenario is far less probable.

Poland's infrastructure in 2012

A high quality and modern infrastructure is of key significance to long-term economic growth and serves as one of the major factors determining the attractiveness of specific locations for foreign investment. It fosters sustainable regional growth, offers equal opportunities on the labor market and facilitates access to public services. Countries and regions with better infrastructure usually have stronger growth potential, higher living standards and a lower level of business-related transaction costs.

An unprecedented number of road and railway infrastructure projects were completed in Poland in 2012. This was mainly because many of these projects were co-financed under the European Union's structural and cohesion programs for the 2007–2013 period. Another contributing factor was the Euro 2012 soccer tournament held in Poland and Ukraine in June. Poland's preparations for the event included not only the construction and modernization of soccer stadiums, but also a number of infrastructure projects aimed at facilitating the effectiveness of the country's transportation system to enable hundreds of thousands of soccer fans to smoothly visit Poland. A long list of projects were carried out, including new freeways, expressways and railroads as well as new rolling stock for the national rail carrier, new airport terminals and hotels.

On the other hand, some of the plans related to Euro 2012 have never been implemented or were completed with a delay, and the prospects for the period beyond 2012 assume a considerable drop in the pace of, and expenditure on, modernization of Poland's infrastructure. At the same time, numerous barriers and dysfunctions are being identified in the current system of carrying out infrastructure projects, which may hinder the future of Poland's infrastructure-related convergence with developed EU countries.

Road infrastructure

In the past two years there has been a rapid increase in the total length of Poland's freeway and expressway network. A total of 294 km of new freeways and 330 km of new expressways were built in 2012 (GDDKiA 2013). There are now 1,366.3 km of freeways in use in Poland, and their length has nearly doubled since 2007. Poland has around 1,097 km of expressways, whose length totaled 317 km in 2007. To compare, in 2011, 213.5 km of freeways and 70.2 km of expressways were completed, while the figures for

the period between 2008 and 2010 were 183.5 km and 293 km respectively. This means that the targets included in the 2007–2015 National Road Construction Program have been over 60% met so far.

Roughly speaking, 67.4% of all roads in Poland are paved and the remaining 32.6% are unpaved. The paved road network is 82.8% made up of county and district roads; national roads account for a further 6.8% of the network, provincial roads for 10.4%, and freeways and expressways for the remaining 0.56% (2010). Just over 20% of national roads are capable of withstanding heavy loads exceeding 115 kN per axle (MTBiGW 2013).

The skyrocketing number of vehicles is one of the factors determining the poor condition of the road infrastructure which is subject to extensive use and wear. The length of the paved road network in Poland increased by only 9.6% between 2000 and 2010. Over the same period, GDP grew by 46.1%, and the number of motor vehicles rose by 63.3%. As a result, the average number of vehicles per 1 km of paved road in Poland was higher than in the EU27, at 84 versus 54 (MTBiGW 2013).

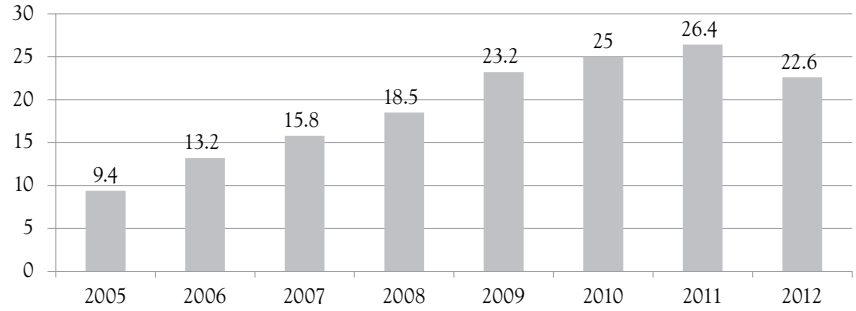
Road infrastructure expenditure

Expenditure on the construction and modernization of Poland's national roads approached ZL118 billion between 2004 and 2012 (Ernst&Young 2012). EU co-financing for freeways, expressways and beltways will come to around ZL46 billion from 2007 to 2015. Private-sector companies have also invested several billion zlotys in the construction of tollways. Private companies operate 460 km of freeways, one-third of the total length of such roads in Poland.

In 2012, total expenditure on the road network in Poland was ZL22.6 billion (GDDKiA 2013). This was nearly ZL4 billion less than in 2011, which was a record year in this respect (see Figure 4). The decrease in investment expenditure was accompanied by a changing trend in spending on the maintenance of the road infrastructure. The future is expected to bring a further decrease in expenditure (Strategy for Transport Development 2013). The overall balance of the National Road Fund is improved by ViaToll, an automatic road toll collection system that has been in operation since July 1, 2011. The system currently covers around 1,890 km of roads, and is expected to be expanded by a further 300 km by March 2013.

The cost of road construction projects continued to drop during 2012. The average cost of 1 km of an expressway in Poland is around € 10 million, near the European average. The decreasing prices, combined with the economic recession and stiff competition, have led to a more difficult financial position for construction companies. A total of 133 general contractors were carrying out road construction projects commissioned by the GDDKiA in 2012. Eight of these companies – 6% of the total number of general contractors who signed contracts with the GDDKiA – have since gone bankrupt. The planned decrease in investment expenditure in 2013 is bound to add to the problems of Polish road building enterprises (GDDKiA 2013).

Figure 5
Road building expenditure in Poland in 2005–2012 (in billions of zlotys)



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

The reduced prices of road building services and the bankruptcy of a large number of general contractors resulted in financial liquidity problems for many subcontractors as well. By July, the problem became acute enough for the parliament to adopt a special Contingency Road Building Act as an initiative by the government. The law enabled subcontractors to receive payment for work done for general contractors commissioned by the General Directorate of National Roads and Motorways. Under the law, subcontractors may seek payment directly from the GDDKiA. The payments will be transferred directly from the account of the National Road Fund, an institution collecting funds for road projects. The General Directorate of National Roads and Motorways will then seek to recover the money from general contractors responsible for building new freeways, expressways and beltways. By December, around ZL485 million worth of payments were offered with the use of this new mechanism to several hundred entrepreneurs who had failed to receive remuneration for their work from 27 general contractors.

Although spending on the construction of national roads remained at a high level, funds earmarked for day-to-day road maintenance, including repairs and renovation, continue to decrease. A particularly steep drop in spending on road repairs was noted in 2011 and 2012, when only around ZL500 million was spent for this purpose (GDDKiA 2012). To compare, total expenditure on national road maintenance amounted to ZL1.2 billion in 2004 and ZL300 million in 2009; (Ernst&Young 2012).

Expenditure on road infrastructure is slated to be reduced drastically in 2013 to around ZL15 billion; (GDDKiA 2013). The government plans to complete 401 kilometers of roads this year, including 126.3 kilometers of freeways and 235 kilometers of expressways. This will largely conclude projects that were started and financed in previous years.

In its National Road and Motorway Construction Plan, the government in 2010 revised its targets for Poland's freeway and expressway network, putting the expressway saturation rate at 23 km/1,000 km^2 and the freeway saturation rate at 6.4 km/1,000 km^2. In both cases, this will still be only around 50% of the EU average; (Council of Ministers 2009).

Railroad infrastructure

Poland has a relatively dense railroad network, but its overall length has been on a continuous decline since 1989. In 2012, the length of all railroad routes amounted to 19,299 kilometers (which equals 37,420 kilometers of rails), including 27,863 kilometers of main route and transit station rails, plus 9,557 kilometers of station rails. In 1989 the overall rail length was 24,000 kilometers; (PKP PLK).

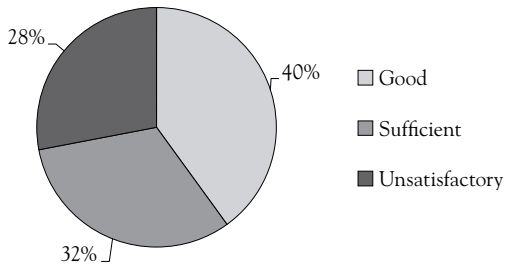
The reduction in the length of Polish railroads stems from a change in their function and role in contemporary Poland compared with 20 years ago, when trains were used by over 1 billion passengers each year. In 2012, trains carried 272 million passengers, according to preliminary data, up from 264 million in 2011 and a low of 258 million in 2005.

The reduction in the overall length of the network was not accompanied by an improvement in its quality. As routes in the poorest condition were usually abandoned, the quality improvement effect was most often purely statistical. In reality, the railway sector suffered from chronic underinvestment for most of the period after 1989, as the main priority was to expand the road network and related infrastructure due to the rapid growth of road transport in the case of both passengers and cargo.

Recognition of the need to provide a more balanced transportation system in Poland came only in the last few years, with a particular focus on the development and improvement of railway-related services. Therefore, more money will be spent on expansion of the railway sector at the expense of road infrastructure.

About 40% of the railroad network is in good condition (Figure 5). This is thanks to factors including the extensive use of wooden ties (around 21.9 million of these are still in use) with a theoretical life span of 18–21 years. The bad news is that 70.3% of these ties are already beyond their permissible life span.

Figure 6
Condition of Poland's railroad network



Source: PKP PLK SA.

The government plans to build 350 kilometers of high-speed railroads for trains traveling in excess of 160 kph by the end of the decade. All province capitals will be

connected by routes allowing passenger trains to achieve an average speed of 100 kph (in 2008 such connections existed only between four province seats).

The railroad sector played an important role in Poland's preparations for the Euro 2012 soccer championship in June. The modernization program was aimed primarily at adapting the lines' parameters to a speed of 160 kph (for example on routes connecting Warsaw and Gdańsk, as well as Warsaw and Terespol), boosting their capacity and shortening travel times. The construction of a railroad connection between downtown Warsaw and the city's Frederic Chopin Airport was a milestone project as well. Despite numerous problems and delays encountered midway, the new line was commissioned in due time to offer direct access from the airport to the city center (the so-called Fan Zone) and the National Stadium, with a trip time of around 20 minutes. A number of train stations, mainly those in the Euro 2012 host cities, were modernized. Warsaw and Poznań also modernized transfer stations in the direct vicinity of the main soccer venues, while Wrocław and Gdańsk constructed new transfer stations near the stadiums, intended mainly for soccer fans (PKP PLK SA).

Railroad infrastructure has unclear growth prospects. On the one hand, the government plans to increase spending on the rail system; on the other, financing is uncertain due to the economic slowdown and the new EU financing framework. The coming years will undoubtedly bring a further reduction in the length of railroads (PKP plans to close 3,000 kilometers of routes), which means the overall length of the railroad network will drop to 16,000 kilometers in 2015. Such a reduction will make it possible to earmark more funds for modernization. The rolling stock will be modernized as well. The first 20 Pendolino trains ordered by PKP Intercity are scheduled to be delivered in June 2013.

Airport infrastructure

There are 13 airports serving passengers in Poland. The country's airport infrastructure and air route network is set to develop further because Poland is a large country and has poor quality road and railway connections. Other Central and Eastern European countries are smaller and their regional air transport networks are less well developed. The number of passengers served in Poland continues to grow every year, largely because many Polish citizens have taken jobs in other EU member states after these countries' labor markets fully opened to Polish workers. In 2012 Polish airports handled 24.6 million passengers, 12.6% more than in 2011, when the figure was 21.9 million; (Institute of Tourism).

There are eight cross-regional airports in Poland that are part of the Trans European Transportation Network. These are Warsaw, Gdańsk, Wrocław, Katowice, Poznań, Rzeszów, Cracow, and Szczecin. Two new airports were commissioned in 2012, Modlin near Warsaw and Lublin/Świdnik. Modlin is intended for low-cost carriers. Some of these, including Wizzair and Ryanair, decided to move their Polish bases to Modlin

in 2012, but the winter of 2012/2013 ruined this plan. The Modlin airport was shut down due to runway damage caused by faulty construction and workmanship. The other new airport opened in 2012, Lublin/Świdnik, is the second airport in eastern Poland after Rzeszów. The Lublin/Świdnik airport cost around ZL418 million to build, with ZL144.4 million provided by the European Union under a regional operational program. The new terminal is 11,000 square meters in size and its annual capacity is estimated at 1.1 million passengers.

In the course of preparations for the Euro 2012 tournament, four airports in the host cities invested over ZL1.7 billion between them. The most expensive expansion program was carried out in Warsaw, while Wrocław topped the list in terms of cost per passenger. The total amount of air transport-related investment in Poland has exceeded ZL6 billion over the past six years. By 2015, expenditure on investment projects in the eight cross-regional airports is expected to reach ZL4.75 billion, with EU co-financing at around ZL2.92 billion.

According to forecasts, the number of passengers served by Polish airports will increase by 6.8% to 26.3 million in 2013. Passenger traffic at Polish airports is expected to grow to 30 million in 2015 and around 41 million in 2020 (Institute of Tourism 2013). However, according to the Ministry of Transport, Polish airports are expected to serve 41 million passengers in 2020, twice as many as in 2008. By the end of the decade they will be capable of handling 60 million tons of cargo, 9% more than in 2010. Due to the noticeable slowdown in economic growth in Poland, these optimistic figures should be treated conservatively.

In terms of Poland as a whole, Podlaskie and Warmińsko-Mazurskie provinces will remain the only regions without direct access to airport infrastructure. In this context, the government is considering whether to build an airport in Szymany. Apart from modernizing the airports themselves, investment priorities for the coming years include building rail and road connections between passenger and cargo airports on the one hand, and city centers and major transportation network interchanges on the other. Considerable amounts will be also spent on creating an airport infrastructure suited to handling cargo and offering appropriate connections with the rail or road transport system (Ministry of Transport 2012).

Inland shipping and seaports

Compared to Western countries as well as its peers in Central and Eastern Europe (Hungary, the Czech Republic, Slovakia), Poland's inland shipping system is severely underdeveloped. The total length of Poland's inland waterways was 3,660 kilometers in 2012, a figure that has remained unchanged for many years. Only around 91% of these waterways (3,347 kilometers) were in actual use. Of this, only 206 kilometers (or around 5.5%) are international waterways. Inland shipping accounted for only 0.3% of the total amount of cargo handled in 2010, down from 0.7% in 2008.

Only two rivers in Poland, the Oder and the Vistula, are of economic value for the transportation sector. The Oder Waterway (*Odrzańska Droga Wodna*), along with the Gliwice and Kędzierzyn Channels, is the most heavily used of all the routes, but the upper and lower sections of the Oder are not navigable for most of the navigation season. The Vistula river is most frequently used in its upper section as well as in the lower section between Płock and the Włocławek dam, and between Tczew and the estuary at the Gulf of Gdańsk. Ports form an integral part of the inland waterway system. Not much has been invested in their expansion in recent years, leading to their further degradation (Ministry of Transport 2013).

There are four international seaports in Poland: Gdańsk, Gdynia, Szczecin and Świnoujście, as well as 57 smaller ports and marinas. Eighteen of these serve as sea border crossings. The most important regional ports include Police, Kołobrzeg, Darłowo and Elbląg; (Ministry of Transport 2013). Recent years have brought no improvement in the landside accessibility of ports (roads, railways). This limits the competitiveness of seaports compared with other forms of transportation as well as with their foreign competitors. Other crucial problems of the existing seaport infrastructure include insufficient port basin depths; low permissible pier loads; inadequately developed dock facilities, and considerable depreciation of the remaining port infrastructure.

Power grid infrastructure

The main challenge that the Polish power grid infrastructure faces is slowing down the process of its increased depreciation. The average age of distribution infrastructure components ranges from 27 to 35 years, while the power transmission system is even older. Around 70% of the power stations and lines are fully depreciated; 15% of all power units are more than 50 years old, while 40% are more than 40 years old. Hence, significant investment is needed to create new power production and transmission capacity. Only three large power units were under construction in the last several years, Pątnów II, Łagisza and a unit at the Bełchatów Power Plant.

Funds needed to invest in power infrastructure are expected to come from government-controlled companies. The plan is that around ZL100 billion will be earmarked for this purpose by the mid 2020s:

- new power units and transfer grids – ZL40 billion net, including new units at Turów, Opole, Puławy, Blachownia, Stalowa Wola, Jaworzno, Kozienice and Włocławek, with a combined power rating of around 7,000 MW and a total net value of ZL30 billion;
- gas-related infrastructure – ZL18 billion net, including an LNG terminal, 1,000 kilometers of gas pipelines and expansion of gas storage facilities from 1.63 to 2.9 billion m^3; crude oil infrastructure – ZL1.6 billion net, including the Gdańsk Oil Terminal;
- shale gas exploration – at least ZL5 billion net over the next two years;
- nuclear power plant – around ZL40 billion; (Council of Ministers 2012).

Provisional plans are afoot for the construction of new power units at Turów, Opole, Puławy, Blachownia, Stalowa Wola, Jaworzno, Kozienice and Włocławek. All these projects should commence in 2015 at the latest and be completed by 2020. The total power rating of the new units will be around 7,000 MW, enough to meet about 17% of the country's demand for electricity; (Council of Ministers 2012).

Construction of the LNG terminal is in progress. In 2012, the European Bank for Reconstruction and Development authorized a ZL300 million for the investor, GazSystem SA, to complete the construction project. The terminal is expected to be commissioned in June 2014. That same year will mark the commencement of construction of the north-south gas corridor connecting the LNG terminal in Świnoujście with the gas systems of the Czech Republic, Slovakia, Ukraine and other Southern European states. This will make it possible to improve the cost-effectiveness of LNG imports and increase Poland's energy security. The project is expected to cost around ZL4.5 billion (GazSystem S.A.).

Apart from the enterprises' own funds and commercial financing, power sector projects will also be financed from the EU's structural funds and the Polish Development Investment Program, a new strategic undertaking by the Polish government that involves the sale of some of the government's stakes in public companies. This program will most likely help finance projects by large companies part-owned by government, such as KGHM, PGNiG, Tauron, Lotos, PSE Operator, Grupa Azoty, PERN and Gaz-System. The investment process will also be facilitated by new legislation on the so-called transfer corridors, aimed at enhancing and speeding up the modernization and expansion of the distribution infrastructure, i.e. power lines and gas pipelines.

Conclusions

The year 2012 saw record results in terms of infrastructure projects commissioned in Poland. The process was speeded up by the European soccer championships held in June 2012. This coincided with the extensive use of funding available under the EU's 2007–2013 financial framework. As a result, many new roads, freeways, refurbished railways and train stations were built, as well as airports and airport terminals.

Investment plans for transport infrastructure in 2013 are much more modest. The economic slowdown has finally reached Poland, and EU funding provided under the new EU budget perspective will only be available after 2014–2015. The good news is that Poland has secured around ZL300 billion during EU budget negotiations, an amount making the country the biggest net beneficiary among all member states.

A shift in priorities assigned to individual sectors took place in 2012. Railroads and other forms of collective transportation received more attention at the expense of roads and freeways. This primarily stems from the low effectiveness of funding provided so far, with no breakthrough in the quality of public infrastructure in Poland. The current model of the investment process favors the development of individual (car-based)

transportation. In connection with this, the public administration aims to channel EU funds elsewhere in an attempt to create a more balanced transportation system boosting Poland's international competitiveness.

The year 2012 produced an improvement in the power sector's investment prospects. Substantial funds (more than ZL10 billion) are available for use under the government's Polish Development Investment Program. The funds will be used to assist businesses in which the government is a shareholder, including most of the power sector enterprises.

In the context of transportation infrastructure, various dysfunctions and development barriers are increasingly hampering Poland's development. The most prominent of these include the progressive dispersion of land ownership and the related decision-making weakness of local governments. On an unprecedented scale, the designation of individual pieces of land is being changed in zoning plans from farmland to land intended for construction. As a result, the existing zoning plans provide enough space for 77 million inhabitants, and the target figure (including land to be zoned as housing areas in the future) is 316 million (Hausner 2013). All property owners expect they will be provided with infrastructure and utilities including roads, power lines and municipal systems. As a consequence, Poland's road network is now twice as long as that of Germany, even though Germany has twice as many inhabitants. Extensive urban development is causing the cost of municipal infrastructure expansion to skyrocket. Many investment projects are either misguided (e.g. biking trails not connected with neighboring towns and districts) or excessive (e.g. construction for public funds of sewer lines or roads leading to isolated properties). Such an approach hinders the raising of funds on priority projects and hampers sensible and economically feasible expansion of mass transportation systems, including railways. The increasing regional and municipal development chaos and infrastructure dysfunctions harm Poland's international competitiveness. These barriers cannot be overcome, however, without reforming the rules governing the operations of local government bodies and the principles of regional and municipal planning and government regulatory supervision.

3.3. Science, Technology and Innovation

Beata Michorowska

Scientific research, innovation and technology serve socioeconomic development. They benefit both households and enterprises and are considered to be the primary driving forces behind economic growth and job creation (European Commission, 2012, p. 127).

This subchapter discusses the importance of the research and development sector (R&D) and the innovativeness of Polish enterprises. In the analysis, major science, technology and innovation indicators are used, along with a discussion of key develop-

ment trends. European Union countries (EU27) are used as a point of reference. The assessment also includes regional data.

The importance of R&D activity in Poland and other European Union countries

Gross domestic expenditure on R&D (GERD) is a key measure of research and development activity. When expressed in terms of sources of funding, it shows the level of involvement of a particular type of institutions in creating new knowledge resources in an economy. On the other hand, GERD related to GDP shows the intensity of R&D undertaken.

Figure 7
Gross domestic expenditure on R&D (GERD) by source of funds (in %)

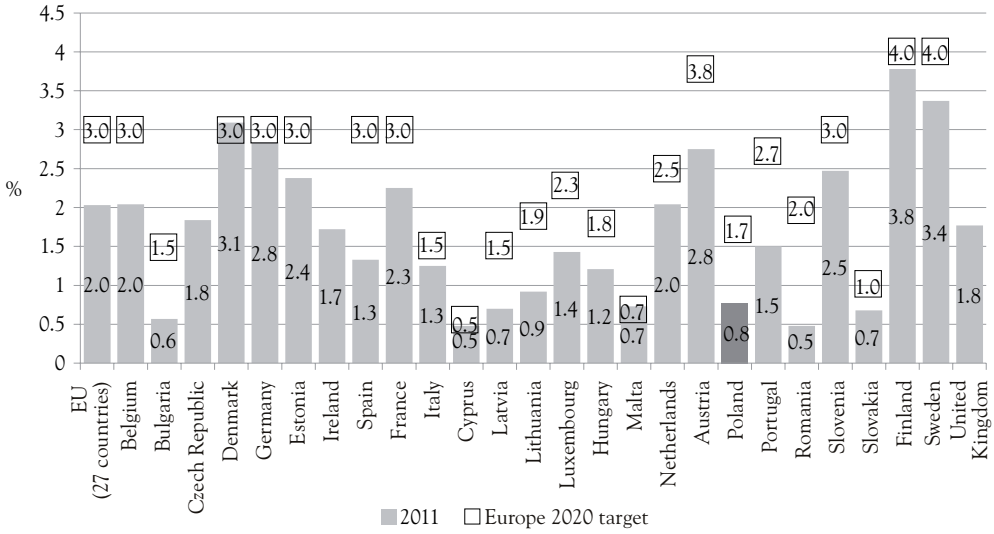
Source: Author's elaboration based on Eurostat data.

The structure of R&D expenditure in Poland differs from the EU average (Figure 7). In Poland, the government sector has been the main source of funds for R&D for years (55.8% in 2011). Business enterprises are far less important in this area (28.1%). The third most important source of R&D funding is entities from abroad (13.4%). The higher education sector and private non-profit institutions play a small role. In the EU as a whole, enterprises are the most important source of funds (53.9%) and the government sector comes next (34.6%).

At the same time, Poland finds it difficult to meet the EU average in terms of the intensity of R&D expenditures. Poland invests only 0.8% of its GDP in research and development, whereas the EU average is 2.0% (Figure 8). Moreover, in the EU's Europe 2020 growth strategy, the 1.7% target set by Poland is still lower than the EU average. Scandinavian countries lead the way in this area; they have already exceeded the EU target for 2020. In 2011, Finland invested 3.8% of its GDP in R&D, Sweden spent 3.4%, and Denmark 3.1%. On the other hand, alongside Poland, other new member countries appear to be the weakest in the EU: Cyprus (0.5%), Romania (0.5%), and Bulgaria (0.6%).

Figure 8

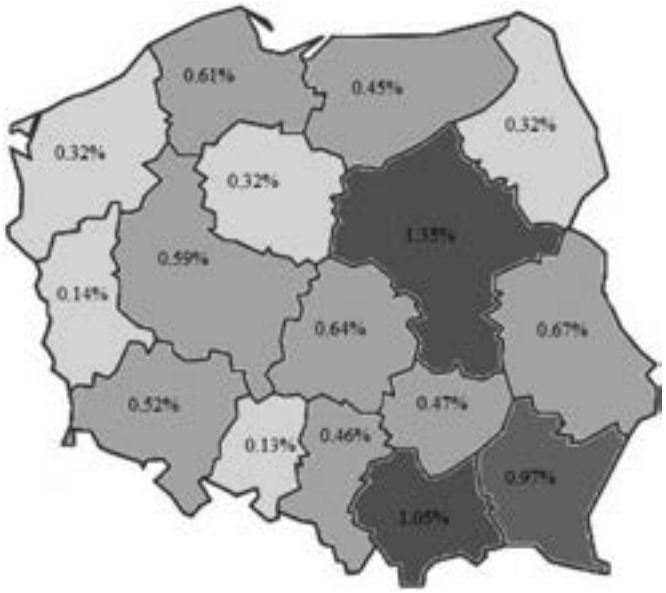
Gross domestic expenditure on R&D in relation to GDP in EU countries in 2011 compared with the Europe 2020 targets (in %)



Source: Author's elaboration based on Eurostat data.

Map 1

Gross domestic expenditure on R&D in relation to GDP, by province, 2010



Source: Author's elaboration based on GUS data, *Bank Danych Lokalnych*.

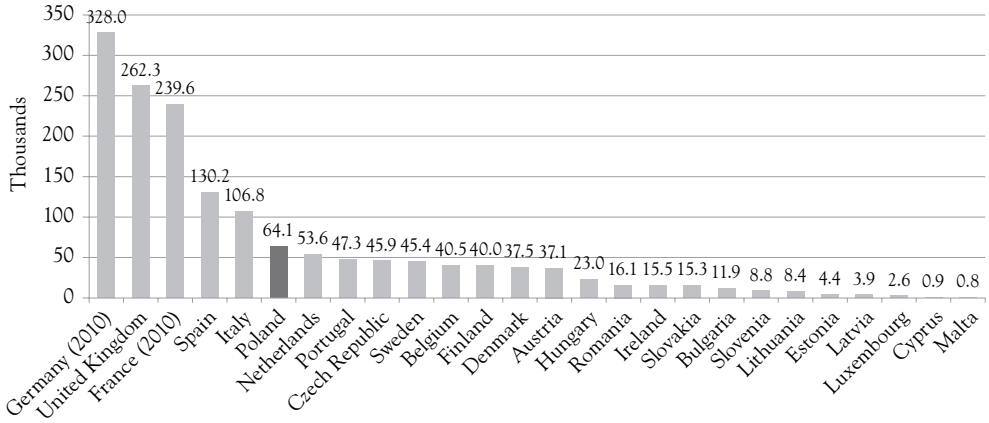
In regional terms (Map 1), there is a distinct concentration of R&D activity in Poland in two provinces. In Mazowieckie province, expenditures amount to 1.35% of the GDP, and in Małopolskie the figure is 1.05%. Podkarpackie province also performs relatively well (0.97%) compared with the national average. In other regions expenditures are lower and range from 0.67% in Lubelskie to 0.13% in Opolskie and 0.14% in Lubuskie.

Another indicator that assesses the state of the R&D sector is the number of researchers in the country (Figure 9). The basic presentation shows the total number of researchers, expressed in full-time equivalents (FTE). This indicator, based on absolute values, puts Poland in sixth place in the EU. The number of researchers in Poland (64,100), however, is much lower than in the largest countries in the bloc: Germany (328,000), Britain (262,300), France (239,600), Spain (130,200) and Italy (106,800), and only slightly higher than in the Netherlands (53,600), for example.

In this context, the approach adopted in Figure 10 better illustrates Poland's weak points. It shows the share of human resources in science and technology (HRST) in the total labor force. The reference to the total labor force sheds new light on the data in Figure 9.

Figure 9

The total number of researchers in EU countries (in thousands, FTE), all sectors of the economy, in 2011

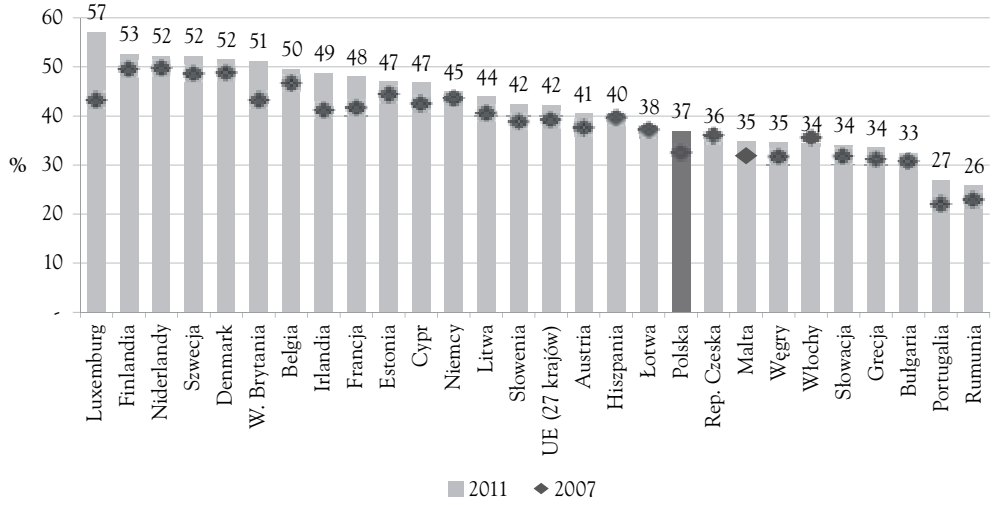


Source: Author's elaboration based on Eurostat data.

In this approach, Poland appears to be much weaker (18th place in the EU27, with an indicator of 35%, below the average for the bloc), although in general the range of indicators for EU countries is not as broad as in Figure 9. Again Scandinavian countries (alongside Luxembourg, with 57%) fare the best (with a 52%–53% share of HRST in the total labor force). Portugal and Romania are the worst performers, with 27% and 26% respectively. Among new EU members, four countries are above the EU average of 42%. These are Estonia and Cyprus (each with 47%), Lithuania (44%), and Slovenia (42%).

Figure 10

Human resources in science and technology as a share of the EU labor force (in %), in 2007 and 2011



Source: Author's elaboration based on Eurostat data.

Map 2

Total number of those employed in the R&D sector by province, 2011 compared to 2007, in thousands

Source: Author's elaboration based on GUS data, *Bank Danych Lokalnych*.

Regionally (Map 2), in terms of the level of employment in the R&D sector, there is a robust concentration of researchers in Poland's Mazowieckie province: 37,400 employees in 2011, an increase of 3,700 over 2007. The number of those employed in R&D in Małopolskie province was less than half that, at 15,300, an increase of 1,500 over 2007. Wielkopolskie comes next, with 13,700, up by 1,040 from 2007, followed by Śląskie, with 12,900, up by 1,900 from 2007. Lubuskie has the smallest number of those employed in R&D, at 1,100; Opolskie and Świętokrzyskie each have 1,600. However, the greatest decrease in the number of those employed in the R&D sector since 2007 was noted in Łódzkie, Kujawsko-Pomorskie and Zachodniopomorskie provinces. The drop in Łódzkie was by 370, and Kujawsko – Pomorskie and Zachodniopomorskie each lost 360 R&D workers.

The regional characteristics presented in absolute terms on Map 2 can also be shown in relative terms – see Table 5 below. The largest number of those employed in the R&D sector per 1,000 of economically active population is noted in Mazowieckie province (9.8 in 2011), followed by Małopolskie province, which had seven R&D employees per 1,000 of economically active population. In relative terms, statistics look somewhat better for Pomorskie and Dolnośląskie provinces, where the indicators were 5.6 and 5.2 respectively in 2011.

Compared with 2007, the most favorable changes took place in Podkarpackie (where the indicator grew by 1.3), Małopolskie (up by 1.2) and Podlaskie (+0.9). On the other hand, Kujawsko-Pomorskie and Zachodniopomorskie reported a decrease in their indicators (by 0.6 and 0.2 respectively).

Table 5
Intensity of R&D employment by province, in 2007 and 2011

	Those employed in the R&D sector per 1,000 of economically active population (FTE[a])	
	2007	2011
Łódzkie	3.2	3.4
Mazowieckie	9.6	9.8
Małopolskie	5.8	7.0
Śląskie	3.3	3.6
Lubelskie	3.1	3.1
Podkarpackie	1.6	2.9
Podlaskie	2.4	3.3
Świętokrzyskie	1.2	1.5
Lubuskie	1.7	1.7
Wielkopolskie	4.6	4.6
Zachodniopomorskie	3.2	3.0

Dolnośląskie	4.6	5.2
Opolskie	2.4	2.4
Kujawsko-Pomorskie	3.7	3.1
Pomorskie	5.0	5.6
Warmińsko-Mazurskie	2.0	2.6

[a] in full-time equivalents (FTE)

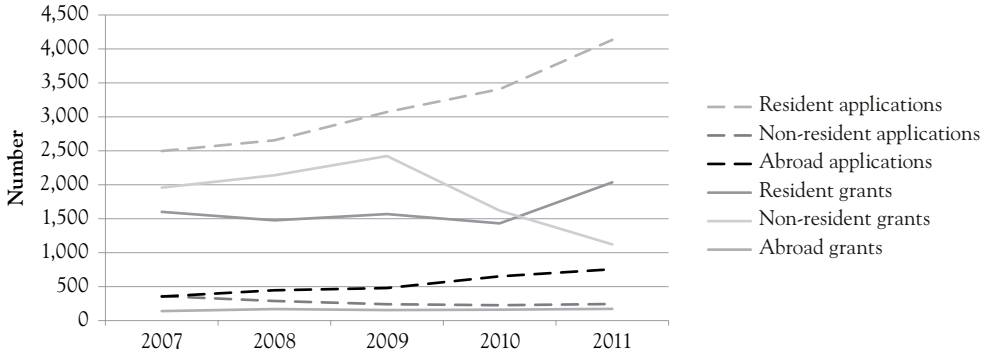
Source: Author's elaboration based on GUS data, *Bank Danych Lokalnych*.

Intellectual rights protection – patents

Intellectual rights protection, in particular in the form of patents, makes it possible to more efficiently allocate scientific achievements in an economy (European Commission, 2012 b). Patent statistics show the actual effectiveness of R&D work conducted.

The number of patent applications has increased in Poland in recent years, thanks to growing patent activity among residents (Figure 11). A slight decrease has been noted, however, in applications filed by non-residents, accompanied by a moderate rise in the number of Polish applications abroad. Similar trends have been noted for patents granted. In 2011, compared with 2010, the number of patents granted to residents grew significantly (from 1,430 to 2,034); on the other hand, the number of patents granted to non-residents has fallen since 2009 (from 2,422 to 1,123). The number of patents granted to Polish residents by foreign offices is still insignificant, at around 170 annually. In general, Poland accounted for under 0.2% of the total number of patent applications worldwide in 2010, far less than other EU countries. For example, Germany registered almost 60,000 patent applications in 2011, Britain more than 22,000, and France more than 16,000 (according to WIPO data).

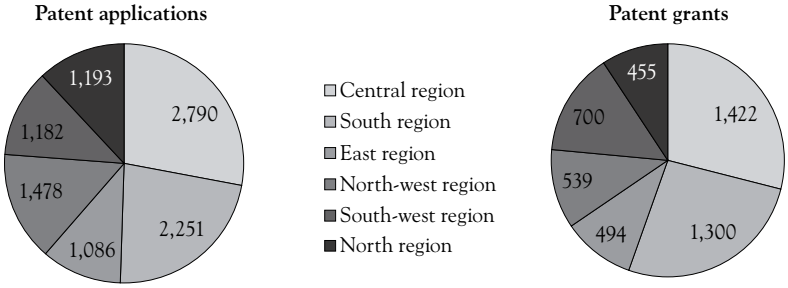
Figure 11
Patent applications and patents granted in Poland by origin of the author, 2007–2011



Source: Author's elaboration based on WIPO data, *Statistical Country Profiles*.

The regional approach again points to the existence of two key knowledge development centers in Poland (Figure 12): the central region with Mazowieckie province and the southern region with a dominant Śląskie province. These two regions accounted for more than 50% of patent applications registered with the Polish Patent Office between 2009 and 2011 and were granted more than 55% of all patents in the country in this period.

Figure 12
Patent applications and patents granted in Poland by region, in 2009–2011

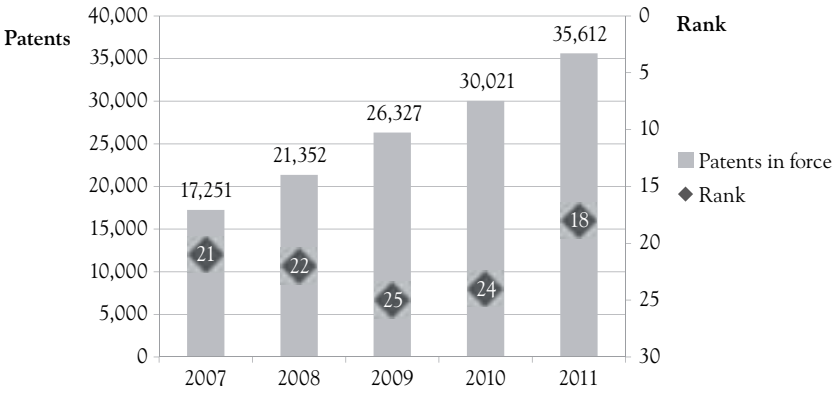


Central region – Łódzkie, Mazowieckie; South region – Małopolskie, Śląskie; East region – Lubelskie, Podkarpackie, Podlaskie, Świętokrzyskie; North-west region – Lubuskie, Wielkopolskie, Zachodniopomorskie; South-west region – Dolnośląskie, Opolskie; North region – Kujawsko-Pomorskie, Pomorskie, Warmińsko-Mazurskie.

Source: Author's elaboration based on GUS data, *Bank Danych Lokalnych.*

In general, Poland has 35,612 patents in force, ranking it 18th in the World Intellectual Property Organization (WIPO) league table in 2011. The number of patents in force in Poland has grown steadily since 2007 (Figure 13).

Figure 13
Polish patents in force and Poland's rank in the WIPO league table



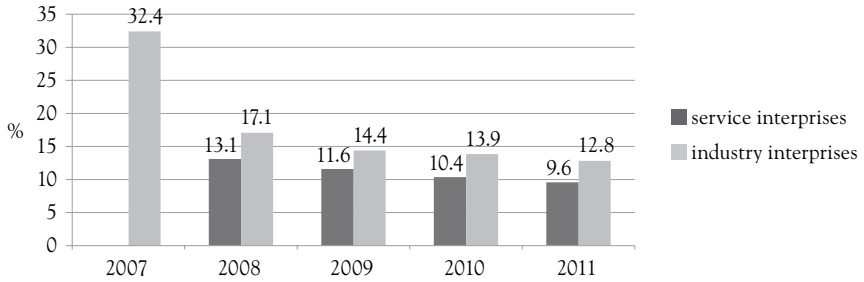
Source: Author's elaboration based on WIPO data, *Statistical Country Profiles.*

Innovative activity of enterprises in Poland

Innovations translate the results of R&D work into market advancements. Innovations are introduced by enterprises aiming at efficiency and competitiveness improvements, and also offer an opportunity to start new businesses and thus create new jobs. For this reason, the innovativeness of enterprises is one of the key determinants of a country's economic development and competitiveness.

Therefore, it is disturbing to observe the downward trend in the percentage of enterprises (in both services and industry) investing in innovation in Poland. This trend has been in place since 2007. In 2011, only 12.8% of industrial enterprises and 9.6% of those in the service sector invested in innovation (Figure 14).

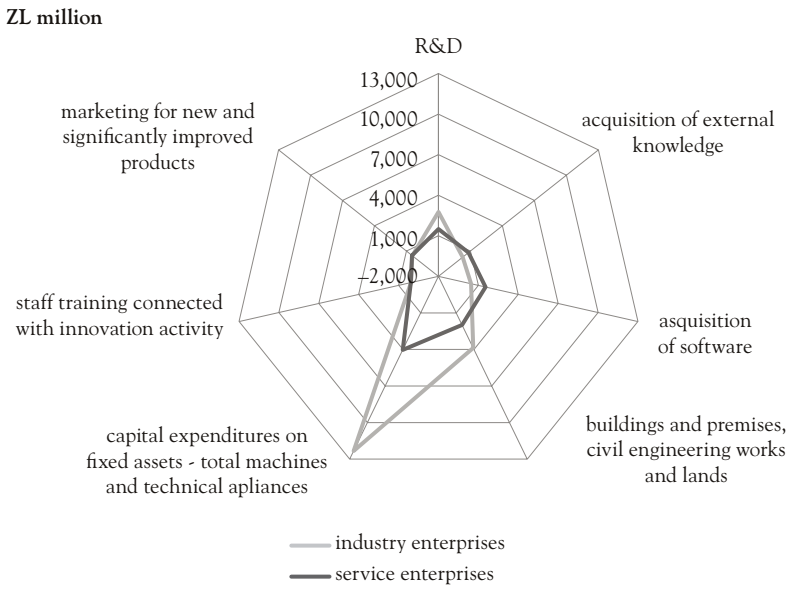
Figure 14
Percentage of enterprises investing in innovation in Poland, 2007–2011



Source: Author's elaboration based on GUS data, *Bank Danych Lokalnych*.

Among enterprises spending funds on innovation, most investment projects concerned fixed assets: machines and equipment (ZL12.3 billion in industry and ZL4 billion in the service sector); buildings, civil engineering work and land (almost ZL3.9 billion in industry and almost ZL2 billion in the service sector) (Figure 15). Research and development claimed ZL2.7 billion in industry and close to ZL1.5 billion in the service sector. Funds spent on the purchase of new software totaled ZL 1.5 billion in the service sector and ZL500 million in industry. The acquisition of external knowledge cost ZL300 million in industry and ZL800 million in the service sector. Marketing for new and significantly improved products came to ZL900 million and staff training related to innovation totaled ZL200 million.

Figure 15
Innovation expenditure by enterprises by type of innovative activity, in 2011[a]



[a] data for service enterprises for 2010

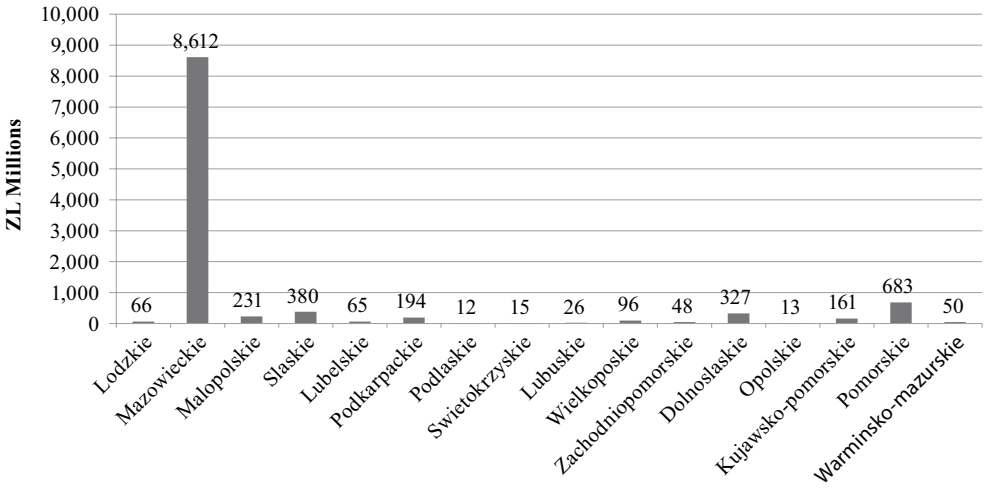
Source: Author's elaboration based on GUS data, *Bank Danych Lokalnych*.

There is a complete domination of Mazowieckie province in regional terms. Figure 16 shows that enterprises active in this province account for almost 80% of total innovation expenditure nationwide.

Enterprises' own funds are the main source of funding for innovation in Poland (Figure 17). The service sector is 86.3% reliant on its own funds and industry 78.5%. In the service sector, only 10.6% of enterprise innovative activity is financed with bank loans; for industry the figure is 11.1%. In addition, industry acquires 9.1% of the funds from abroad; in the service sector, the figure is 1.9%.

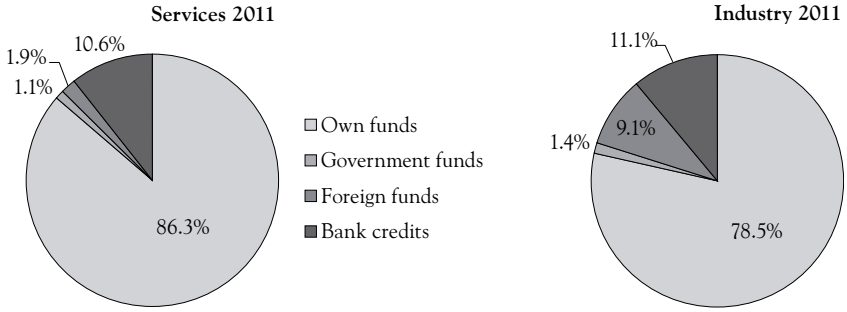
The need to finance innovation with one's own funds, combined with difficulties in obtaining external funds, is a significant barrier to enhancing the innovativeness of Polish enterprises. The lack of funding from external sources interested in investing in innovation determines the low innovativeness of Polish enterprises and the inadequate structure of innovative activity undertaken.

Figure 16
Enterprise innovation expenditure by province, in 2011



Source: Author's elaboration based on GUS data, *Bank Danych Lokalnych*.

Figure 17
Enterprise innovation expenditure in Poland by source of funds, in 2011



Source: Author's elaboration based on WIPO data, *Statistical Country Profiles*.

As not all enterprises investing in innovative activity in a specific year introduce innovations, the percentage of innovative enterprises is even lower than suggested by the data on firms investing in innovative activities (Figure 14). In the comparison shown in Figure 18, Mazowieckie province has lost its otherwise dominant role.

Figure 18

Innovative enterprises in provinces by type of economic activity and in Poland as a whole by type of innovation implemented, in 2011

Source: Author's elaboration based on WIPO data, *Statistical Country Profiles*.

In Poland, 16.1% of industrial enterprises and 11.6% of service enterprises introduced at least one product or process innovation to the market in the studied period; 11.2% of industrial enterprises introduced product innovations and 12.4% introduced process innovations. On the other hand, among service enterprises only 11.6% were innovative; 6% introduced product innovations and 9% process innovations.

A closer look at the regional level reveals a change in the status of Mazowieckie province. Although in this province there is almost no differentiation between the innovativeness of the service sector and industry, Mazowieckie is below the national average, especially in the case of innovativeness among industrial enterprises. Moreover, in 2011, Mazowieckie province was not the leader in the service sector, either (with a showing of 13.8%). A higher percentage of innovative enterprises was noted in Pomorskie province (14.1%), and only slightly smaller in Śląskie (13.2%). On the other hand, the largest share of innovative enterprises was recorded in Podkarpackie province (21%) and only slightly smaller in Opolskie (20.1%). Małopolskie and Lubelskie provinces also had relatively high figures (at 19.5% and 19.3% respectively).

Conclusions

Summing up, the position of the R&D sector and innovation intensity in Poland are not satisfactory. With only 0.8% of its GDP spent on R&D, Poland is below the

EU average. Moreover, there are no signs that growing R&D expenditure is translating into a growing percentage of innovative enterprises and those investing in innovation. In fact, there has been a decrease in innovative activity in the country.

These facts can be partially explained by the unfavorable structure of R&D financing sources. Generally, investment projects launched as a result of decisions made by public institutions tend to be less effective and less well-adjusted to the needs of the economy than those financed directly by enterprises. Moreover, the low share of external funding (bank loans and foreign sources) in enterprises' overall funds decreases the scope of projects undertaken or even enterprises' readiness to invest in innovations.

On the other hand, a positive trend can be observed in patenting activity in Poland. The numbers of patent applications and patent grants are growing, though they are still far from impressive in global terms.

Regional characteristics show a definite concentration of enterprise research and development activity in Mazowieckie province. R&D expenditure in Mazowieckie is the highest, and the province also boasts the largest number of researchers employed (both directly and indirectly), which results in the highest level of patenting activity there. Nonetheless, Mazowieckie is not the leader in terms of enterprise innovativeness. While the province's innovation performance in the service sector is relatively good, in manufacturing it is relatively low.

The data provided in this subchapter indicate that there is still a need for further improvement in research and development in terms of effectiveness, in addition to better cooperation between science and business and support for innovative enterprises.

3.4. Changes in Total Factor Productivity

Mariusz Próchniak

The analysis of total factor productivity (TFP) is conducted using the growth accounting framework. Growth accounting is an empirical exercise aimed at calculating how much economic growth is caused by changes in measurable factor inputs and in the level of technology. The level of technology, which cannot be directly observed, is measured as a residual. This means that we define technical progress as that part of economic growth which cannot be explained by changes in measurable factor inputs. This residual technical progress is interpreted as the increase in the total productivity of the inputs, denoted as TFP.

The basic model of growth accounting, which is used in this edition of the report, 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[11].

The analysis covers 10 Central and Eastern European countries, EU10 (Poland, Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Romania, Slovakia, and Slovenia) in the 2005–2012 period. The period includes the years of EU membership for most of the EU10 countries. A new element in this edition of the report is that the analysis is expanded to include sectoral growth accounting. The estimation of TFP at the sector level allows us to better understand the nature of technical progress observed at the country level; from the methodological perspective, it is also an interesting applicative extension of the growth accounting framework; equation (1) is used to estimate TFP at both the country and sector levels. The sector analysis covers the 2001–2011 period and compares Poland with three EU10 countries (the Czech Republic, Slovakia, and Hungary) as well as four Western European economies (France, Germany, Italy, and Spain).

The following time series were collected for the purposes of our analysis: (a) the growth rate of GDP, (b) the growth rate of labor, and (c) the growth rate of physical capital. For the analysis at the country level, the data are derived from the following sources: the World Bank (World Bank, 2013), the International Monetary Fund (IMF, 2013), and Eurostat (2013), while the sector analysis is entirely based on Eurostat data. In this round of the research, we updated all the time series of the analyzed variables, so the results may differ from those presented in the previous editions of the report. Of course, this remark does not apply to the sector analysis, which is carried out for the first time and all the results are new.

TFP analysis at the country level

The rate of economic growth is the real annual GDP growth rate. The growth rate of labor is the change in employment according to the Eurostat data (since the figures for 2012 cover only three quarters, when calculating the 2012 employment dynamics, we compare these figures with those for the first three quarters of 2011 so as to achieve comparability with the corresponding period of the previous year). The amount of physical capital is calculated using the perpetual inventory method with gross fixed capital formation measuring investment outlays. Moreover, we assume a 5% deprecia-

[11] The methodology of the research is described in detail in the 2008 edition of the report (Próchniak, 2008). In the latest edition, the analysis included three measurable factors of production: labor, physical capital and human capital (Próchniak, 2012). Rapacki and Próchniak (2006) carry out the growth accounting framework for the whole group of post-socialist countries.

tion rate and an initial capital/output ratio of 3.[12] (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). We also assume that the share of physical capital in income is constant at 0.5, implying that the share of labor in income is 0.5 as well.[13]

Before analyzing productivity in Poland and comparing Poland's performance with that of other new EU member states, some assumptions can be made about the expected outcomes. We suppose that most economic growth in EU10 countries is due to technological progress and does not result from changes in physical capital and labor inputs. Under central planning, the resources were fully exploited. Officially, unemployment did not exist and the total amount of physical capital was used in production. The move to a market-based system required a more efficient use of factor inputs. As a result, despite the initial recession, rapid economic growth could be achieved along with a decrease in labor inputs and only a partial exploitation of physical capital. This trend was presumably maintained long after the end of the transformation recession, even into the second decade of the transition period. This means that TFP was probably the main source of economic growth. Nevertheless, the part of TFP due to higher labor productivity should be treated as the human capital contribution to economic growth, and not that of TFP. The detailed results on the impact of human capital were presented in the previous edition of the report (however, we must be aware that the measure of human capital adopted in that study, i.e. the level of labor force education, is only one of many possible human capital indicators, and one should take it into account when interpreting the previously published results). In this edition of the report, human capital is not included, and TFP will also include the human capital contribution to economic growth.

Table 6 shows the detailed breakdown of economic growth. The values in the respective cells of the table show: (a) the growth rate of labor (*L*), physical capital (*K*), TFP, and GDP, (b) the contribution of labor, physical capital, and TFP to economic growth in percentage points, (c) the contribution of labor, physical capital, and TFP to economic growth in percentage terms. Tables 7 and 8 sum up the data given in Table 6. Table 7 shows the average values of the TFP growth rates in the EU10 countries throughout the 2005–2012 period as well as in three different subperiods: (a) in the years before the global financial crisis (2005-2007), (b) during the crisis or economic slowdown (2008-2009), (c) in the 2010–2012 period, which for some countries marked a time of recovery while for others it was a period of continued poor macroeconomic performance.

12 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.

13 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, according to a suggestion by Welfe (2001), this share has been increased to 0.5 in order to fit better the real values.

Table 6
Labor, physical capital, and TFP contribution to economic growth, 2005–2012

		2005			2006			2007			2008			2009			2010			2011			2012		
		growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)	growth (%)	contr. (% points)	contr. (%)
Bulgaria	L	2.0	1.0	16	4.3	2.1	33	4.6	2.3	36	3.3	1.7	27	–3.2	–1.6	29	–6.2	–3.1	–785	–3.4	–1.7	–101	–0.7	–0.3	–33
	K	3.3	1.6	26	5.5	2.7	42	6.3	3.1	49	6.8	3.4	55	8.5	4.3	–78	5.3	2.6	669	3.1	1.6	94	2.7	1.3	133
	TFP	3.7	3.7	58	1.6	1.6	25	1.0	1.0	16	1.1	1.1	18	–8.1	–8.1	149	0.8	0.8	216	1.8	1.8	107	0.0	0.0	1
	GDP	6.4	6.4	100	6.5	6.5	100	6.4	6.4	100	6.2	6.2	100	–5.5	–5.5	100	0.4	0.4	100	1.7	1.7	100	1.0	1.0	100
Czech Rep.	L	1.6	0.8	12	1.3	0.7	10	1.9	1.0	17	1.6	0.8	26	–1.4	–0.7	15	–1.0	–0.5	–18	0.4	0.2	12	–0.4	–0.2	19
	K	4.0	2.0	30	4.2	2.1	30	4.4	2.2	38	5.2	2.6	83	5.1	2.5	–54	3.5	1.8	64	3.3	1.7	99	3.0	1.5	–148
	TFP	3.9	3.9	58	4.2	4.2	60	2.6	2.6	45	–0.3	–0.3	–10	–6.5	–6.5	139	1.5	1.5	54	–0.2	–0.2	–11	–2.3	–2.3	228
	GDP	6.8	6.8	100	7.0	7.0	100	5.7	5.7	100	3.1	3.1	100	–4.7	–4.7	100	2.7	2.7	100	1.7	1.7	100	–1.0	–1.0	100
Estonia	L	2.0	1.0	11	6.4	3.2	32	1.4	0.7	9	0.2	0.1	–2	–9.2	–4.6	32	–4.2	–2.1	–92	6.7	3.3	44	2.8	1.4	57
	K	7.1	3.5	40	8.0	4.0	40	9.8	4.9	66	9.8	4.9	–133	6.6	3.3	–23	1.7	0.9	38	1.1	0.6	7	2.6	1.3	54
	TFP	4.3	4.3	49	2.9	2.9	29	1.9	1.9	25	–8.6	–8.6	235	–13.0	–13.0	91	3.5	3.5	154	3.7	3.7	49	–0.3	–0.3	–11
	GDP	8.9	8.9	100	10.1	10.1	100	7.5	7.5	100	–3.7	–3.7	100	–14.3	–14.3	100	2.3	2.3	100	7.6	7.6	100	2.4	2.4	100
Hungary	L	0.0	0.0	0	0.7	0.4	9	–0.1	0.0	–48	–1.2	–0.6	–66	–2.5	–1.3	18	0.0	0.0	–1	0.8	0.4	24	1.8	0.9	–88
	K	3.5	1.8	44	3.6	1.8	46	3.1	1.5	1,546	3.2	1.6	175	3.1	1.6	–23	2.0	1.0	80	1.2	0.6	36	0.7	0.4	–34
	TFP	2.2	2.2	55	1.7	1.7	44	–1.4	–1.4	–1,398	–0.1	–0.1	–9	–7.1	–7.1	105	0.3	0.3	21	0.7	0.7	40	–2.3	–2.3	223
	GDP	4.0	4.0	100	3.9	3.9	100	0.1	0.1	100	0.9	0.9	100	–6.8	–6.8	100	1.3	1.3	100	1.7	1.7	100	–1.0	–1.0	100

Latvia	L	1.6	0.8	8	5.2	2.6	23	2.8	1.4	15	0.6	0.3	–9	–12.6	–6.3	35	–4.3	–2.1	641	–8.4	–4.2	–77	2.7	1.4	31
	K	7.0	3.5	35	8.9	4.4	40	9.8	4.9	51	9.5	4.8	–146	6.5	3.2	–18	1.8	0.9	–262	0.3	0.2	3	2.2	1.1	24
	TFP	5.8	5.8	58	4.1	4.1	37	3.3	3.3	34	–8.3	–8.3	254	–14.7	–14.7	83	0.9	0.9	–279	9.5	9.5	174	2.0	2.0	45
	GDP	10.1	10.1	100	11.2	11.2	100	9.6	9.6	100	–3.3	–3.3	100	–17.7	–17.7	100	–0.3	–0.3	100	5.5	5.5	100	4.5	4.5	100
Lithuania	L	2.9	1.4	19	1.7	0.9	11	2.3	1.2	12	–0.9	–0.5	–16	–6.8	–3.4	23	–5.1	–2.5	–177	–6.5	–3.2	–55	2.1	1.0	38
	K	4.4	2.2	28	5.0	2.5	32	6.4	3.2	33	8.2	4.1	140	6.5	3.3	–22	1.5	0.7	52	1.4	0.7	12	1.7	0.9	32
	TFP	4.1	4.1	53	4.4	4.4	57	5.4	5.4	55	–0.7	–0.7	–24	–14.7	–14.7	99	3.2	3.2	225	8.4	8.4	143	0.8	0.8	31
	GDP	7.8	7.8	100	7.8	7.8	100	9.8	9.8	100	2.9	2.9	100	–14.8	–14.8	100	1.4	1.4	100	5.9	5.9	100	2.7	2.7	100
Poland	L	2.3	1.2	32	3.4	1.7	27	4.4	2.2	33	3.7	1.8	36	0.4	0.2	13	0.6	0.3	8	1.1	0.5	12	–0.9	–0.4	–18
	K	1.6	0.8	22	1.9	1.0	15	2.8	1.4	21	3.9	2.0	38	4.4	2.2	136	3.9	2.0	50	3.6	1.8	41	3.3	1.6	70
	TFP	1.6	1.6	46	3.6	3.6	57	3.2	3.2	47	1.3	1.3	26	–0.8	–0.8	–49	1.6	1.6	42	2.0	2.0	46	1.1	1.1	49
	GDP	3.6	3.6	100	6.2	6.2	100	6.8	6.8	100	5.1	5.1	100	1.6	1.6	100	3.9	3.9	100	4.3	4.3	100	2.4	2.4	100
Romania	L	0.1	0.1	2	1.9	1.0	12	0.7	0.3	5	0.2	0.1	1	–1.3	–0.7	10	0.0	0.0	1	–1.1	–0.6	–22	1.2	0.6	63
	K	3.3	1.6	39	3.2	1.6	20	3.7	1.9	29	6.0	3.0	41	7.3	3.7	–56	5.2	2.6	–158	4.9	2.5	100	4.9	2.5	261
	TFP	2.5	2.5	59	5.3	5.3	67	4.1	4.1	65	4.3	4.3	58	–9.6	–9.6	146	–4.2	–4.2	257	0.5	0.5	22	–2.1	–2.1	–223
	GDP	4.2	4.2	100	7.9	7.9	100	6.3	6.3	100	7.3	7.3	100	–6.6	–6.6	100	–1.6	–1.6	100	2.5	2.5	100	0.9	0.9	100
Slovakia	L	2.2	1.1	16	3.9	2.0	24	2.4	1.2	11	3.2	1.6	28	–2.8	–1.4	28	–2.1	–1.0	–25	1.5	0.7	22	–0.7	–0.4	–14
	K	3.5	1.8	27	4.7	2.3	28	5.1	2.6	24	5.5	2.7	48	5.0	2.5	–51	2.7	1.3	32	3.4	1.7	51	2.7	1.4	52
	TFP	3.8	3.8	57	4.0	4.0	48	6.7	6.7	64	1.4	1.4	24	–6.1	–6.1	123	3.9	3.9	93	0.9	0.9	27	1.6	1.6	62
	GDP	6.7	6.7	100	8.3	8.3	100	10.5	10.5	100	5.8	5.8	100	–4.9	–4.9	100	4.2	4.2	100	3.3	3.3	100	2.6	2.6	100
Slovenia	L	0.6	0.3	8	1.3	0.6	11	2.5	1.2	18	1.1	0.6	16	–1.5	–0.8	10	–1.5	–0.7	–60	–3.1	–1.5	–258	–1.4	–0.7	31
	K	3.7	1.9	47	3.7	1.8	31	4.2	2.1	30	5.0	2.5	74	5.3	2.6	–34	2.5	1.2	101	1.7	0.9	142	0.9	0.4	–20
	TFP	1.8	1.8	46	3.4	3.4	58	3.6	3.6	52	0.3	0.3	9	–9.7	–9.7	124	0.7	0.7	60	1.3	1.3	216	–2.0	–2.0	89
	GDP	4.0	4.0	100	5.9	5.9	100	7.0	7.0	100	3.4	3.4	100	–7.8	–7.8	100	1.2	1.2	100	0.6	0.6	100	–2.2	–2.2	100

Source: Author's calculations.

Table 8 shows the values of TFP contribution to economic growth for the same subperiods as in Table 7. Both tables also provide the minimum and maximum figures for a given variable for the entire period.

We have divided the analyzed period into various subperiods because the global financial crisis and economic recession could disrupt the mechanisms driving the economy and lead to changes in trends and relationships 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.[14] As a result, the statistics, which include both contractionary and expansionary periods, may be unrepresentative. This mainly applies to 2009, when the fall of GDP in some countries was enormous.

The data in Tables 6–8 yield a number of interesting findings. Over the entire period, the highest TFP growth rate was recorded in Slovakia, Poland, and Lithuania. In 2005–2012, total factor productivity grew at an average rate of 2.0% per annum in Slovakia, 1.7% in Poland, and 1.4% in Lithuania. In the remaining EU10 countries, the growth of productivity was much slower, at about zero percent. The Czech Republic, Latvia, Bulgaria and Romania recorded TFP growth rates of 0.4%, 0.3%, 0.2% and 0.1% per annum respectively during 2005–2012, while Slovenia, Estonia and Hungary noted a fall in TFP on average by 0.1%, 0.7% and 0.7% on a yearly basis respectively.

The highest variance of TFP growth rates in the analyzed period was noted in the Baltic states. The large differences in how productivity grew in these countries to a large extent results from high fluctuations in GDP growth rates. The Baltic states recorded rapid economic growth before the global crisis, 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, the differentiation of TFP changes in the Baltics was the highest one among EU10 countries. The difference between the highest and the lowest TFP growth rate was 24.2 percentage points in Latvia (ranging between 14.7% and 9.5%), 23.1 p.p. in Lithuania, and 17.3 p.p. in Estonia. Poland, which exhibited relatively regular growth in output during 2005–2012 and was the only EU country to avoid recession, recorded exceptionally small variations in TFP, at 4.4 percentage points (with TFP growth ranging from –0.8% in 2009 to 3.6% in 2006).

The percentage TFP contributions in most countries (except Poland and Hungary) ranged between 51% and 82% during 2005–2012. This is in line with our research hypothesis as to the important role of TFP in the economic growth of the countries under study. In Poland, the TFP contribution to economic growth was 33% on average during 2005–2012. Hungary recorded a spurious outcome of –115%, resulting from a very slow rate of GDP growth: 0.1% in 2007. Dividing the change in TFP (–1.4%) by 0.1% yields an unbelievably high result (in absolute terms), which is entirely spurious. Similarly, the result for Poland is artificially biased downwards because, in 2009, Poland recorded an

[14] For example, an increase in TFP has a positive impact on economic growth during an expansionary period but a negative impact during a recession.

economic growth rate of 1.6%. That, given the negative growth rate of TFP (–0.8%), yielded a negative TFP contribution to economic growth (–49%).

Table 7
TFP growth rates (%)

Country	The whole 2005–2012 period			2005–2007	2008–2009	2010–2012
	Mean	Min.	Max.	Mean	Mean	Mean
Bulgaria	0.2	–8.1	3.7	2.1	–3.5	0.9
Czech Republic	0.4	–6.5	4.2	3.6	–3.4	–0.3
Estonia	–0.7	–13.0	4.3	3.0	–10.8	2.3
Hungary	–0.7	–7.1	2.2	0.8	–3.6	–0.4
Latvia	0.3	–14.7	9.5	4.4	–11.5	4.1
Lithuania	1.4	–14.7	8.4	4.7	–7.7	4.2
Poland	1.7	–0.8	3.6	2.8	0.3	1.6
Romania	0.1	–9.6	5.3	4.0	–2.6	–1.9
Slovakia	2.0	–6.1	6.7	4.9	–2.3	2.1
Slovenia	–0.1	–9.7	3.6	2.9	–4.7	0.0

Source: Author's calculations.

Table 8
TFP contribution to economic growth (%)

Country	The whole 2005–2012 period			2005–2007	2008–2009	2010–2012
	Mean	Min.	Max.	Mean	Mean	Mean
Bulgaria	74	1	216	33	83	108
Czech Republic	71	–11	228	55	65	90
Estonia	78	–11	235	34	163	64
Hungary	–115	–1398	223	–433	48	95
Latvia	51	–279	254	43	169	–20
Lithuania	80	–24	225	55	37	133
Poland	33	–49	57	50	–11	46
Romania	56	–223	257	64	102	18
Slovakia	62	24	123	57	74	61
Slovenia	82	9	216	52	67	122

Source: Author's calculations.

Given the large differentiation of the results in the studied period, due to an unstable economic situation in Europe and the world, the calculations for individual subperiods yield a better assessment of the nature of the TFP changes. The EU10 countries recorded very high TFP growth rates in the pre-crisis period. The highest growth rates of productivity were noted by two Baltic states, Latvia and Lithuania, as well as by Slovakia, where TFP grew 4.4%, 4.7%, and 4.9% on average during 2005–2007. A rapid growth in productivity in this period was also noted by two other EU10 countries: Romania (4.0%) and the Czech Republic (3.6%). In Estonia and Slovenia, TFP growth was slightly slower, at 3.0% and 2.9% per annum. A similar figure was reported by Poland, which noted an average TFP growth rate of 2.8% in the 2005–2007 period.[15] In the remaining two EU10 countries TFP growth was slower: 2.1% in Bulgaria and 0.8% in Hungary.

The above data show that in the pre-crisis period the EU10 countries recorded high TFP growth rates, leading to rapid GDP changes. The TFP contribution to economic growth, expressed in percentage terms, was considerable and, more important, it cannot be treated as spurious in most of the countries except Hungary. For example, in Poland during 2005–2007, the TFP contribution to economic growth amounted to 50% on average, which is a reasonable result. In Slovakia, Lithuania and Latvia, which means the countries with the fastest TFP growth, this contribution stood at 57%, 55% and 43% respectively. In the remaining countries, except Hungary, the average TFP contribution to economic growth ranged from 33% to 64% on average during 2005–2007.

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 EU10 group. All the analyzed Central and Eastern European countries noted negative TFP growth rates under a recession. Moreover, negative productivity growth was observed not only in the contractionary periods. Poland recorded a fall in TFP in 2009 even though its GDP grew that year. The same happened in the Czech Republic, Hungary and Lithuania in 2008.

The three Baltic states experienced the greatest deceleration in total factor productivity in the 2008–2009 period, compared with the 2005–2007 period. The fall of TFP in these countries was in the double digits in 2008–2009: –11.5% in Latvia, –10.8% in Estonia, and –7.7% in Lithuania. In Bulgaria, the Czech Republic, Romania, Slovakia, Slovenia, and Hungary, TFP also declined considerably (by about 2%–5%) but less dramatically than in the Baltics. In 2008–2009, the best results in terms of productivity changes were achieved by Poland where TFP growth was slightly positive (with the average growth rate at 0.3%).

Comparing these results with the pre-crisis period, we may conclude as follows. Countries in which economic growth was based mainly on TFP growth recorded the deepest recession and the greatest fall in TFP (though this was not always the rule). Hence, the recession that appeared in the wake of the economic crisis was mainly brought about by those inputs which are included in TFP (as well as, less markedly, by labor) while

[15] For the TFP growth rates for Poland in previous years, see e.g.: Rapacki (2002).

not by physical capital, which, in 2009 (and in 2008), increased in all the countries in the analyzed group (see Table 6). Physical capital grew at a relatively fast rate in Poland in 2009 (4.4%), while employment increased by 0.4%. As a result, considering the slight fall in TFP, Poland only experienced an economic slowdown and not a recession.

In the 2010–2012 period, after the end of the first phase of the crisis in most EU10 countries, average TFP growth was positive with a few exceptions. Romania, Hungary, and the Czech Republic recorded negative TFP growth rates of –1.9%, – 0.4% and –0.3% respectively in that period. Slovenia recorded a zero growth rate in terms of total factor productivity. During 2010–2012, the fastest TFP growth prevailed in Lithuania (4.2%), Latvia (4.1%), Estonia (2.3%), and Slovakia (2.1%). The best figures were achieved by those countries that did a good job dealing with the implications of the global crisis. Estonia and Lithuania recorded an economic growth rate of 6% or over in 2011, Latvia's economy expanded at a rate of 4.5%–5.5% in 2011–2012, while Slovakia saw relatively stable GDP growth of 3%–4% per annum in 2010–2012. Poland, with a GDP growth rate of 2.5%–4.5% in the 2010–2012 period, recorded 1.6% TFP growth per annum, which marked a 46-percent contribution to economic growth. The recovery of Poland's economy was mainly due to the growth of the physical capital stock as well as, less markedly, labor: during 2010–2012 Poland's physical capital stock grew by 3%–4% per annum, while employment increased only slightly in 2010–2011 (by 0.6% and 1.1% respectively), followed by a 0.9% fall in 2012.

The detailed results for the EU10 countries in 2012 show, however, that treating the averaged data for the 2010–2012 period as an optimistic forecast for the future may be misleading. In 2012, most of the countries in the analyzed group recorded negative TFP growth, in part due to a return of the recession. TFP fell in the Czech Republic and Hungary (– 2.3%), Romania (– 2.1%), Slovenia (– 2.0%), and Estonia (– 0.3%) in 2012, while Bulgaria recorded zero growth in productivity. In 2012, TFP grew only in Slovakia (1.6%), Poland (1.1%), Latvia (2.0%), and Lithuania (0.8%).

As we can see, in 2012, the EU10 countries, with a few exceptions, did not return to their pre-crisis TFP growth rates. Moreover, these countries' economic growth paths have not stabilized yet, as reflected by the large fluctuations in the TFP growth rates during 2010–2012. The direction of further changes is uncertain and will depend on many factors determining the economic growth of the EU10 countries in the coming years.

Summing up, our results show that changes in productivity played an important role in the economic growth of Poland and other EU10 countries in the analyzed period. The TFP growth rates of the EU10 countries are considerably higher than those of high-income countries, as evidenced by some empirical studies. For example, in the second half of the 20th century, TFP contribution to economic growth in France, West Germany, Britain, Japan, and the United States was lower than 50% (Kim and Lau, 1994). In 1980–1990, the TFP growth rate of 22 OECD countries stood at 0.8%–1.0%, with an economic growth rate of 2.5%–2.8% (Englander and Gurney, 1994). Barro and Sala-i-Martin (2003, pp. 439–440) have found that the TFP contribution to economic growth was usually under 50% in the case of OECD, Latin American and East Asian countries.

The differences in the TFP growth rates imply differences in the productivity of the inputs and differences in the competitive advantage of the economies concerned. In Poland and other new EU member states, which recorded a high TFP contribution to economic growth, the productivity of inputs grew more rapidly than in high-income countries. This can be interpreted as a sign of improvement in the competitiveness of Poland and other EU10 countries.

The TFP analysis at the sector level

Growth accounting at the sector level is carried out for Poland and seven other EU countries. The analysis covers the 2001–2011 period, being the result of data availability (sector statistics are published with a delay and data for 2012 were unavailable as this report goes to press). The study encompasses sectors of the economy according to the NACE2 classification (10 sectors; or 11 if manufacturing is treated as a separate sector).

Changes in total factor productivity at the sector level are calculated according to equation (1) reflecting the application of the same methodology as in the case of the economy as a whole. The economic growth rate is measured by the growth of gross value added (GDP at factor prices) in a given sector. The growth of labor is calculated as the increase/decrease of total employment based on the number of hours worked. For Poland, employment data according to the NACE2 classification have been available since 2005; hence labor inputs for the earlier years have been estimated using the total employment growth rates (based on the number of workers) according to the NACE1 classification. Although the NACE1 classification is broader as it includes 31 sectors, the conversion of the time series to NACE2 standards was not an easy process; it involved a number of calculations and estimations (including those using weighted averages) because both classifications (NACE1 and NACE2) differ in terms of sector grouping and are not fully complementary. The physical capital stock is calculated, as in the case of the country data, from the perpetual inventory method, assuming an initial capital-output ratio of 3 and a depreciation rate of 5%. The perpetual inventory method starts earlier, in 1997, to minimize the impact of initial assumptions on the physical capital stock estimates. We further assume that both labor and capital shares in income are 0.5. Since this analysis is carried out for the first time, for simplicity we assume that all the parameters of the model are the same for all the sectors of the economy. In the next rounds of the research, it may be worth abandoning this assumption in favor of including the specific features of individual sectors.

Table 9 shows the results of growth accounting at the sector level. The data provide not only the average results for the entire 2001–2011 period but also more detailed information for individual years. Since the research is conducted for the first time, we decided to present the full results of the calculations to show the changing economic environment in the consecutive years and the high fluctuations of the time series, which cannot be shown by either the averaged data or data for selected years. For Poland, the

results include the growth rates for labor, physical capital, TFP and GDP, as well as factor contribution to economic growth expressed in percentage points and in percent. For the remaining countries, we present only the TFP and GDP growth rates and the TFP contribution to economic growth in percentage terms. The average percentage contribution (of labor, capital, or TFP) is calculated based on the average growth of a given input and GDP for the whole period, and not as the simple arithmetic average of a given variable in individual years.

In Poland, the highest TFP growth rate was recorded in manufacturing, in which total factor productivity increased by 5.7% per annum during 2001–2011. Rapid TFP growth was accompanied by an even faster growth of output (8.3%), which implied that the TFP contribution to GDP growth in manufacturing amounted to 68%. Data for individual years show that output in manufacturing in Poland grew rapidly during 2003–2004, 2006–2007 and 2011 when the growth rate for output exceeded 10% per annum. Since the labor and capital inputs did not rise as dynamically, a large part of the economic growth is attributable to TFP. In the global crisis period, both manufacturing output and TFP in Poland decelerated: TFP grew by 3%–3.5% during 2008–2009. The slowest growth in gross value added took place in 2001 (0.5%), implying that TFP, calculated as a residual, decreased that year. Three other Central and Eastern European countries (the Czech Republic, Slovakia and, to a smaller extent, Hungary) also displayed rapid TFP growth (Slovakia recorded even higher TFP growth rates than Poland because manufacturing output in Slovakia grew almost 20% in selected years; not more than one-fourth of this growth can be attributed to changes in labor and physical capital). In Western Europe (France, Germany, Italy, and Spain), TFP growth was much slower. In fact, in Italy, TFP fell overall during the studied period as a result of a recession in manufacturing for many years.

Table 9 also has data for industry as a whole (sectors B-E). In Poland, the average TFP growth rate was 3.4% per annum during 2001–2011. Given the 6.1% growth of value added, the TFP contribution to industrial production growth in Poland stood at 56%.

Construction recorded smaller changes in total factor productivity than manufacturing. In Poland, TFP in construction grew at an average rate of 2.8%, reflecting the good performance of this sector since 2005 as well as poor physical capital growth. The main source of construction output growth in Poland was either employment or TFP (depending on the year), while investment outlays were low, implying a small physical capital contribution. Slovakia again achieved better results than Poland in terms of TFP changes (as in manufacturing). In most other countries, the TFP growth rates in construction during 2001–2011 were close to zero, or even negative.

In agriculture, TFP grew generally slower than in manufacturing. In Poland during 2001–2011, the average growth of total factor productivity in agriculture was 1.7% accompanied by 1% average growth in value added. But there were major fluctuations between individual years. In Poland, both TFP and gross value added increased until 2004, but from 2005 (with some exceptions) both variables showed a significant and consistent decline. The highest growth rate for productivity was again recorded by

Slovakia (7.2% on average during 2001–2011); the same result was noted by Hungary, but the results for Hungary may be misleading due to doubtful Eurostat figures on agricultural production that suggest around 50% growth per annum in 2004 and 2008.

Poland recorded slow TFP growth in trade, transport, accommodation and food services (sectors G-I) as well as in information and communication. In sectors G-I, the average growth rate for productivity in Poland was 1.3% during 2001–2011. Given the 3.3% growth of gross value added, the TFP contribution to economic growth was 38%. Unlike in some other sectors, the results for sectors G-I were relatively stable over time: the growth of gross value added, employment and capital revealed low fluctuations; the yearly TFP growth rates ranged between –0.8% and 3.8%, meaning little differentiation. In the information and communication sector, TFP growth was negative. Hence, despite the shorter time frame, the rapid increase of labor in this sector in selected years and a regular increase in the physical capital stock did not lead to a significant acceleration in output, implying low TFP estimates.

Poland achieved satisfactory results in terms of total factor productivity in finance and insurance as well as in sectors M-N, which comprise professional, scientific and technical activities, and administrative and support service activities. In finance and insurance, the average TFP growth rate in Poland was 3.1% during 2001–2011, which, given the 5.3% gross value added growth rate, yielded a 58% TFP contribution to economic growth. Good TFP growth results in this sector were also noted by the Czech Republic (4.4%), Slovakia (6.8%), Spain (4.1%), and Italy (3.2%), while in the remaining three countries the average growth of TFP in finance and insurance was close to zero.

The slowest productivity growth was in the following sectors: L (real estate activities), O-Q (public administration, defense, education, human health and social work activities), and R-U (arts, entertainment and recreation; other service activities; activities of households and extraterritorial organizations and bodies). Poor results in terms of TFP changes were noted not only in Poland but also other analyzed countries. The real estate sector recorded negative growth in TFP during 2001–2011 in all eight countries; for example, in Poland productivity grew at a rate of –3.4% per annum. In sectors R-U, negative growth in productivity was noted in Poland (– 1.1%), the Czech Republic, and Spain, while in Italy the rate was close to zero. Sectors O-Q saw a slow rise of TFP in Poland (0.3% during 2001–2011); similarly, in the Czech Republic, Spain and Italy, the average TFP growth rate did not exceed 1% per annum. These results are likely to be reliable because in sectors such as public administration and national defense, culture or social activities, it is hard to achieve a strong increase in the productivity of inputs. GDP growth in these sectors is mainly fuelled by the growth of employment and/or the physical capital stock.

To sum up, this study at the sector level, carried out for the first time, yields interesting results as to the nature of total factor productivity in individual sectors. It should be treated as the first step toward further and deeper analyses on the subject. TFP estimates at the sector level are important not only because they expand our knowledge, but also because they have direct applications. They suggest to policy makers which sectors can muster rapid growth in productivity and output and consequently improve their competitiveness.

Table 9
Economic growth accounting: the sector approach

Country	Variable	Average	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
A – Agriculture, forestry and fishing													
Poland	TFP	1.7	19.7	0.7	4.5	6.2	–0.2	–3.4	–4.5	–4.7	9.0	–4.3	–4.1
	GDP	1.0	6.6	1.3	2.9	7.0	0.3	–4.3	–4.1	–1.7	9.1	–4.3	–2.2
	TFP contr. (%)	178	299	50	154	89	–82	78	109	276	99	100	189
	L	–5.6	–31.1	–2.2	–5.8	–1.0	–2.1	–6.4	–3.9	0.9	–5.1	–4.3	–0.1
	K	4.1	4.8	3.5	2.7	2.6	3.2	4.5	4.6	5.1	5.3	4.3	4.0
	L contr. (p.p.)	–2.8	–15.6	–1.1	–2.9	–0.5	–1.1	–3.2	–2.0	0.5	–2.6	–2.2	–0.1
	K contr. (p.p.)	2.0	2.4	1.7	1.3	1.3	1.6	2.3	2.3	2.5	2.6	2.2	2.0
	L contr. (%)	–288	–236	–85	–100	–7	–350	74	48	–26	–28	50	2
	K contr. (%)	210	37	134	46	18	532	–52	–56	–149	29	–50	–91
Czech Rep.	TFP	–0.9	–1.3	0.9	5.3	9.5	6.2	–6.3	–20.7	3.2	27.3	–26.4	–7.6
	GDP	–0.8	–2.2	–2.6	5.9	12.0	4.6	–5.9	–21.8	7.3	26.4	–26.6	–5.5
	TFP contr. (%)	117	59	–35	90	79	135	107	95	44	103	99	138
Hungary	TFP	7.2	15.2	–16.2	7.1	50.8	–2.4	–5.3	–17.5	54.1	–11.3	–16.1	20.5
	GDP	5.9	12.9	–14.8	1.9	49.9	–5.1	–6.1	–19.9	51.6	–13.2	–14.9	22.4
	TFP contr. (%)	122	118	109	373	102	48	87	88	105	86	108	91
Slovakia	TFP	7.2	23.9	15.3	7.3	–1.5	–4.7	9.5	15.5	9.8	–2.9	–13.4	20.9
	GDP	6.4	21.6	11.1	4.2	–1.3	–4.0	7.2	14.9	11.6	–2.0	–13.6	20.5
	TFP contr. (%)	113	111	138	175	112	117	132	104	84	147	99	102
France	TFP	0.6	–5.0	5.9	–16.8	19.2	–6.6	0.3	–0.6	5.3	6.9	–7.2	4.7
	GDP	0.9	–3.2	5.4	–15.6	21.1	–5.5	–0.1	–0.8	4.2	6.4	–5.7	3.9
	TFP contr. (%)	62	158	110	108	91	120	–286	71	126	108	126	122

Country	Variable	Average	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Germany	TFP	2.0	–5.3	–2.1	1.9	33.2	–10.0	–4.2	31.1	2.5	1.4	–16.0	–10.4
	GDP	3.6	–4.3	–0.8	3.0	33.9	–9.3	–5.1	35.4	6.3	4.0	–14.8	–9.2
	TFP contr. (%)	56	124	266	63	98	107	82	88	39	36	108	113
Italy	TFP	–1.6	–6.8	–3.6	–5.1	9.6	–5.8	–3.6	–0.8	1.2	–2.2	–0.7	0.1
	GDP	–0.4	–2.6	–2.9	–4.7	12.9	–4.4	–1.1	0.2	1.4	–2.5	–0.3	–0.4
	TFP contr. (%)	401	261	124	108	74	132	327	–384	86	89	242	–31
Spain	TFP	1.6	.	1.1	0.3	–1.3	–7.2	7.8	8.3	–0.9	–1.7	0.8	8.3
	GDP	0.6	.	0.4	–0.7	–2.6	–8.4	5.5	7.0	–2.7	–3.2	2.0	8.2
	TFP contr. (%)	283	.	275	–45	50	86	141	119	34	53	41	102
B-E – Industry (except construction)													
Poland	TFP	3.4	–4.3	2.4	6.8	6.4	–0.2	5.7	5.2	1.5	0.8	6.1	7.2
	GDP	6.1	–0.1	–0.2	8.7	10.9	3.5	9.9	10.0	6.0	1.2	7.3	10.0
	TFP contr. (%)	56	4307	–1196	78	58	–5	57	52	25	66	83	72
	L	0.8	3.6	–9.1	0.7	5.6	3.5	4.4	4.6	2.9	–5.6	–2.6	1.3
	K	4.6	4.8	3.9	3.1	3.5	3.8	4.1	5.0	6.1	6.4	5.0	4.3
	L contr. (p.p.)	0.4	1.8	–4.6	0.4	2.8	1.8	2.2	2.3	1.5	–2.8	–1.3	0.7
	K contr. (p.p.)	2.3	2.4	2.0	1.6	1.7	1.9	2.0	2.5	3.1	3.2	2.5	2.2
	L contr. (%)	7	–1800	2275	4	26	50	22	23	24	–233	–18	7
	K contr. (%)	37	–2407	–979	18	16	55	21	25	51	268	35	22
Czech Rep.	TFP	3.9	2.3	1.6	2.4	6.2	11.7	13.9	3.6	6.5	–10.4	4.0	1.6
	GDP	5.8	3.1	4.3	3.2	9.0	15.0	15.4	6.3	10.0	–13.4	6.5	4.8
	TFP contr. (%)	68	74	38	75	69	78	90	58	65	77	61	34
Hungary	TFP	.	.	.	.	.	.	.	.	.	.	.	.

	GDP	2.7	1.4	5.6	5.1	5.8	3.7	5.2	6.8	–3.7	–14.4	11.4	2.9
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Slovakia	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	8.2	6.5	4.9	18.5	16.6	5.3	17.9	12.1	4.4	–16.1	15.1	5.2
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
France	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	0.2	1.5	0.3	1.5	2.2	1.3	1.1	2.0	–4.3	–7.5	3.3	0.5
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Germany	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	1.9	1.1	–1.9	0.9	4.3	1.8	6.8	5.0	–1.9	–17.7	15.8	6.2
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Italy	TFP	–0.9	–2.4	–2.2	–3.5	0.8	0.6	2.1	0.9	–3.4	–10.9	7.6	0.2
	GDP	–0.4	–0.9	–0.4	–2.3	1.7	0.9	3.9	2.8	–3.0	–15.1	6.9	1.2
	TFP contr. (%)	237	264	542	153	48	70	54	31	114	72	110	18
Spain	TFP	0.1	.	–0.5	0.4	0.3	0.7	2.1	0.9	–2.4	–6.7	4.5	1.9
	GDP	–0.2	.	0.2	1.5	0.8	1.0	1.7	0.5	–2.1	–12.1	4.3	2.7
	TFP contr. (%)	–89	.	–228	27	38	74	126	173	116	55	105	71
C – Manufacturing													
Poland	TFP	5.7	–3.7	4.4	10.3	9.2	0.0	11.7	7.4	3.0	3.5	6.8	9.7
	GDP	8.3	0.5	1.6	12.1	13.8	3.8	16.2	12.9	7.9	3.7	7.3	11.5
	TFP contr. (%)	68	–747	273	85	67	0	72	58	38	95	93	84
	L	0.9	3.6	–9.1	0.7	5.6	3.4	4.7	5.5	3.3	–6.2	–3.1	1.0
	K	4.4	4.9	3.6	2.9	3.5	4.2	4.4	5.4	6.6	6.6	4.1	2.7
	L contr. (p.p.)	0.4	1.8	–4.6	0.4	2.8	1.7	2.4	2.8	1.7	–3.1	–1.6	0.5
	K contr. (p.p.)	2.2	2.4	1.8	1.5	1.8	2.1	2.2	2.7	3.3	3.3	2.1	1.3

Country	Variable	Average	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
	L contr. (%)	5	360	–284	3	20	45	15	21	21	–84	–21	4
	K contr. (%)	27	487	111	12	13	55	14	21	41	89	28	12
Czech Rep.	TFP	5.5	2.8	2.4	2.5	6.0	14.9	16.0	4.6	7.0	–12.2	10.6	5.9
	GDP	7.5	3.3	5.1	4.0	9.3	19.1	18.1	7.7	10.7	–15.4	12.7	8.1
	TFP contr. (%)	73	85	47	63	65	78	89	59	65	79	83	73
Hungary	TFP	2.0	–2.3	6.4	6.6	5.5	4.8	3.9	4.8	–3.5	–17.8	13.6	–0.4
	GDP	3.5	2.5	6.9	8.0	5.8	5.7	5.6	6.8	–2.3	–18.3	14.6	3.6
	TFP contr. (%)	56	–92	93	83	95	84	69	70	154	97	93	–10
Slovakia	TFP	6.5	12.0	–1.0	12.5	13.6	6.1	6.7	6.4	2.4	–11.1	20.1	3.9
	GDP	9.9	14.3	1.6	17.9	18.5	11.3	13.4	12.1	7.7	–14.9	20.9	6.1
	TFP contr. (%)	66	84	–63	70	73	54	50	53	31	74	96	64
France	TFP	1.1	0.2	0.5	2.6	2.9	3.2	2.3	2.3	–4.2	–4.0	5.0	1.1
	GDP	0.2	0.4	–0.9	1.7	2.1	2.3	1.2	2.3	–4.2	–7.4	3.8	0.8
	TFP contr. (%)	560	39	–58	151	138	140	194	100	101	55	131	132
Germany	TFP	2.6	2.1	–1.2	2.8	4.2	3.6	9.7	4.5	–3.4	–18.1	17.9	6.9
	GDP	2.2	1.8	–2.4	1.4	4.1	2.3	9.0	5.0	–2.6	–22.1	19.5	8.3
	TFP contr. (%)	119	119	51	197	103	157	107	89	131	82	92	83
Italy	TFP	–0.9	–2.1	–2.3	–3.6	0.8	0.8	2.8	1.3	–3.8	–11.9	8.0	0.3
	GDP	–0.6	–0.8	–0.8	–2.5	1.5	0.8	4.3	3.2	–3.6	–16.6	7.1	1.2
	TFP contr. (%)	156	259	287	144	55	95	64	41	105	72	113	25
Spain	TFP	0.8	.	–0.1	0.7	0.6	1.4	3.2	1.7	–2.9	–6.3	6.4	3.7
	GDP	–0.6	.	–0.1	0.9	0.4	0.8	1.8	0.3	–3.4	–13.1	3.9	2.9
	TFP contr. (%)	–149	.	126	78	162	174	176	582	87	48	164	129

F – Construction													
Poland	TFP	2.8	–7.1	–1.1	0.9	3.0	4.8	8.0	2.6	–2.0	8.5	7.4	6.2
	GDP	4.4	–3.0	–7.5	–2.8	1.1	6.6	12.5	9.4	5.8	11.6	6.4	8.2
	TFP contr. (%)	65	238	15	–34	274	72	64	28	–34	73	116	75
	L	3.4	9.5	–11.1	–5.7	–2.0	5.2	10.1	13.6	14.6	4.6	–3.2	2.2
	K	–0.3	–1.2	–1.7	–1.8	–1.8	–1.5	–1.2	0.0	1.0	1.6	1.1	1.9
	L contr. (p.p.)	1.7	4.8	–5.6	–2.9	–1.0	2.6	5.1	6.8	7.3	2.3	–1.6	1.1
	K contr. (p.p.)	–0.2	–0.6	–0.9	–0.9	–0.9	–0.8	–0.6	0.0	0.5	0.8	0.6	0.9
	L contr. (%)	39	–158	74	102	–91	39	40	72	126	20	–25	13
	K contr. (%)	–4	21	11	32	–83	–12	–5	0	9	7	9	11
Czech Rep.	TFP	1.4	0.7	–0.6	4.5	6.7	–0.7	3.1	6.8	–3.2	–3.3	5.4	–4.3
	GDP	1.3	–3.9	0.7	3.9	8.1	–0.4	2.1	6.3	–0.9	–1.5	4.8	–4.6
	TFP contr. (%)	102	–17	–85	115	82	165	146	108	360	222	113	94
Hungary	TFP	–1.9	6.1	9.6	–7.2	–3.9	3.8	–7.0	–8.4	–7.2	0.9	–5.6	–1.6
	GDP	–1.4	5.7	11.2	–1.4	–1.6	6.0	–3.0	–5.6	–8.8	–3.6	–9.0	–5.3
	TFP contr. (%)	133	107	86	515	245	63	233	149	82	–26	62	30
Slovakia	TFP	4.6	–9.2	26.0	–16.7	5.1	5.2	18.1	10.1	14.0	–9.7	–0.1	8.0
	GDP	5.9	–11.0	24.5	–15.1	8.1	9.0	19.7	13.3	20.3	–7.6	–1.0	4.8
	TFP contr. (%)	78	84	106	110	63	58	92	76	69	127	9	166
France	TFP	0.0	4.0	0.5	0.5	0.4	2.1	1.1	2.1	–3.1	–5.1	–3.8	0.6
	GDP	0.1	3.7	–0.6	–0.6	1.6	3.0	2.2	4.6	–1.7	–6.0	–4.8	0.0
	TFP contr. (%)	–39	109	–83	–90	26	70	50	47	181	85	78	.
Germany	TFP	0.9	–0.9	1.3	–0.5	–0.5	–0.2	1.7	–0.2	1.1	–4.7	7.3	5.1
	GDP	–1.5	–5.8	–3.6	–4.5	–3.2	–3.6	0.2	–0.8	–0.2	–6.5	6.9	4.6
	TFP contr. (%)	–58	15	–37	11	17	7	853	27	–544	72	106	112

Country	Variable	Average	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Italy	TFP	–1.1	1.7	1.1	0.6	–0.2	0.1	0.2	–1.7	–3.0	–7.9	–1.2	–1.6
	GDP	0.1	5.5	2.2	2.5	1.9	2.6	2.0	0.9	–2.7	–8.4	–3.0	–2.9
	TFP contr. (%)	–2010	31	48	24	–11	3	8	–187	112	94	41	55
Spain	TFP	–0.3	.	3.3	1.8	1.1	0.0	–1.0	–4.4	1.4	0.3	–7.6	2.1
	GDP	–0.1	.	6.2	4.6	4.2	5.5	5.0	1.8	–0.2	–7.8	–14.3	–5.9
	TFP contr. (%)	335	.	53	40	26	1	–21	–244	–705	–4	53	–36
I – Wholesale and retail trade, transport, accommodation and food service activities													
Poland	TFP	1.3	–0.2	3.1	0.7	2.4	3.8	2.8	–0.8	1.0	0.5	1.0	–0.5
	GDP	3.3	1.0	2.6	0.5	3.7	5.2	5.7	4.5	4.5	2.4	4.3	1.6
	TFP contr. (%)	38	–15	119	148	66	72	49	–17	21	21	23	–33
	L	1.4	–0.1	–2.1	–1.3	1.8	1.8	4.1	7.8	3.1	–1.0	1.6	–0.4
	K	2.6	2.4	1.1	0.8	0.7	1.1	1.7	2.7	4.0	4.8	5.0	4.7
	L contr. (p.p.)	0.7	–0.1	–1.1	–0.7	0.9	0.9	2.1	3.9	1.6	–0.5	0.8	–0.2
	K contr. (p.p.)	1.3	1.2	0.6	0.4	0.4	0.5	0.9	1.4	2.0	2.4	2.5	2.3
	L contr. (%)	21	–7	–41	–131	24	17	36	87	34	–21	19	–13
	K contr. (%)	40	122	22	83	10	10	15	30	44	100	58	146
Czech Rep.	TFP	1.0	6.2	2.0	0.8	3.0	1.4	5.1	4.7	–7.4	–8.7	2.1	1.5
	GDP	3.2	6.8	4.2	2.7	4.0	4.1	8.5	7.3	–3.7	–6.0	3.9	3.7
	TFP contr. (%)	30	92	46	28	76	34	60	64	200	145	54	40
Hungary	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	1.8	7.3	6.1	3.4	3.1	6.2	8.7	1.5	–1.8	–14.3	–1.3	0.6
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.

Slovakia	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	2.6	7.9	–3.8	4.5	2.1	7.8	0.4	8.1	11.5	–7.4	0.2	–2.5
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
France	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	1.2	2.4	0.9	0.3	1.3	1.4	1.7	3.2	1.5	–5.3	3.0	3.0
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Germany	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	2.2	4.2	0.0	1.0	2.6	3.2	4.8	1.8	2.4	–0.4	1.7	3.1
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Italy	TFP	–0.9	1.1	–3.2	–3.3	0.6	0.8	–0.1	0.0	–2.2	–7.5	3.5	0.5
	GDP	0.0	1.9	–1.7	–1.4	1.6	1.7	1.4	1.7	–1.8	–8.1	3.4	0.9
	TFP contr. (%)	2475	59	189	236	36	45	–10	1	120	92	102	51
Spain	TFP	0.3	.	–0.5	–0.5	0.8	0.0	0.7	1.5	–1.7	–0.3	2.3	0.5
	GDP	1.9	.	2.1	1.8	3.9	2.2	3.1	4.3	0.4	–1.9	1.6	1.1
	TFP contr. (%)	14	.	–22	–29	21	–2	21	34	–432	18	144	49
J – Information and communication													
Poland	TFP	–0.5	.	.	.	.	–3.1	–4.9	–1.7	5.9	–2.0	–1.4	3.7
	GDP	3.6	.	.	.	.	–3.3	4.5	6.5	9.4	3.3	–0.1	4.8
	TFP contr. (%)	–14	.	.	.	.	94	–109	–26	62	–60	1354	78
	L	4.7	.	.	.	.	–2.8	17.2	13.0	2.3	5.5	–1.9	–0.6
	K	3.5	.	.	.	.	2.4	1.6	3.4	4.8	5.0	4.4	2.7
	L contr. (p.p.)	2.3	.	.	.	.	–1.4	8.6	6.5	1.2	2.8	–1.0	–0.3
	K contr. (p.p.)	1.7	.	.	.	.	1.2	0.8	1.7	2.4	2.5	2.2	1.4
	L contr. (%)	65	.	.	.	.	42	191	100	12	83	950	–6
	K contr. (%)	49	.	.	.	.	–36	18	26	25	76	–2204	28

Country	Variable	Average	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Czech Rep.	TFP	2.0	3.2	2.1	5.0	0.0	8.5	6.6	5.3	–0.9	–6.5	–0.3	–0.5
	GDP	5.3	4.8	7.8	5.6	2.1	13.8	10.4	10.7	4.4	–2.8	0.9	0.2
	TFP contr. (%)	39	68	27	90	–2	62	63	50	–21	232	–38	–238
Hungary	TFP	2.2	–1.0	7.5	8.6	5.4	3.1	–4.5	0.3	–3.5	7.5	1.5	–0.8
	GDP	6.1	7.2	13.2	11.7	5.4	6.0	5.1	3.3	3.0	7.9	2.0	2.4
	TFP contr. (%)	36	–14	57	74	100	51	–88	10	–116	95	74	–35
Slovakia	TFP	2.3	2.3	6.6	–2.2	1.7	1.7	6.8	9.7	–5.3	6.7	–2.6	–0.1
	GDP	5.8	7.2	5.8	2.6	2.2	7.0	11.5	13.1	–0.9	9.7	–0.2	6.1
	TFP contr. (%)	39	32	114	–84	79	24	59	74	584	69	1313	–1
France	TFP	1.8	2.7	6.9	3.4	4.7	–0.7	5.8	1.6	–0.5	–5.2	1.3	0.0
	GDP	4.2	6.9	7.9	4.5	8.1	1.0	8.8	5.0	3.1	–4.3	3.1	2.5
	TFP contr. (%)	42	38	87	75	58	–70	65	31	–17	120	41	–1
Germany	TFP	1.7	6.4	1.0	–10.1	4.7	–5.6	4.9	6.9	2.9	9.2	–1.7	–0.2
	GDP	3.7	9.8	3.6	–9.8	6.2	–3.1	6.8	10.5	4.8	9.9	–0.2	1.9
	TFP contr. (%)	45	66	28	104	76	180	72	65	60	93	847	–12
Italy	TFP	1.1	5.1	3.9	–0.4	1.3	0.4	–0.8	3.3	–0.4	–0.1	2.8	–2.8
	GDP	3.3	11.9	6.7	1.0	1.8	2.1	2.8	5.2	1.1	1.8	2.4	–0.8
	TFP contr. (%)	34	43	58	–41	72	21	–29	63	–34	–8	115	352
Spain	TFP	0.9	.	–0.2	0.7	–0.4	1.6	–1.8	2.7	–1.0	–0.7	7.2	1.0
	GDP	3.7	.	5.5	3.8	3.6	5.2	2.7	3.4	1.5	0.9	6.5	3.9
	TFP contr. (%)	24	.	–4	19	–12	30	–67	78	–69	–78	111	27
K – Financial and insurance activities													
Poland	TFP	3.1	–7.3	–0.2	11.9	9.9	3.5	–0.3	24.9	17.2	–32.9	5.3	2.0
	GDP	5.3	4.9	–1.8	7.2	7.9	7.7	5.2	30.3	15.4	–27.5	5.5	3.7

	TFP contr. (%)	58	–149	9	165	125	45	–5	82	112	120	97	55
	L	2.9	18.3	–7.9	–10.5	–3.5	8.6	10.9	9.9	–5.9	8.8	–0.8	3.6
	K	1.6	6.1	4.6	1.1	–0.5	–0.2	0.1	0.8	2.2	1.9	1.2	–0.2
	L contr. (p.p.)	1.4	9.2	–4.0	–5.3	–1.8	4.3	5.5	5.0	–3.0	4.4	–0.4	1.8
	K contr. (p.p.)	0.8	3.1	2.3	0.5	–0.2	–0.1	0.0	0.4	1.1	1.0	0.6	–0.1
	L contr. (%)	27	187	219	–73	–22	56	105	16	–19	–16	–7	49
	K contr. (%)	15	63	–128	8	–3	–1	1	1	7	–4	11	–3
Czech Rep.	TFP	4.4	13.1	–23.4	18.6	3.4	–8.4	9.8	16.2	12.2	5.8	1.2	–0.1
	GDP	5.2	11.8	–26.2	17.0	5.2	–8.9	11.6	18.4	15.5	8.5	2.3	1.7
	TFP contr. (%)	85	111	89	109	66	94	85	88	79	68	52	–6
Hungary	TFP	–0.1	6.0	13.9	7.8	–2.4	3.9	0.1	–7.6	–9.2	–2.1	–2.6	–8.3
	GDP	–0.1	–1.7	8.8	7.0	3.1	3.6	–0.6	–8.7	–2.3	0.5	–4.7	–5.6
	TFP contr. (%)	102	–350	158	112	–79	109	–13	87	399	–428	56	148
Slovakia	TFP	6.8	–3.2	63.8	–2.2	1.0	16.6	–1.2	–4.1	–8.0	5.7	0.2	6.2
	GDP	6.4	–3.6	59.1	–5.3	–0.1	15.7	1.9	–0.5	–4.2	5.1	–2.5	5.3
	TFP contr. (%)	106	90	108	42	–1012	106	–61	817	190	113	–9	117
France	TFP	0.8	–3.9	1.4	4.8	0.1	1.3	4.5	2.0	–4.4	2.8	–2.6	2.4
	GDP	2.2	–2.3	2.1	6.1	2.2	2.5	4.5	4.7	–2.8	5.0	–0.9	3.4
	TFP contr. (%)	34	171	66	79	4	52	101	42	157	55	291	70
Germany	TFP	0.9	–1.2	3.5	–9.0	–0.8	–8.4	8.3	9.0	4.8	–0.6	2.0	2.4
	GDP	–0.7	–2.5	2.4	–11.0	–2.4	–10.0	6.6	5.9	2.7	–1.7	1.4	1.4
	TFP contr. (%)	–139	46	146	81	33	84	125	152	176	34	140	174
Italy	TFP	3.2	1.4	–1.4	–0.5	5.6	5.6	7.0	7.5	–0.9	5.0	5.2	0.9
	GDP	2.7	1.1	–2.4	–0.6	4.1	5.5	6.6	8.4	–0.5	4.0	3.3	0.4
	TFP contr. (%)	118	125	59	76	138	102	106	89	180	125	157	217

Country	Variable	Average	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Spain	TFP	4.1	.	6.5	5.4	10.2	11.7	11.5	8.9	2.4	–5.4	–6.2	–4.0
	GDP	5.2	.	7.2	4.7	10.4	13.0	13.4	11.9	2.8	–4.0	–3.7	–3.6
	TFP contr. (%)	79	.	90	114	98	90	86	74	86	135	168	112
L – Real estate activities													
Poland	TFP	–3.4	2.2	–2.4	–3.3	–13.1	0.3	4.4	–8.1	–10.2	–5.2	–2.9	0.8
	GDP	1.4	–2.2	6.1	3.0	–1.7	–0.5	3.6	–2.4	–1.0	3.2	5.0	2.2
	TFP contr. (%)	–245	–101	–39	–109	773	–65	122	336	1025	–162	–59	38
	L	1.6	–23.0	7.7	2.9	14.9	–8.8	–8.3	4.5	10.9	9.3	9.7	–2.2
	K	8.0	14.1	9.3	9.6	8.0	7.2	6.7	6.8	7.6	7.5	6.2	4.9
	L contr. (p.p.)	0.8	–11.5	3.9	1.5	7.5	–4.4	–4.2	2.3	5.5	4.7	4.9	–1.1
	K contr. (p.p.)	4.0	7.1	4.6	4.8	4.0	3.6	3.4	3.4	3.8	3.7	3.1	2.5
	L contr. (%)	58	523	63	48	–438	880	–115	–94	–545	145	97	–50
	K contr. (%)	287	–322	76	161	–235	–715	93	–142	–380	116	62	112
Czech Rep.	TFP	–2.8	–1.0	–15.2	–5.1	0.4	–1.4	–2.9	–6.2	0.9	0.8	0.0	–1.0
	GDP	3.2	–1.6	–1.7	1.9	1.8	11.3	5.5	2.7	8.0	3.9	1.6	1.5
	TFP contr. (%)	–88	61	897	–268	25	–12	–53	–231	11	21	2	–69
Hungary	TFP	–2.7	–6.9	–20.1	12.2	4.8	–5.0	–3.3	–2.6	–5.9	–2.0	–2.9	2.0
	GDP	1.6	–2.9	–2.5	5.4	0.3	6.1	7.9	0.1	–0.1	2.9	–0.2	0.3
	TFP contr. (%)	–172	239	803	225	1604	–81	–42	–2610	5945	–68	1474	664
Slovakia	TFP	–3.2	–2.5	–4.4	–16.5	–6.1	–19.2	–2.6	6.0	8.4	–1.1	–3.3	6.0
	GDP	1.5	6.6	–6.0	–8.1	–5.4	–8.0	–0.7	14.6	4.5	0.6	7.0	11.3
	TFP contr. (%)	–215	–38	74	204	113	239	370	41	187	–188	–47	53

France	TFP	–2.0	–2.2	–5.0	–2.5	–1.8	–2.9	–0.7	–3.8	–4.0	2.1	0.0	–0.7
	GDP	1.4	2.9	–1.4	0.6	3.5	2.8	2.5	0.8	–0.1	0.9	1.3	1.1
	TFP contr. (%)	–144	–76	356	–421	–51	–103	–29	–473	3978	234	3	–65
Germany	TFP	–1.0	0.3	–0.2	–0.6	–2.8	0.0	–2.5	0.3	0.0	0.3	–4.5	–1.2
	GDP	1.9	5.1	4.2	2.4	–0.2	3.1	0.6	3.1	1.6	1.6	–1.7	0.6
	TFP contr. (%)	–53	6	–4	–26	1387	–1	–419	10	3	18	263	–203
Italy	TFP	–3.1	–4.4	–2.8	–3.1	–3.5	–0.9	–4.0	–7.7	–0.3	–2.2	–4.0	–0.9
	GDP	0.6	1.7	2.6	2.2	0.2	0.1	1.8	–1.4	0.6	–0.8	–1.2	1.3
	TFP contr. (%)	–475	–257	–108	–141	–1741	–915	–225	546	–48	276	331	–66
Spain	TFP	–10.3	.	–19.9	–17.3	–13.6	–12.9	–13.6	–6.9	–8.0	–0.5	–3.0	–7.7
	GDP	2.0	.	3.6	3.1	2.1	2.4	2.2	2.8	2.1	0.0	–0.9	2.7
	TFP contr. (%)	–514	.	–552	–559	–649	–538	–619	–246	–380	.	336	–284
M-N – Professional, scientific and technical activities; administrative and support service activities													
Poland	TFP	2.9	.	.	.	.	3.2	4.5	6.0	7.4	1.6	–3.6	1.0
	GDP	5.9	.	.	.	.	4.7	6.0	11.4	8.9	6.2	0.7	3.7
	TFP contr. (%)	48	.	.	.	.	68	75	52	83	26	–512	26
	L	6.0	.	.	.	.	4.8	4.6	11.0	2.2	7.4	7.6	4.6
	K	0.2	.	.	.	.	–1.8	–1.6	–0.1	0.9	1.8	1.0	0.9
	L contr. (p.p.)	3.0	.	.	.	.	2.4	2.3	5.5	1.1	3.7	3.8	2.3
	K contr. (p.p.)	0.1	.	.	.	.	–0.9	–0.8	–0.1	0.4	0.9	0.5	0.4
	L contr. (%)	51	.	.	.	.	51	38	48	12	60	543	62
	K contr. (%)	1	.	.	.	.	–19	–13	–1	5	15	69	12
Czech Rep.	TFP	1.3	6.0	11.0	0.5	1.6	2.3	–5.4	7.1	1.7	–13.8	2.2	0.7
	GDP	3.4	6.1	13.9	–0.3	2.3	5.6	–2.9	10.6	5.3	–9.9	4.3	2.1
	TFP contr. (%)	37	98	79	–151	71	42	185	67	31	139	51	31

Country	Variable	Average	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Hungary	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	2.9	7.4	11.0	4.0	–0.2	3.4	7.7	–0.7	2.4	–3.8	1.2	–0.1
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Slovakia	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	6.3	–11.6	13.7	–6.6	–2.1	8.9	32.8	16.7	10.9	2.4	2.9	0.8
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
France	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	1.3	–0.7	0.9	0.7	1.9	3.6	4.1	3.7	1.5	–7.9	3.4	3.5
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Germany	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	1.0	3.4	0.0	1.3	–1.7	2.2	3.3	6.6	1.7	–12.3	2.6	4.2
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Italy	TFP	–0.8	1.8	0.5	0.2	–2.8	–2.0	0.3	0.4	–3.6	–4.3	–0.3	0.5
	GDP	0.4	3.9	2.0	1.8	–0.8	–0.9	2.1	2.0	–2.1	–6.2	1.0	1.6
	TFP contr. (%)	–207	45	27	12	344	217	16	18	169	69	–28	32
Spain	TFP	0.0	.	–4.5	–1.9	–3.0	1.3	3.3	3.5	–3.1	–1.5	1.6	4.5
	GDP	3.3	.	0.9	2.4	1.4	6.9	10.3	8.0	2.3	–2.6	–0.2	3.2
	TFP contr. (%)	1	.	–495	–80	–217	18	32	44	–133	58	–807	140
O-Q – Public administration, defense, education, human health and social work activities													
Poland	TFP	0.3	–3.9	1.8	3.4	1.4	0.2	0.3	2.5	–0.9	0.9	–2.1	–0.2
	GDP	2.1	3.3	2.7	4.8	0.8	1.1	2.0	2.7	1.8	3.1	0.5	0.5
	TFP contr. (%)	14	–119	66	71	176	19	13	91	–48	29	–416	–41
	L	3.5	15.5	2.9	3.7	–0.6	2.1	3.8	0.5	4.2	3.3	4.1	–0.5

	K	0.1	–1.0	–1.1	–0.9	–0.6	–0.3	–0.3	0.0	1.1	1.1	1.1	1.9
	L contr. (p.p.)	1.8	7.7	1.4	1.9	–0.3	1.1	1.9	0.3	2.1	1.7	2.1	–0.3
	K contr. (p.p.)	0.0	–0.5	–0.5	–0.4	–0.3	–0.2	–0.2	0.0	0.6	0.6	0.5	1.0
	L contr. (%)	84	234	53	39	–38	95	95	9	117	53	410	–50
	K contr. (%)	2	–15	–19	–9	–39	–15	–8	0	31	18	106	191
Czech Rep.	TFP	–0.5	5.5	2.0	0.8	–1.8	–2.4	–1.1	–1.2	–1.6	–0.1	–2.3	–3.2
	GDP	0.6	2.5	2.1	1.3	–0.7	0.6	–0.9	0.9	1.1	0.6	0.3	–1.7
	TFP contr. (%)	–90	221	96	65	263	–405	123	–135	–146	–21	–770	190
Hungary	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	1.0	1.9	2.8	3.7	0.9	2.5	0.5	–4.0	0.3	0.0	0.2	2.0
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Slovakia	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	2.0	6.9	–2.0	1.9	–5.9	5.1	3.0	4.4	1.6	7.5	4.1	–5.0
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
France	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	1.0	1.4	0.2	0.4	1.7	0.9	1.6	1.0	0.9	1.1	0.9	1.2
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Germany	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	1.1	0.1	1.7	0.4	–0.2	0.8	1.3	0.8	3.2	1.4	1.7	0.9
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Italy	TFP	0.9	2.8	1.7	1.7	1.1	0.8	0.3	0.6	–0.1	0.3	0.9	–0.1
	GDP	1.0	2.2	2.1	1.4	1.8	1.2	0.6	0.7	0.3	0.5	0.3	–0.2
	TFP contr. (%)	91	127	81	120	59	65	56	93	–44	53	289	54
Spain	TFP	0.1	.	0.1	0.7	0.1	0.2	–0.1	2.2	1.2	–1.8	–0.7	–1.4
	GDP	3.3	.	2.7	4.1	3.5	3.6	3.8	4.5	5.1	2.3	2.4	1.1

Country	Variable	Average	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
R-U – Arts, entertainment and recreation; other service activities; activities of households and extraterritorial organizations and bodies													
Poland	TFP	–1.1	–13.3	4.9	2.4	–0.5	3.2	–0.7	0.7	3.8	–3.6	–8.6	–0.5
	GDP	1.1	–2.4	3.8	0.8	–2.3	3.5	5.1	0.4	6.8	–1.0	–3.7	1.6
	TFP contr. (%)	–98	554	128	295	22	90	–13	173	55	362	232	–30
	L	3.7	23.4	–0.7	–1.6	–1.8	1.7	12.5	–1.4	4.8	1.5	4.4	–2.1
	K	0.8	–1.6	–1.4	–1.5	–1.8	–1.0	–1.0	0.8	1.3	3.7	5.3	6.2
	L contr. (p.p.)	1.9	11.7	–0.4	–0.8	–0.9	0.9	6.3	–0.7	2.4	0.8	2.2	–1.1
	K contr. (p.p.)	0.4	–0.8	–0.7	–0.8	–0.9	–0.5	–0.5	0.4	0.6	1.9	2.7	3.1
	L contr. (%)	162	–488	–9	–100	39	24	123	–175	35	–75	–59	–66
	K contr. (%)	36	34	–19	–95	39	–14	–10	102	9	–187	–72	195
Czech Rep.	TFP	–1.8	–2.8	–3.5	2.7	–4.8	–0.9	6.5	–2.0	–9.3	–5.5	–2.6	1.8
	GDP	–0.6	–4.3	–1.1	3.9	–2.3	–3.8	10.6	0.2	–9.4	–3.7	0.2	2.9
	TFP contr. (%)	299	64	314	70	209	25	62	–1001	99	148	–1299	60
Hungary	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	1.4	8.9	7.5	–6.1	–1.3	4.6	–0.8	2.3	0.6	–5.0	0.1	5.1
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Slovakia	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	7.2	6.2	6.3	–8.2	2.6	26.6	5.3	19.1	–21.7	33.1	2.1	7.9
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
France	TFP	.	.	.	.	.	.	.	.	.	.	.	.
	GDP	1.8	3.5	2.5	2.6	1.9	1.5	2.7	1.6	2.8	–0.3	0.7	0.0
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.

Germany	TFP	.	.	.	.	.	.	.	.	.	.	.
	GDP	0.4	–0.4	–2.0	0.1	2.4	1.0	1.9	2.0	2.1	–1.5	–0.5	–0.5
	TFP contr. (%)	.	.	.	.	.	.	.	.	.	.	.	.
Italy	TFP	0.4	1.4	–4.2	–7.1	8.0	–1.4	1.6	2.8	0.3	–0.7	1.0	3.1
	GDP	1.0	1.0	–2.3	–2.9	6.4	–1.2	3.2	2.6	0.2	–0.6	1.8	2.5
	TFP contr. (%)	45	137	181	246	125	117	51	109	172	120	53	125
Spain	TFP	–1.3	.	–0.4	–0.8	–1.4	–0.4	–2.2	–2.2	–2.0	–2.1	–1.6	–0.4
	GDP	2.4	.	3.1	3.2	4.0	4.6	3.0	2.2	2.0	0.3	0.3	1.4
	TFP contr. (%)	–56	.	–12	–25	–35	–9	–72	–98	–98	–716	–543	–25

Source: Own calculations based on Eurostat data.

Chapter 4

Policies and Institutions and Their Quality

This chapter discusses the main aspects of the qualitative factors determining the competitiveness of the Polish economy, such as economic policy and quality of institutions. The review of Poland's economic policy in 2012 is followed by an assessment of recent developments in the Polish financial system, in which efficiency is essential for competitiveness. The last section of the chapter focuses on an evaluation of the business environment and the quality of national institutions.

4.1. Assessment of Poland's Economic Policy in 2012

Jan W. Bossak

Challenges and threats: Growth-oriented reforms and adjustment

As recommended by the European Commission, Poland undertook in 2012 to reduce its excessive public finance deficit in a credible and sustainable manner. To this end, the authorities imposed restrictions on both central and local government spending and adopted special rules to limit other expenditure. This was accompanied by a freeze on nominal wages in the central administration and a steady reduction in the proportion of public investment in GDP.

The planned fiscal consolidation was designed to strengthen the credibility and foundations of the Polish economy and to make it possible to reduce public debt in relation to GDP and avoid the risk associated with public debt overshooting the 55%-of-GDP mark.

The most important economic policy objectives included progress in meeting the EU's fiscal criteria in order to have the so-called excessive deficit procedure imposed by the EU lifted at the beginning of 2013. Stabilization in public finances and lower inflation were expected to enable a reduction in nominal and real interest rates at the end of the year.

Improved economic trends in Germany, France and Britain, which are Poland's key economic partners, were expected to mitigate the negative effect of reduced public spending and investment. However, exports to these countries decreased, hurting the effectiveness of the growth-oriented reform and adjustment policy.

The main purpose of the reforms – which, alongside restrictive macroeconomic policies, constituted an integral part of the growth-oriented adjustment program – was further liberalization in economic relations with foreign countries. Increased global competitive pressure, coupled with progress in deregulation, demonopolization, and privatization, was expected to stimulate entrepreneurship, competition and innovation in the economy, in addition to increasing the efficiency of the market and speeding up the process of restructuring production and employment.

Economic policy to improve competitiveness and investment attractiveness

Macroeconomic policy and reforms were expected to stabilize and, if possible, improve Poland's financial rating by the end of the 2012–2013 period. Importantly, it was expected that, with progress in this area, it would be possible to reduce the cost of Eurobond debt financing. This, in turn, was expected to reduce the costs of financing and handling the budget deficit and public debt.

Monetary policy

The National Bank of Poland (NBP), as well as the government in its budget targets, expected inflation to remain at around 4.0% in 2012. This relatively high inflation target was largely due to an earlier depreciation of the zloty and an increased cost of energy imports and producer supplies.

In the first three quarters of 2012, as in 2011, inflation remained at a high level. In the fourth quarter, it subsided to 2.4%. At the beginning of 2013, inflation dropped to 1.7%, well below the NBP's target.

As the inflationary pressure subsided, the economy slowed down, and unemployment rose at the end of 2012, the NBP launched a series of interest rate reductions. The first

cut took place in November when the NBP's reference rate was reduced to 4.5%, followed by another cut to 4.25% in December. In January 2013, a further reduction was made, to 4.0%, followed by 3.75% at the beginning of February, and 3.25% in March 2013 (Table 1).

Table 1
Changes in the NBP interest rates, 2010–2013

Effective from:	Reference rate	Lombard rate	Deposit rate	Rediscount rate
2010				
2010–01–01	3.50	5.00	2.00	3.75
2011				
2011–01–20	3.75	5.25	2.25	4.00
2011–04–06	4.00	5.50	2.50	4.25
2011–05–12	4.25	5.75	2.75	4.50
2011–06–09	4.50	6.00	3.00	4.75
2012				
2012–05–10	4.75	6.25	3.25	$5.00
2012–11–08	4.50	6.00	3.00	4.75
2012–12–06	4.25	5.75	2.75	4.50
2013				
2013–01–10	4.00	5.50	2.50	4.25
2013–02–07	3.75	5.25	2.25	4.00
2013–03–07	3.25	4.75	1.75	3.50

Source: NBP.

Fiscal policy

As in 2011, the government said developments in the Polish economy in 2012–2013 were largely the result of what happened across the European Union, combined with fiscal consolidation and changes in the labor activity ratio at home.

After a period of strong growth in public investment, which reached record levels in Poland, its GDP share fell from 5.8% in 2011 to 5.2% in 2012.

The slower rate at which investment demand increased in 2012, combined with the slowdown in external demand, reduced the demand for labor. The unemployment rate increased more markedly than expected. The persistently high jobless rate, together with a growing supply of labor, significantly reduced wage growth in the economy. In 2012, real wage growth was lower than in the previous year, when it stood at 1.1%. The

year 2012 was the fourth straight year in which real wages grew at a slower rate than labor productivity.

The government's 2012 budget target for real private consumption growth was about 2.1%. The actual figure was far lower and had a negative impact on GDP growth. The positive influence of the Euro 2012 soccer championships – hosted by Poland together with Ukraine in June – on consumer demand was lower than expected.

Among its budget targets, the government also assumed that imports in 2012 would grow at a slower rate than exports in real terms. This was expected to offset the impact of the public finance consolidation policy on income growth and employment.

The Polish currency was expected to strengthen gradually due to the country's strong economic fundamentals, including a relatively small current-account deficit, an inflow of foreign investment and a decline in the risk premium associated with the reduced public finance imbalance. However, the uncertainty on global financial markets and, in particular, increased risk aversion associated with the crisis in the eurozone proved to be a significant risk factor for the zloty.

Alongside macroeconomic trends, changes in the tax system had an impact on the government's revenue. These included the removal of a tax break for internet users and new allowance rules for those bringing up children. The latter change was primarily designed to make state assistance more equitable rather than produce financial gain for the government, officials said.

The consolidation of government expenditure, in addition to a reduced proportion of public investment expenditure, involves the strict observance of a temporary financial mechanism designed to limit an excessive increase in public spending. This mechanism was put in place in 2011 via an amendment to the law on public finances. It involves reductions in discretionary spending not defined in regulations governing public expenditure. Discretionary spending must not increase by more than 1% in real terms. The temporary financial mechanism leads to a gradual reduction in the size of the public sector in the economy and helps restrain the rapid growth of public debt.

The temporary financial mechanism covers discretionary spending accounting for around 25% of total government expenditure. The mechanism does not apply to fixed expenditure in areas such as debt service, national defense, transport infrastructure, Poland's contribution to the EU budget, and subsidies to local governments to finance the payment of pension benefits guaranteed by the state.

Budget deficit and public debt

Preliminary Finance Ministry data show that the 2012 budget deficit came to ZL31.82 billion, compared with the government's budget target of ZL34.999 million. This means that the public finance consolidation process was more restrictive than planned.

The public debt-to-GDP ratio calculated according to the method used by the Polish government was under 53% at the end of 2012, while the ratio calculated according

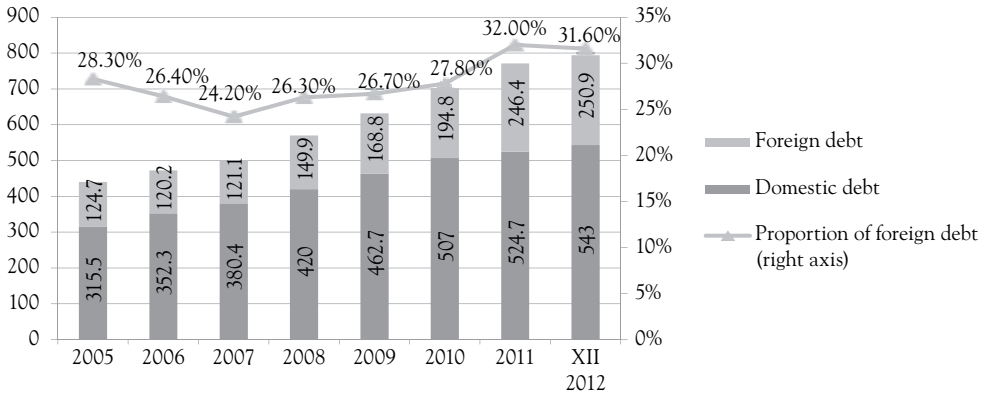
to an EU method was under 56%. Poland was among five EU countries that reduced their public debt-to-GDP ratio in 2012.

Importantly, the proportion of foreign debt in the total public debt decreased from 32.0% at the end of 2011 to 31.6% at the end of 2012. In 2013, a further reduction in this proportion should be expected due to factors including decreasing foreign and domestic debt financing costs.

At the end of December 2012, public debt stood at ZL793.8 billion (i.e. € 194.2 billion or $ 256.1 billion, according to the exchange rates as of Dec. 31, 2012, when the zloty traded at 4.0882 to the euro and at 3.0996 to the dollar). Compared with the end of 2011, Poland's public debt increased by ZL22.725 billion, or 2.9%.[1]

Figure 1

Public debt by place of issuance in 2005–2012 (ZL billion and %)



Source: *Report on Inflation*, NBP, November 2012.

If the preliminary data on the size of the deficit proves to be accurate, the European Commission will adopt a recommendation in mid-2013 on lifting the excessive deficit procedure with regard to Poland. Under that procedure, which was imposed in 2009, Poland was required to reduce its deficit to 3 percent of the GDP.

The abolition of the excessive deficit procedure would contribute to a further increase in the level of confidence Poland enjoys on international financial markets.

Exchange rate

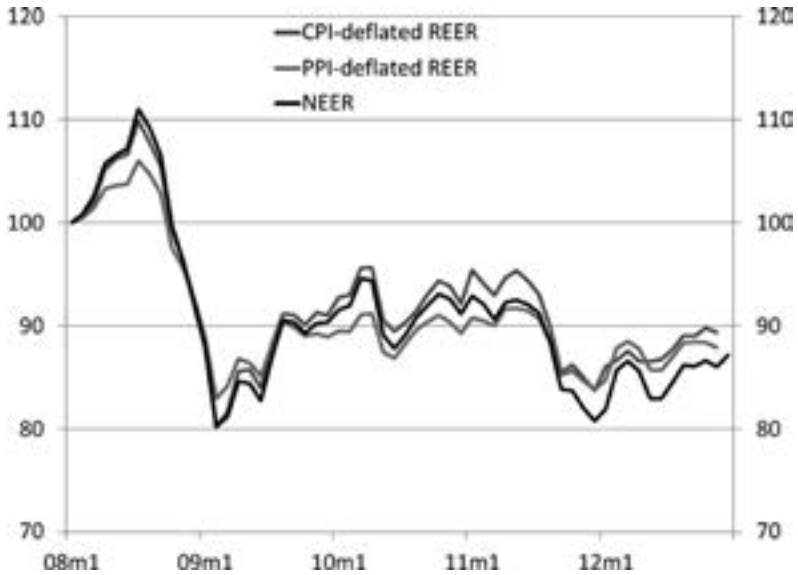
In 2012, the nominal exchange rate of the zloty hovered within a narrow range of 4.05–4.20 to the euro. As in previous years, the real effective exchange rate of the zloty

[1] According to GUS as of March 4, 2013.

fell less markedly than the nominal exchange rate. The smaller depreciation of the zloty is linked to a strong decline in unit labor costs in the manufacturing sector, which is more strongly associated with foreign trade than with the economy as a whole. The nominal exchange rate of the zloty adjusted by relative changes in unit labor costs, compared with 2008, is increasingly deviating from both the nominal exchange rate (by around 12%) and the real effective exchange corrected by relative differences in inflation (by around 16%). This confirms the positive trends in the cost and price competitiveness of the Polish economy resulting from faster growth in labor productivity and a decline in unit costs of production, especially industrial production, compared with countries that are Poland's key trading partners.

Figure 2

Real and nominal effective exchange rates of the zloty to the euro (increase denotes appreciation, January 2008 = 100)



Source: *Inflation Report*, National Bank of Poland, March 2013, p. 38.

In 2012, the financial efficiency of enterprises decreased slightly compared with 2011. However, it remained at a relatively high level. In 2013, this efficiency should improve further due to a significant reduction in interest rates and inflation as well as an expected rise in the export surplus and better use of production capacity.

Surveys show that exports are profitable if the zloty trades to the euro at a level no higher than 3.85, with the nominal exchange rate at 4.10 on average. The profitability of exports can be maintained at a relatively high level thanks to the fact that labor productivity in Poland is growing at a faster rate than in other EU countries, while salaries and costs are rising at a slower rate. This means that an economic recovery

in the EU will enable relatively strong growth in Polish exports and produce a multiplier effect in the economy.

Table 2
Selected efficiency indicators of Polish companies in 2008–2012

Indicator (%)	2008	2009	2010	2011	2012[a]
Profitability of sales	5.0	5.0	5.2	5.3	4.4
Debt of public limited-liability companies	47.5	46.9	47.1	48.0	48.5
Gross profit to interest ratio	5.9	7.1	7.8	7.5	6.4

[a]Data for the first half of 2012.

Source: *Inflation Report*, NBP, November 2012.

For now, recessionary trends in the German, French and British economies, which are Poland's most important trade partners, have resulted in a relatively strong slowdown in the rate at which Polish exports are growing. This decline has been partially offset by a strong rise in exports to dynamically developing markets such as Russia and China. This indicates progress in the competitiveness of the Polish economy and its relatively high ability for expansion on new dynamic markets.

The NBP's March 2013 decision to cut interest rates to 3.25% should promote a depreciation of the zloty against the euro. This would add to the profitability of exports and reduce imports. The significant drop in inflation and interest rates between November 2012 and March 2013 should stimulate domestic demand and the use of production capacity. As a consequence, the economy, after a period of a strong decline in the growth rate and a fall in employment, should stabilize and subsequently show progressive improvement in GDP growth in the second half of 2013.

The stability of the nominal exchange rate of the zloty, combined with an increase in foreign exchange reserves to a level above €80 billion (more than six times the value of monthly imports), have increased the confidence of foreign investors. Other contributing factors include the continued significant inflow of European funds, the transfer of savings by Poles working abroad (mainly in other EU countries), foreign direct and portfolio investment, a significant decline in inflation, and a reduction in the deficit in relation to GDP, in addition to reforms.

In 2012, Poland improved its net investment position as a result of three factors. First, the country paid its foreign debt to the London Club (old debt restructured in 1994) ahead of schedule. Second, the proportion of foreign debt in Poland's total public debt was reduced from 32.0% to 31.6%. Third, in 2012, for the first time, Poland made significant direct investment abroad. Copper giant KGHM (which accounted for 55% of Poland's total direct investment abroad) invested more than $4.5 billion in copper mining in the Sierra Gorda region in northern Chile, together with Japan's Sumitomo

Metal. Another major Polish direct investor, Impexmetal, started investing in bauxite extraction and enrichment in Guinea in West Africa.

At the end of February, the Fitch rating agency revised upward Poland's outlook to "positive" from "stable" and reaffirmed the country's credit rating of "A minus." A few days later, the Japan Credit Rating Agency (JCR) upgraded Poland's foreign currency rating from A– to A, and it also revised upward Poland's national currency rating from A to A +. After the rise, both of these ratings have a stable outlook. The JCR previously raised Poland's rating nearly 10 years ago.

Table 3
Poland's financial rating in February 2013

Rating agency	Foreign currency		National currency		Prospect
	Long term	Short term	Long term	Short term	
Fitch	A–	F2	(A)	none	positive
Moody's	A2	P–1	A2	P–1	stable
Standard & Poor's	A–	A–2	(A)	A–1	stable

Source: Bloomberg, Feb. 21, 2013.

The increased confidence of financial markets in the Polish economy enabled a significant reduction in yields on Polish Treasury bonds issued in the form of Eurobonds. In the fourth quarter of 2012, yields on two-year, five-year and 10-year bonds fell to 3.5%–4%. To compare, in 2007, they were around 5.5%, and at the height of the crisis at nearly 8%. The falling yields are a result of the positive way in which the Polish economy is perceived on financial markets. Polish Treasury bonds, thanks to their relatively high yields, were more profitable for investors than German or Czech bonds, for example. They were also less risky than Spanish or Italian bonds.

Government investment programs launched and planned in 2013

In 2013, the government plans to launch two new large investment programs. The first concerns support for small and medium-sized enterprises businesses, and the other is related to investment in infrastructure.

The first program, launched in early March 2013, offers guarantees to small and medium-sized enterprises aiming to strengthen their current liquidity. Under the Warranty Line Portfolio instrument, Bank Gospodarstwa Krajowego (BGK) will issue guarantees to ensure the repayment of loans offered by commercial banks and cooperative banks to small and medium-sized enterprises. BGK has sufficient funds of its own to issue ZL30 billion worth of guarantees, which in turn will make it possible to grant

ZL50 billion worth of financial credit. Easier access to credit means greater security for companies, and this translates directly into retaining jobs.

The other government investment program planned for 2013 is called Polish Investment. It is due to be launched in the second quarter and is designed to finance a number of major projects related to conventional, renewable, and nuclear energy as well as projects involving oil and shale gas extraction. The government plans to contribute shares in some of Poland's largest companies – such as Bank PKO BP, PZU, KGHM, PSE, PGE and Orlen – to the program.

In 2013, a substantial increase is planned in investment in railway modernization, which will be largely financed from EU funds. The government will continue to spend heavily on the construction of freeways and expressways.

In 2012, in connection with the proven existence of extensive shale gas deposits in Poland (the largest in Europe), intensive drilling work was conducted. As the first results of this work were encouraging, on March 1, 2013, the Ministry of Finance proposed imposing a tax on the extraction of hydrocarbons, including natural gas and crude oil. Under the proposal, the tax rate would range from 12.5% to 25%, as of Jan. 1, 2015.

2013 budget targets

Under the 2013 budget targets, the government expects to generate total revenue of ZL299.3 billion, with expenditure set at ZL334.9 billion. The budget deficit should not exceed ZL35.5 billion as of Dec. 31, 2013. It will be financed with revenue from sources including the sale of Treasury securities, privatization and loans.

Revenue from European funds is expected to total ZL81.4 billion, with spending at ZL75.2 billion.

The government's budget targets are based on the assumption that Poland's 2013 GDP growth will be around 2%. In the first two quarters, this growth is slated to be under 2%, with an expected acceleration in the second half of the year.

4.2. Financial System and Capital Market Development

Oskar Kowalewski

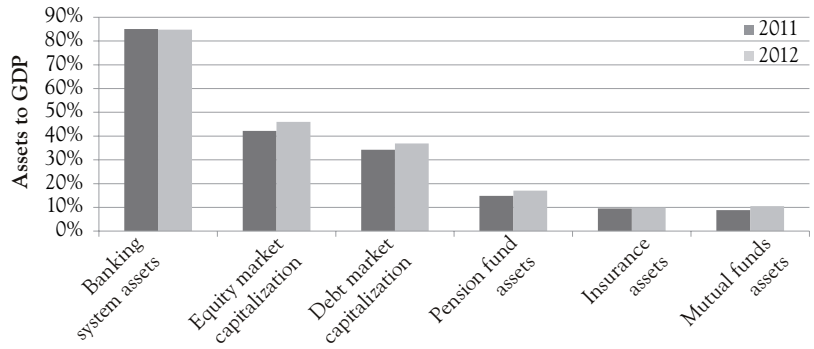
Poland's financial system has proved to be resistant to the pressures of the global financial crisis that began in 2007 and it has also been resilient to the eurozone debt crisis which started in 2009. This is due to a combination of three factors: Poland's relatively good though declining economic performance in 2007–2012; a relatively

low level of consumer and corporate debt prior to the crisis; and a responsible policy pursued by the central bank and the financial supervision authorities in the last decade (Kowalewski and Rybiński, 2011).

The Polish financial system remains one of the most developed among the non-euro-area EU member countries despite the economic slowdown since 2010. The financial system's assets represented an estimated 205% of the GDP in 2012, compared with 195% in 2011. Moreover, Poland's financial sector is well integrated into the EU financial system, which is demonstrated by the high degree of foreign ownership of financial institutions and the increasingly international role of the Warsaw Stock Exchange (WSE). Moreover, consolidated data from the Bank of International Settlements (BIS) show that foreign banks' claims on Poland amounted to 59% of the GDP at the end of 2012, reflecting the openness of Poland's financial system. The proportion of bank assets owned by foreign institutions through their branches and subsidiaries reached almost 65% in 2012. These cross-border linkages make Poland vulnerable to potential spillovers from escalating financial and sovereign stress in the euro area. Furthermore, parent bank deleveraging or funding withdrawal may worsen the Polish banking system's liquidity situation, with potential adverse effects on credit and growth. However, the fears of massive credit-line withdrawals by foreign parent banks have not materialized so far.

Figure 3

Assets of financial intermediaries as a percentage of GDP at the end of 2011 and 2012



Source: National Bank of Poland, Polish Financial Supervisory Authority.

The structure of the Polish financial system is still dominated by credit institutions, but their share in the total assets of the financial sector has decreased in recent years. The banking sector's share in total financial sector assets has declined by over 10 percentage points since 2000 to 85% of the GDP in 2012. Meanwhile, the stock market has expanded and other financial intermediaries, such as insurance companies and pension funds, have increased their role in the financial system. In 2012, the equity and bond market's capitalization increased and accounted for more than 46% and 37% of GDP

respectively. At the same time, pension fund assets and mutual fund assets increased by 2% over the previous year. The assets of insurance companies increased only slightly in 2012. Figure 3 offers a broad overview of the structure of Poland's financial system at the end of 2011 and 2012.

Banking sector

As already shown, the Polish financial system is mainly bank-based due to the prominent role of commercial and cooperative banks. In 2012, however, the number of credit institutions declined slightly to 641, from 646 in 2010. As a result, the banking sector consisted of 572 cooperative banks, 45 commercial banks and 24 branches of foreign banks in 2012. The decline was mainly caused by an ongoing consolidation process among credit institutions, which was partially due to the selloff of foreign-owned bank subsidiaries, whereas the process of withdrawing from the Polish banking market was a result of financial problems on the home market caused by the financial crisis (Hryckiewicz and Kowalewski, 2011).

Table 4
Number and type of credit institutions in Poland

	1993	1995	2000	2005	2010	2012
Credit institutions, of which:	1,740	1,591	753	649	646	641
Commercial banks	87	81	73	54	49	45
– state-owned	29	27	7	4	4	4
– foreign banks	10	18	46	50	45	40
Bank branches	-	-	-	7	21	24
Cooperative banks	1,653	1,510	680	588	576	572

Source: National Bank of Poland and Polish Financial Supervisory Authority.

In 2011, Irish financial institution AIB decided to sell its Polish subsidiary BZ WBK to Spanish financial group Santander. Santander also acquired Poland's Kredyt Bank from Belgian financial holding company KBC. In 2012, Santander received permission to merge these two institutions and as a result Santander will soon own the third-largest foreign bank in this country. As a consequence of the crisis, the ownership structure of Poland's banking sector has changed significantly in recent years. Currently, foreign investors in Poland's banking sector hail from 18 countries and no country accounts for more than 12.5% of total assets, yet most foreign bank subsidiaries are owned by European credit institutions. The largest foreign investors in Poland's banking sector are Italy's UniCredit, Spain's Santander and Germany's Commerzbank, with 11.3%, 7.8%

and 7.6% of total assets respectively. However, the state-controlled PKO BP remained the largest bank in the Polish financial system in 2012, accounting for around 25% of the banking sector's total assets. Nevertheless, the level of concentration in the Polish banking sector is relatively low, as the five largest credit institutions accounted for a combined 45% of the total assets in 2012.

Table 5 shows that credit growth declined in 2012 as conditions tightened due to uncertainty over Poland's economic outlook. Overall bank lending grew by 1.2% in 2012 in average annual terms. Corporate and consumer loans grew 2.9% and 0.2% respectively. As shown in Table 5, the loan-to-deposit ratio remained at a healthy level of below 110% in 2012. The relatively low reliance of subsidiaries on parent funding prevented a credit crunch in Poland during the crisis, yet a significant decline in loan growth has been observed since 2008. As a result, the ratio of bank credit to GDP, which illustrates the importance of credit institutions relative to the size of the economy, is still among the lowest in the EU. Bank credit represented just over 50% of Poland's GDP at the end of 2012, while the EU average was 118%. Only Romania and Slovakia had lower bank credit-to-GDP ratios, at 33% and 49% respectively. Furthermore, credit to enterprises was equivalent to only 17% of the GDP and was the lowest among EU member states. In the EU as a whole, enterprise credit represented 50% of the GDP on average. Similarly, credit to households remains relatively low in Poland. Credit to households stood at 19% of the GDP in 2012, while the EU average was 40%. The difference reflects the continued underdevelopment of the Polish banking sector, which nonetheless was still the most important part of the country's financial system.

Table 5

The development of Poland's banking sector in 2008–2012 (%)

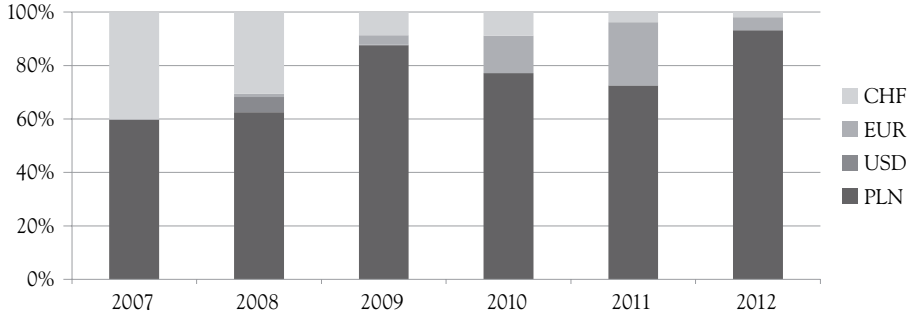
	2008	2009	2010	2011	2012
Deposits growth	20.5	10.1	9.7	8.9	7.8
Lending growth	36.5	10.0	8.9	14.6	1.2
Loan to deposit ratio	108.1	107.9	108.1	111.4	109.5
Mortgages to GDP	15.2	16.1	19.0	21.1	21.6
FX lending to total lending	31.4	29.2	29.7	30.7	30.1

Source: UniCredit (2012).

In Poland, as in other CEE countries, most of the mortgage loan growth was contained in unhedged foreign currency (FX) prior to the crisis. In 2008, the value of FX mortgage loans, mainly those denominated in Swiss francs (CHF), was twice as high as that of domestic currency loans, even though the Polish financial authorities took precautionary measures to reduce demand for FX loans prior to the financial crisis. After the crisis erupted, the national supervisory authorities in all CEE countries tried to rein in consumer credit growth, especially when it came to foreign-currency

mortgage loans. Poland's financial authorities made several recommendations regarding consumer loans. Their implementation has resulted in a significant decline in the value of new foreign-currency-denominated mortgage loans granted in the last five years. The proportion of new domestic-currency loans granted to households in Poland increased from 60% in 2008 to 97% in 2012.

Figure 4
Currency structure of new housing loans to households, 2007–2012



Source: National Bank of Poland and the Polish Financial Supervisory Authority.

In 2012, the quality of the household loan portfolio remained broadly unchanged, and impaired loans grew mainly in the case of housing loans. By contrast, the financial difficulties of some enterprises active on the real estate market and involved in infrastructure projects led to a fall in the quality of the corporate loan portfolio.

Table 6
The profitability of Poland's banking sector in the 2005–2012 period (in ZL million and %)

	Net earnings	Total assets	Total capital	ROA	ROE
2005	9,110	586,426	54,970	1.55%	16.57%
2006	10,697	681,792	59,208	1.57%	18.07%
2007	13,642	792,774	68,343	1.72%	19.96%
2008	13,935	1,041,769	82,277	1.34%	16.94%
2009	8,278	1,057,376	103,800	0.78%	7.98%
2010	11,420	1,159,358	115,980	0.99%	9.85%
2011	15,693	1,295,063	129,035	1.21%	12.16%
2012	16,138	1,353,084	147,265	1.19%	10.96%

Source: National Bank of Poland and Polish Financial Supervisory Authority.

An increased burden of credit risk materialization costs led to a drop in net income from banking activity. As a result, the return on assets (ROA) and equity (ROE) declined and remained substantially lower than in 2011. Table 6 shows, however, that the banking sector's net profits in nominal terms hit a new all-time high in 2012 and surpassed the levels observed prior to the financial crisis.

The declining profitability is related to the increased burden of credit risk. A slower pace of economic growth will continue to have an adverse effect on the quality of corporate loans, and it may also have a negative influence on the quality of loans to households. Consequently, banks in Poland are implementing restructuring programs with the aim of increasing profitability. Implementing these plans involves restructuring costs, but should help improve cost effectiveness in the long term. As a result of restructuring, employment in the banking sector declined from 176,000 to 175,000 for the first time in a decade. Moreover, planned restructuring programs and bank mergers may dampen the growth of employment and branch network expansion in the near future. In addition, banks' general expenses may grow as a result of the planned introduction of an additional prudential fee for the BFG stabilization fund (NBP, 2012).

Finally, banks will find it difficult to raise the profitability of capital also because of their limited possibilities for increasing financial leverage. This will result from both market pressure and regulatory measures. A decline in profitability, coupled with slow growth in the loan portfolio and bank assets, will lead to a fall in bank profits in nominal terms. Consequently, the profitability and condition of the Polish banking sector will probably deteriorate in the coming year.

Capital market

After a decline in equity prices in 2011, the stock market improved significantly in 2012. The WSE's main index, the WIG, increased by 26%, while the WIG20 blue-chip index rose by 20%. As a consequence, the equity market's capitalization increased to 46% of the GDP in 2012 from 42% in 20011.

In 2012, a total of 438 companies, including 43 foreign-owned businesses, were listed on the WSE. At the end of the year, the WSE listed the largest number of companies among all stock exchanges in the CEE region. The WSE also had the biggest capitalization and the highest turnover in shares among CEE exchanges. The 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 2012, of the 51 foreign companies listed on the WSE's markets, 12 were from Ukraine.

According to the annual *IPO Watch Europe* survey by professional services firm PricewaterhouseCoopers (PwC), the WSE again topped the list among European exchanges in terms of the number of IPOs in 2012. In total, 108 companies were newly listed on the WSE's markets, representing 39.5% of all European IPOs. In terms of the

value of IPOs, the WSE ranked fifth among European exchanges in 2012 (*IPO Watch Europe*, 2013). The survey shows that the offering of Alior Bank was the fifth-largest IPO on European markets in the final quarter of 2012.

Apart from initial public offerings, the WSE's growth was fueled by the sale of stakes held by the government in enterprises in 2012. At the end of 2012, the government held significant blocks of shares in many listed companies and was responsible for 20.7% of the WSE's capitalization. It is expected that the government will continue to privatize companies through the WSE in the coming quarters, both by reducing its stake in already listed companies and by privatizing enterprises.

Poland's debt securities market, equivalent to around 37% of the country's GDP in 2012, is the largest and most liquid in the CEE region. It is 90% made up of government bonds, while corporate bonds account for about 4% of the market. The Catalyst debt instrument trading system launched in 2009 has proved to be an important driver of growth on the non-Treasury debt instrument market in Poland. The nominal value of non-Treasury debt instruments listed on Catalyst at the end of 2012 was 31% higher than a year earlier.

The number of futures and options contracts increased in 2012 in comparison with previous years. As a result, the WSE is the leading European exchange in terms of the volume of trading in derivatives. A major part of the trading in derivatives on the WSE has been generated by WIG20 index futures. The WSE ranked fourth among European exchanges by the volume of trading in share index futures in 2012 (WSE Annual Report, 2012).

Table 7

Market capitalization to GDP and number of instruments on the WSE at end of year (%)

	1991	1995	2000	2005	2010	2012
Market capitalization to GDP (%)						
domestic listed companies	0.20	3.42	17.48	31.37	29.30	32.80
foreign listed companies	-	-	-	11.85	12.92	13.20
domestic bonds		3.92	9.96	29.19	34.27	36.88
foreign bonds	-	-	-	0.11	0.01	0.01
Number of listed instruments						
Companies	9	65	225	255	400	438
of which: foreign	-	-	-	7	27	43
Bonds	-	33	48	76	50	62
of which: foreign	-	-	-	4	3	2
Futures	-	-	16	54	55	91
Options	-	-	-	122	106	120

Source: Warsaw Stock Exchange.

Foreign investors were responsible for more than 40% of the WSE markets' capitalization in 2012. However, the WSE has yet to join the stock exchange consolidation process in Europe. The consolidation of exchanges through mergers, acquisitions and strategic alliances with the biggest market operators in Europe and beyond has been a market trend for some time. While the WSE has tried to take over some of the exchanges in the region, these attempts have not been successful.

Insurance sector

At the end of 2012, 28 life insurance and 32 non-life insurance companies were operating in Poland. Most of these insurers are owned by universal insurance companies that offer products in both market segments. As in the banking sector, the country's economic development and the large potential of the market has encouraged many foreign insurers to enter the Polish market. As a result, 23 of the 28 life insurers and 23 of the 32 non-life insurers are foreign owned, mainly by European entities.

As in the banking sector, the number of companies in the insurance industry declined further in 2012, though by only one life insurer and one non-life insurer. The decline was due to consolidation caused by the sell-off of foreign-owned insurance companies in Poland. As in the banking sector, the decision to sell insurance subsidiaries in Poland was largely a consequence of problems experienced by parent insurance companies on their home markets. In early 2012, Talanx emerged as a new and significant force through its acquisition of two Polish companies Warta and Europa, from KBC and Getin Holding respectively. In mid-2012, Austria's VIG completed its acquisition of specialist life insurer Polisa. Moreover, VIG has completed the integration of two of its non-life businesses, Interrisk and PZM. Consequently, as in the banking sector, the ownership structure of Poland's insurance market is changing dramatically.

State-controlled PZU remains the largest universal insurance company, with a market share of 27% in the life insurance segment and over 32% in the non-life business in 2012. Consequently, the insurance market remains highly concentrated, though this is gradually changing as foreign companies aggressively challenge the leader with lower prices, better customer service and alternative sales channels.

As of late 2012, it was abundantly clear that the life segment has returned to strong growth after three years of stagnation. There has been a significant increase in sales of insurance products to individuals through the *bancassurance* channel. Most, but not all, of the larger players in the segment have benefited. The obvious implication is that Polish households have regained an appetite for risk, with the result that life insurance's importance as a conduit for organized savings in the country is growing rapidly once more.

At the end of 2012, the gross written premium in the Polish insurance industry as a whole stood at ZL46,946 million, marking a 7.8% rise year on year. The gross written premium in the life and non-life insurance segments increased over 11% and 4% respec-

tively. The total value of investments by all insurance companies amounted to ZL86.9 billion at the end of 2012 and increased by 4.8% compared with the end of 2011. The so-called technical result of the insurance sector increased by 20% to ZL3,438 million in 2012. An important factor that improved the performance of the insurance sector is that many companies benefited from lower claims in 2012 relative to 2011.

In contrast to other CEE countries, premiums were growing at respectable rates in both the life and non-life segments in 2012. A number of positive factors, such as higher rates and the introduction of new products, are at work. The implication is that the difficult economic conditions have not had the expected impact. As a result, the Polish insurance market remains the largest in CEE, with a total premium volume close to ZL50 billion at the end of 2012.

Poland's insurance sector, however, remains underdeveloped compared with its counterparts in developed countries. In 2012, insurance penetration in Poland, in the form of premiums as a percentage of GDP, was still considerably lower than in developed countries. Non-life business penetration in Poland was at 1.24%, while the European average was 3.0%. Penetration in the life business was at 1.70%, while the European average was 4.5% in 2010 (SwissRe, 2011).

Table 8
Key characteristics of the Polish insurance market

	1991	1995	2000	2005	2010	2012
Life insurance						
Number of companies	5	13	35	32	30	28
Total assets (in millions of zlotys)	18	2,372	20,391	53,476	93,966	96,810
Gross written premiums (in millions of zlotys)	208	1,852	8,335	15,336	31,420	27,187
Gross written premiums to GDP (%)	2.57	1.11	1.68	1.57	2.09	1.70
Non-life insurance						
Number of companies	19	27	33	37	33	32
Total assets (in millions of zlotys)	910	2,932	17,536	36,086	51,204	61,908
Gross written premiums (in millions of zlotys)	1,275	3,731	12,503	15,649	22,739	19,758
Gross written premiums to GDP (%)	1.57	0.55	1.12	1.60	1.66	1.24

Source: National Bank of Poland and Polish Financial Supervisory Authority.

The low insurance market penetration rate means that the Polish insurance sector has high growth potential. The mid-term growth rate forecast by SwissRe (2012) for emerging markets is still around 6% on average for life insurance and 7% for non-life insurance, while only 2% and 3% for advanced countries respectively. But despite

optimistic forecasts and large market potential, the economic slowdown may hamper the development of the Polish insurance sector in the near future. On the other hand, Poland's insurance market has returned to its pre-crisis level in terms of growth, while its counterparts in most developed countries are still below that level. Moreover, new health and medical insurance products are still undeveloped in Poland and may lead to further development of the insurance market in the near future.

Investment funds

At the end of December 2012, the net assets of Poland's investment funds approached ZL145.8 billion, a rise by 26.9% from a year earlier. Thus, in 2012, investment fund assets were the highest after a record level reached in October 2007, when Poland's investment fund companies managed over ZL144 billion of assets between them, including ZL63 billion allocated to equities. This increase was driven by falling interest rates and reduced bank deposit yields as well as favorable changes in the prices of financial instruments.

Table 9
Net assets value growth by investment fund type (in ZL million)

Investment fund	Dec. 31, 2012		Dec. 31, 2011		
	Net assets	Market Share	Net assets	Market Share	Change
Debt	41,233	28.3%	24,710	21.5%	66.9%
Stock	24,604	16.9%	21,337	18.6%	15.3%
Non-public assets	23,352	16.0%	14,261	12.4%	63.7%
Mixed	20,163	13.8%	21,286	18.5%	–5.3%
Cash	13,795	9.5%	13,595	11.8%	1.5%
Undefined	9,898	6.8%	8,135	7.1%	21.7%
Absolute return rate	4,419	3.0%	2,956	2.6%	49.5%
Real property	3,486	2.4%	3,307	2.9%	5.4%
Capital protection	2,281	1.6%	2,886	2.5%	–21.0%
Securitization	2,071	1.4%	1,760	1.5%	17.7%
Commodity market	519	0.4%	697	0.6%	–25.5%
TOTAL	145,821	100.0%	114,930	100.0%	26.9%

Source: Analizy Online.

The macroeconomic situation further influenced the changes in the structure of assets by market segment. High net inflows were recorded by domestic debt and equity

securities funds, with funds mainly paid to entities open to a broad group of investors. Moreover, non-public asset funds also had their highest market share in 2012. On the other hand, most funds were withdrawn from money market funds. This may have been associated with the lower returns of some entities that held loss-making corporate bonds in their portfolios.

The three largest investment funds by managed assets in 2012 were Pioneer Pekao, PZU and Aviva Investors Poland. The five largest investment funds accounted for 42.6% of the total value of net assets under management at the end of December 2012. Consequently, the asset management sector is relatively concentrated.

The financial condition of investment fund management companies worsened in 2012. Management fees, which are the main source of revenue for investment fund companies, declined although the average value of fund assets increased. Lower revenues translated into a substantial fall in ROE for the asset management sector in 2012.

Pension funds

The profitability of Poland's pension fund management companies (PTEs) increased slightly in 2012 over 2011. But many companies improved their financial results only because they were forced to stop advertising their products as a result of a new law that took effect in 2012. The law completely banned advertising and active customer enlistment on the market for pension funds. Currently, correspondence is the only allowable way of concluding agreements with open pension funds. This has significantly reduced the number of people changing pension funds (a decrease by 79% compared with 2011) and limited the number of individuals who are joining pension funds for the first time as a result of their own decision (a drop by 62% compared with 2011). The law also prohibits large pension funds from taking part in procedures for the random selection of customers, in which a total of 356,000 people (79% of all new customers) were allocated to pension funds in 2012. At the same time, the three largest funds, ING, PZU and Aviva, saw their market share drop by between 0.2 and 0.5 percentage points in 2012.

PTE revenue from contribution fees declined considerably in 2012 due to a reduction in the contribution from 7.3% to 2.3%. Consequently, the structure of PTE revenue changed as the proportion of revenue from pension fund management grew from 58% in 2011 to 68% in 2012. Moreover, pension fund management costs declined considerably due to the ban on the active enlistment of customers imposed in 2012. In the past, the costs of finding customers constituted a significant part of PTE costs associated with OFE management.

At the end of 2012, the total net assets of all OFEs amounted to ZL272.3 billion and were 20% higher than at the end of 2011. The structure of the OFE investment portfolio is determined by limits on investment and the situation on financial markets. The investment strategy of PTEs has not changed significantly since 2011. At the end of

2012, domestic Treasury securities were still the dominant component of OFE portfolios and accounted for 44% of total assets. At the same time, equities represented 34.2% of the OFE portfolio on average, while the regulatory limit was 45% of total assets. It seems that PTE decisions on equity purchases are to a greater extent determined by the situation on the domestic financial market than by increases in the limit on this type of investment.

In 2012, Poland's pension fund companies took advantage of positive trends on the stock market and their good position on the debt market. As a result, the value of OFE units rose by 16.3% on average, which was the second best result in the history of OFE investment.

Table 10

The profitability and assets of pension fund companies (PTE) and open pension funds (OFE) in ZL million

	PTE		OFE	
	Net profit	ROE	Assets	Unit Return
2005	460.8	23.9%	85,925	15.0%
2006	604.5	27.2%	116,216	16.4%
2007	696.3	28.3%	139,594	6.2%
2008	730.9	23.9%	138,206	–14.2%
2009	762.3	23.7%	179,040	13.7%
2010	598.0	17.3%	221,462	11.2%
2011	616.0	19.4%	226,204	–4.7%
2012	715.1	19.7%	272,300	16.2%

Source: Polish Financial Supervisory Authority.

Conclusions

Poland has one of the most developed financial sectors among CEE countries. Moreover, the Polish financial system is well integrated into the EU financial system, as demonstrated by the high level of foreign ownership in financial institutions and the increasingly international role of the WSE. However, the WSE has so far not taken part in the European stock exchange consolidation process.

The financial system is dominated by banks but their share in total financial sector assets has decreased in recent years. The Polish banking system weathered the 2008–2009 crisis relatively unscathed and fears of massive credit-line withdrawals by foreign parent banks did not materialize. Polish banks are not directly exposed to credit risk in outlying European countries, even though Poland's banking system is deeply

integrated with international banks. Foreign investors control almost 70% of the Polish banking sector's assets; most of these are European companies.

The condition of Poland's banking sector has improved steadily since the end of 2009. Interest margins have returned to their 2008 level, boosting the sector's profitability. Credit growth has continued in recent years despite the economic slowdown, but the credit-to-GDP ratio has remained low in comparison with other EU member states. Moreover, more stringent regulations have had a negative impact on the appetite for household loans, because prior to the crisis most mortgage loans were denominated in foreign currency. Despite the resilience of the economy to the crisis until 2012, the quality of loans to the non-financial sector has worsened since 2009 amid rising unemployment. In 2012, the quality of loans was stable.

Non-banking institutions play a relatively important role in financial intermediation, accounting for roughly 30% of the total assets of Poland's financial institutions by 2012. The insurance sector expanded in 2012, but its size is still far below the eurozone average. Investment funds have also increased their assets recently and returned to their pre-crisis levels for the first time. The increase in investment fund assets was mainly due to a decline in market interest rates and encouraging trends on the stock market. The increase in equity prices in 2012 also resulted in a record improvement in pension fund performance. Launched in 1999, pension funds remain the biggest non-banking intermediaries. They are among the biggest domestic institutional investors on the WSE despite government reforms that significantly reduced transfers to private pension funds in 2011. In early 2013, the government announced plans to further reform the pension system and nationalize pension funds in an attempt to reduce public debt. Such a reform could have a significant negative impact on the development of the WSE, because OFE pension funds were a driving force behind the development of Poland's capital market in the past.

4.3. Quality of Business Environment

Aleksander Sulejewicz

Global ranking lists measuring and assessing the behavior of economies have become a serious transnational instrument of regulation these days. These league tables have become an increasingly important ideological benchmark for local public bureaucracies, media and academic lobbies in the realm of economic reform, public relations, and image management. This last development appears to be among the factors responsible for this year's improvement in Poland's position.

In this assessment of the quality of Poland's business environment and its role in shaping the country's competitiveness, we rely on two key sources: the Heritage Foundation and the World Bank's Doing Business Project. We leave the methodologi-

cal and technical aspects of various compilations for the reader to look up in the works referenced below.

The quality of the business environment as an aspect of economic freedom

The Index of Economic Freedom (19th edition) is compiled by the Heritage Foundation/Wall Street Journal/Dow Jones and Co. (Center for International Trade and Economics). The Heritage Foundation (HF) score is based on around 50 variables packaged in 10 detailed freedoms: business freedom, trade freedom, fiscal freedom, government size, monetary freedom, investment freedom, financial freedom, property rights, freedom from corruption, and labor freedom. The Index of Economic Freedom is a gross indicator and each factor is graded according to a unique scale. The scale runs in percentages from 0 (policies/environment least conducive to economic freedom) to 100 (most conducive).

In 2013, the average indicator of economic freedom in the world as a whole (185 countries) was 59.6%, up by 0.1% from 2012. The Polish business environment as approximated by the index scored 66% and was ranked 57th (behind Malaysia and ahead of Albania). The previous positions were as in Table 11.

Table 11
Poland's position in the Heritage Foundation ranking of economic freedom

Year	'95	'00	'01	'02	'03	'04	'05	'06	'07	'08	'09	'10	'11	'12	'13
Poland's rank	76	75	67	51	66	80	77	84	90	83	82	71	68	64	57

Source: Heritage Foundation.

The rankings show that Poland has always been in the middle of the pack in the race for reform. Table 12 shows the general trends in relative changes of the assessment of Poland's business environment. It shows a tilde-like pattern (~): rising steadily from 1995 to 2002, falling between 2002 to 2007, and rising again. The progress achieved recently has allowed Poland to be ranked among the five "big gainers," i.e., countries that improved their business environment the most even though they are still below the average for their neighbors (70.1). These five big gainers are Colombia, Indonesia, Jordan, Poland, and the United Arab Emirates. "With a cumulative score improvement of 3.5 points or more, each of these countries has achieved five consecutive years of improving economic freedom and turned the global economic crisis into an opportunity to upgrade its economic system." (Heritage Foundation, 2012, p. 1). Poland, however, remains "moderately free."

Table 12

Overall score of economic freedom for Poland and its neighbors;
Heritage Foundation 2013

Year	Poland	Czech Republic	Estonia	Lithuania	Latvia	Slovakia	Hungary	Ukraine	Average 6 (EU) neighbors
2013	66.0	70.9	75.3	72.1	66.5	68.7	67.3	46.3	70.1
2012	64.2	69.9	73.2	71.5	65.2	67.0	67.1	46.1	67.0
2011	64.1	70.4	75.2	71.3	65.8	69.5	66.6	45.8	69.8
2010	63.2	69.8	74.7	70.3	66.2	69.7	66.1	46.4	69.5
2009	60.3	69.4	76.4	70.0	66.6	69.4	66.8	48.8	69.8
2008	59.5	68.5	77.8	70.8	68.3	68.7	67.2	51.0	70.2
2007	57.4	67.8	78.0	71.5	68.3	68.4	64.4	51.5	69.7
2006	58.6	66.8	74.9	71.8	67.2	68.7	64.7	54.4	69.0
2005	58.8	64.9	75.1	70.5	66.4	65.6	63.2	55.8	67.6
2004	58.7	67.0	77.4	72.4	67.4	64.6	62.7	53.7	68.6
2003	61.8	67.5	77.7	69.7	66.0	59.0	63.0	51.1	67.1
2002	65.0	66.5	77.6	66.1	65.0	59.8	64.5	48.2	66.6
2001	61.8	70.2	76.1	65.5	66.4	58.5	65.6	48.5	67.1
2000	60.0	68.6	69.9	61.9	63.4	53.8	64.4	47.8	63.7
1999	59.6	69.7	73.8	61.5	64.2	54.2	59.6	43.7	63.8
1998	59.2	68.4	72.5	59.4	63.4	57.5	56.9	40.4	63.0
1997	56.8	68.8	69.1	57.3	62.4	55.5	55.3	43.5	61.4
1996	57.8	68.1	65.4	49.7	55.0	57.6	56.8	40.6	58.8
1995	50.7	67.8	65.2	-	-	60.4	55.2	39.9	-

Source: *Index of Economic Freedom*, Heritage Foundation. Reports for years 1995–2012, accessed Feb. 22, 2013, www.heritage.org

The individual freedoms are rated differently. The results for the last 19 years are summarized in Table 13.

Monetary and trade policy aspects improved the overall Polish score although these items have decreased in value. Institutional features tended to lower the overall score but have been improving. The biggest rise was noted in business and financial freedom. The size of the state is still deemed "unfavorable," but a decrease in corruption was registered.

Table 13
Poland: overall and partial indicators of economic freedom (2013)

Year	IEF	Business freedom	Trade freedom	Fiscalism freedom	Big govt freedom	Monetary freedom	Investor freedom	Financial freedom	Property rights freedom	Freedom from corruption	Employer freedom
2013	66.00	64.00	86.80	76.00	43.00	77.70	65.00	70.00	60.00	55.00	62.90
2012	64.20	61.40	87.10	74.40	40.30	79.10	65.00	60.00	60.00	53.00	61.30
2011	64.10	61.40	87.60	74.00	43.80	78.10	65.00	60.00	60.00	50.00	61.20
2010	63.21	62.20	87.48	74.93	46.83	78.15	60.00	60.00	55.00	46.00	61.53
2009	60.32	53.66	85.80	68.97	42.18	80.82	60.00	60.00	50.00	42.00	59.81
2008	60.29	54.24	86.00	68.56	43.49	82.26	60.00	60.00	50.00	37.00	61.32
2007	58.11	55.32	86.60	68.63	44.79	80.35	50.00	50.00	50.00	34.00	61.39
2006	59.29	56.51	82.40	68.69	39.52	79.61	50.00	70.00	50.00	35.00	61.19
2005	59.61	70.00	79.20	68.35	30.30	82.27	50.00	70.00	50.00	36.00	59.99
2004	58.73	70.00	70.40	64.88	35.13	78.13	50.00	70.00	50.00	40.00	-
2003	61.82	70.00	70.20	65.60	46.07	73.51	50.00	70.00	70.00	41.00	-
2002	65.01	70.00	78.80	65.27	49.57	70.43	70.00	70.00	70.00	41.00	-
2001	61.82	70.00	77.60	61.30	44.53	70.93	70.00	50.00	70.00	42.00	-
2000	59.95	70.00	74.80	58.08	33.73	66.95	70.00	50.00	70.00	46.00	-
1999	59.62	70.00	73.00	53.25	35.97	63.58	70.00	50.00	70.00	50.80	-
1998	59.23	70.00	73.00	51.62	33.16	59.61	70.00	50.00	70.00	55.70	-
1997	56.79	70.00	49.60	49.46	26.79	55.23	70.00	50.00	70.00	70.00	-
1996	57.78	70.00	57.00	47.99	32.60	52.41	70.00	50.00	70.00	70.00	-
1995	50.70	70.00	57.00	51.01	09.58	48.71	70.00	50.00	50.00	50.00	-

Source: *Index of Economic Freedom*, Heritage Foundation, as above.

Institutional quality when doing business

A more disaggregated presentation of the qualitative aspects of Poland's business environment can be found in data compiled as part of the *Doing Business* project (Table 14). The summary characteristics of the Polish business environment rank it 55th worldwide (up from 62nd in 2012, 70th in 2011 and 72nd in 2010).

Last year, a number of countries improved significantly. Poland moved up by seven notches (+7), yet it is still behind most of its neighbors, including Montenegro and Kazakhstan, though ahead of Belarus, for example. In contrast to the *DB2012* report, which ranked Poland among the bottom 15 countries in terms of progress shown, this year's *DB2013* names Poland as the world leader in implementing four of 10 reforms promoted by the World Bank (World Bank, 2012, p. 12). Poland was also listed 17th among the 50 countries that made the most progress in reforming their economies since 2005 (Georgia, Rwanda, and Belarus are the leaders). Polish sources attribute the success in the rankings to the government's sustained efforts and focus on providing detailed information to World Bank specialists on Poland's economic reforms, combined with eliminating misunderstandings in definitions; in other words, to successful lobbying[2].

Table 14

Ratings of selected European Union member countries according to *Doing Business 2013*

Country	Position	Country	Position	Country (post-socialist countries)	Position
Singapore	1	Germany	20 (−1)	Georgia	9 (+7)
Hong Kong	2	Switzerland	28 (−2)	Latvia	25 (−4)
New Zealand	3	Belgium	33 (−5)	Macedonia	23 (−1)
Denmark	5 (−1)	France	34 (−5)	Estonia	21 (+3)
Norway	6	Portugal	30	Lithuania	27
Great Britain	7 (+1)	Holland	31	Slovenia	35 (+2)
Iceland	14 (−5)	Austria	29 (+3)	Kazakhstan	49 (−2)
Ireland	15 (−2)	Cyprus	36 (+4)	Slovakia	46 (+2)
Finland	11 (+3)	Spain	44	Hungary	54 (-3)
Sweden	13 (+9)	Luxembourg	56 (−6)	**Poland**	**55 (+7)**
Italy	73 (+14)	Greece	78 (+22)	Czech Rep.	65 (−1)

(*-x*/+*x* depicts fall/rise of x positions in the ranking compared to the previous year = 2012).

[2] The labor-intensive and time-consuming research and lobbying activities at home and abroad were carried out by an inter-ministerial team led by the aides of former Deputy Prime Minister Leszek Balcerowicz. See: "Skąd wziął się sukces Polski w rankingu Doing Business 2013?," *Dziennik Gazeta Prawna*, Nov. 26, 2012, reprint: http://forsal.pl/artykuly/657644, skad_wzial_sie_sukces_polski_w_rankingu_doing_business_2013.html accessed Feb. 22, 2013.

Table 15
World Bank *Doing Business* indicators in 2008, 2010, 2012 and 2013

Indicator	Poland 2008	Poland 2011	Poland 2012	Poland 2013	Lithuania 2013 (27)	Poland's rank in 2013 (2011)
1. Starting a business						124 (113)
Procedures (number)	10	6	6	6	7	
Time (days)	31	32	32	32	20	
Cost (% of income per capita)	21.2	17.5	17.3	14.4	1.1	
Min. capital (% of income per capita)	196.8	14.7	14.0	13.0	31.3	
2. Dealing with permits						161 (164)
Procedures (number)	30	32	30	29	15	
Time (days)	308	311	301	339	142	
Cost (% of income per capita)	159.8	124.2	53.6	49.4	22.3	
3. Employing workers						–(76)
Difficulty of hiring	11	11	-	-	-	
Rigidity of hours index	60	33	-	-	-	
Difficulty of redundancy	40	30	-	-	-	
Rigidity of employment	37	25	-	-	-	
Cost of hiring (% of wages)	21		-	-	-	
Cost of redundancy (weeks of salary)	13	13	-	-	-	
4. Registering property						62 (86)
Procedures (number)	6	6	6	6	3	
Time (days)	197	152	152	54	3	
Cost (% of property value)	0.5	0.4	0.4	0.4	0.8	
5. Getting credit						4 (15)
Strength of legal rights	4	9	8	9	5	
Depth of credit information	4	4	9	6	6	
Public registry coverage (% of adults)	0	0	0	0	24.4	
Private registry coverage (% of adults)	51.5	91.7	74.8	76.9	81.2	
6. Protecting investors						49 (44)
Extent of disclosure	7	7	7	7	7	
Extent of director liability	2	2	2	2	4	
Ease of shareholder suits	9	9	9	9	6	
Strength of investor protection	6.0	6	6.0	6	5.7	

Indicator	Poland 2008	Poland 2011	Poland 2012	Poland 2013	Lithuania 2013 (27)	Poland's rank in 2013 (2011)
7. Paying taxes						114 (121)
Payments (number per year)	41	29	29	18	11	
Time (hours per year)	418	325	296	286	175	
Total tax rate (% of profit)	38.4	42.3	43.6	43.8	43.7	
8. Trading across borders						50 (49)
Documents to export (number)	5	5	5	5	5	
Cost to export (US$ per container)	834	884	1,050	1,050	825	
Time to export (days)	17	17	17	17	9	
Documents to import (number)	5	5	5	5	6	
Cost to import (US$ per container)	834	884	1,000	1,025	980	
Time to import (days)	27	25	16	16	8	
9. Enforcing contracts						56 (77)
Procedures (number)	38	38	37	33	30	
Time (days)	830	830	830	685	275	
Cost (% of claim)	10	12	12	19	23.6	
10. Closing a business						–(81)
Time (years)	3.0	3	-	-	1.5	
Cost (% of estate)	22	20	-	-	7	
Recovery rate (cents on the dollar)	27.8	31.3	-	-	51	

Source: Doing Business, World Bank, http://www.doingbusiness.org/; accessed Feb. 22, 2013.

Corruption Index

Ethics in business is a regular component of institutional quality rankings. Table 16 provides illustrative data in this area compiled by the NGO Transparency International. The scale runs from 0 to 10; 10 is the maximum score indicating a corruption-free environment.

Among the post-socialist countries only Slovenia and Estonia are ahead of Poland. While the perception of Polish corruption did show a U pattern, the position has stabilized. One hypothesis suggests this should be attributed to the nature of the ruling party and the overall political atmosphere.

Table 16

Corruption Perception Index (CPI) according to Transparency International; rank in brackets

	2001	2003	2005	2007	2009	2011	2012
Denmark	9.5 (2)	9.5 (3)	9.5 (4)	9.4 (1)	9.3 (2)	9.4 (2)	90 (1)
Czech Republic	3.9 (47)	3.9 (54)	4.3 (47)	5.2 (41)	4.9 (52)	4.4 (57)	49 (54)
Estonia	5.6 (28)	5.5 (33)	6.4 (27)	6.5 (28)	6.6 (27)	6.4 (29)	64 (32)
Lithuania	4.8 (38)	4.7 (41)	4.8 (44)	4.8 (51)	4.9 (52)	4.8 (50)	54 (48)
Latvia	3.4 (59)	3.8 (57)	4.2 (51)	4.8 (51)	4.5 (56)	4.2 (61)	49 (54)
Slovakia	3.7 (51)	3.7 (59)	4.3 (47)	4.9 (49)	4.5 (56)	4.0 (66)	46 (62)
Hunagry	5.3 (31)	4.8 (40)	5.0 (40)	5.6 (39)	5.1 (46)	4.6 (54)	55 (46)
Poland	4.1 (44)	3.6 (64)	3.4 (70)	4.2 (61)	5.0 (49)	5.5 (41)	58 (41)

Source: Transparency International. http://www.transparency.org/cpi2012/results, accessed Feb. 22, 2013.

Global Competitiveness Index

Among the competitiveness indices produced by the World Bank in association with the World Economic Forum, we will focus on the first pillar of the Global Competitiveness Index (GCI).

The GCI is a weighted average of several dozen variables grouped in 12 "pillars" of competitiveness. Institutions are listed as the No. 1 factor. The institutional aspects taken into account include: transparency of government policy making, efficacy of corporate boards, wastefulness of government spending, organized crime, business costs of terrorism, burden of government regulation, property rights, efficiency of legal framework, public trust of politicians, business costs of crime and violence, protection of minority shareholders' interests, judicial independence, reliability of police services, strength of auditing and reporting standards, diversion of public funds, intellectual property protection, favoritism in decisions of government officials, ethical behavior of firms, and (added or moved from other blocks in 2011) corruption level and investor protection.

Poland is classified as graduating from the second to the third stage of growth where efficiency is being replaced by innovation as the primary driver. Since 2007, Poland has made progress among the new EU members, and is only behind Estonia and the Czech Republic today. The ratings of the post-socialist economies are notably worse in the institutional pillar than their overall ranking. Poland's improved results (Table 18) raised its rank to 55th (down by three notches from the previous year), behind Estonia.

Table 17

Global Competitiveness Index (GCI): Poland and selected other countries compared in 2007–13 (for 133, 133, 139, and 144 countries classified).

Country	Rank 2007–08	Rank 2009–10	Rank 2010–11	Rank 2012–13
Switzerland	2	1	1	1
Estonia	27	35	33	34
Slovenia	39	37	45	56
Hungary	47	58	52	60 (−12)
Lithuania	38	53	47	45 (−1)
Latvia	45	68	70	55 (+9)
Slovakia	41	47	60	71 (−2)
Croatia	57	72	77	81 (−5)
Czech Rep.	33	31	36	39 (−1)
Montenegro	82	62	49	72 (−12)
Kazakhstan	61	67	72	51 (+21)
Poland	51	46	39	41
Azerbaijan	66	51	57	46 (+9)
Georgia	90	90	93	77 (+11)
Tajikistan	117	122	116	100 (+5)
Romania	74	64	67	78 (−1)
Armenia	93	97	98	82 (+10)
Serbia	91	93	96	95
Macedonia	94	84	79	80 (−1)
Moldova	97	-	94	87 (+6)
Bulgaria	79	76	71	62 (+12)
Bosnia & Herzegovina	106	109	102	88 (+12)
Albania	109	96	88	89 (−11)
Ukraine	73	82	89	73 (+9)
Russia	58	63	63	67 (−1)
Mongolia	101	117	99	93 (+3)
Kyrgyz Rep.	119	123	121	127 (−1)

Source: http://www.weforum.org/en/initiatives/gcp/Global%20Competitiveness%20Report/index.html.; accessed Feb. 22, 2013; (*-x*/*+x* depicts fall/rise of x positions in the ranking compared to the previous year = 2012).

Table 18

The first pillar of global competitiveness: institutions in Poland compared to selected other countries (2007-2013)

Country	Rank 2007–08	Rank 2009–10	Rank 2010–11	Rank 2012–13
Singapore	1	1	1	1
Estonia	34	31	31	30 (–1)
Slovenia	44	46	50	58 (–3)
Hungary	54	76	79	80 (–7)
Lithuania	58	59	60	60 (+2)
Latvia	59	65	75	59 (+7)
Slovakia	60	78	89	104 (–3)
Croatia	65	85	86	98 (–8)
Czech Rep.	69	62	72	82 (+2)
Montenegro	78	52	45	44 (–2)
Kazakhstan	80	86	91	66 (+28)
Poland	82	66	54	55 (–3)
Azerbaijan	83	55	71	63 (+5)
Georgia	86	72	69	61 (–1)
Tajikistan	88	81	77	65 (–2)
Romania	94	84	81	116 (–17)
Armenia	96	95	97	71 (+12)
Serbia	99	110	120	130 (–9)
Macedonia	102	83	80	78 (+3)
Moldova	105	-	102	110 (–4)
Bulgaria	109	116	114	108 (+2)
Bosnia & Herzegovina	113	128	126	85 (+24)
Albania	114	87	63	84 (–27)
Ukraine	115	120	134	132 (–1)
Russia	116	114	118	133 (–5)
Mongolia	120	121	122	113 (+6)
Kyrgyz Rep.	127	124	131	137 (–1)

Source: http://www.weforum.org/reports/global-competitiveness-report-2011–2012, accessed Feb. 22, 2013; (*-x*/*+x* depicts fall/rise of x positions in the ranking compared to the previous year = 2012).

A more precise dissection of the institutional environment (21 aspects in Table 19) reveals the burden of state regulation, low trust in politicians, favoritism, lack of transparency, wastefulness, and impotence of legal protection. Poland lowered its

score in 15 of 21 indices. Progress was registered only in four areas: bribes and irregular payments; judicial independence; business costs of terrorism; and strength of auditing and reporting standards. If lobbying was correctly singled out as an important factor behind Poland's success in the World Bank 2013 ranking, it might be conjectured that the World Economic Forum lobbying was weak or nonexistent.

Table 19
The first pillar of global competitiveness: institutions in Poland (2007-13)

No.	Item	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13
1	Property rights	90	94	76	59	54	63
2	Intellectual property protection	67	76	64	60	61	67
3	Diversion of public funds	70	72	50	43	44	44
4	Public trust of politicians	81	113	99	82	76	90
5	Bribes and irregular payments	-	-	-	41	39	37
6	Judicial independence	77	73	55	53	53	50
7	Favoritism of decisions of government officials	62	105	64	49	52	55
8	Wastefulness of government spending	102	115	94	76	76	93
9	Burden of government regulation	96	127	111	111	124	131
10	Efficiency of legal framework in settling disputes	89	109	114	106	97	111
11	Efficiency of legal framework in challenging regulation	-	-	106	95	83	103
12	Transparency of government policy making	113	128	127	113	93	104
13	Business costs of terrorism	96	85	69	59	43	40
14	Business costs of crime and violence	81	95	82	50	37	38
15	Organized crime	101	96	77	55	40	48
16	Reliability of police services	77	86	74	60	63	67
17	Ethical behavior of firms	61	47	50	54	53	53
18	Strength of auditing and reporting standards	77	74	60	46	41	38
19	Efficacy of corporate boards	107	101	85	73	79	80
20	Protection of minority shareholders' interests	77	76	62	60	79	86
21	Strength of investor protection	-	-	-	33	36	39

Source: http://www.weforum.org/reports/global-competitiveness-report-2011–2012, accessed Feb. 22, 2013.

Concluding remarks

The complexity of the economic environment poses a formidable challenge for any attempts at a synthetic presentation of the multidimensional world of the institutions. The reports referred to in this chapter apply different methodologies, show frequently doubtful measurements and/or possible statistical errors. These rankings yield in an unknown manner to the strategic country image management by governmental or semigovernmental organizations. This is why the sometimes surprising differences in Poland's showing are difficult to explain.

Poland's position is in the middle of the pack, usually between 40th and 80th place. The picture of Poland emerging from the league tables is consistently worse than that of many other EU members. The data from the past three years generates more optimism. This is probably due to a more optimistic appraisal of the local results of the global financial crisis rather than an institutional breakthrough. The growing GDP, FDI inflow (in infrastructure) and some other positive indicators described in other chapters of this report show that individual organizations, both Polish- and foreign-owned, are capable of benefiting from the business environment, despite its imperfections, and that they are in a position to build a competitive advantage.

PART III

COMPETITIVENESS OF REGIONS AND REGIONAL POLICY IN POLAND

Chapter 5

The Competitive Position of Polish Regions in the EU

This chapter assesses the key factors behind the competitiveness of Polish regions compared with other regions in the European Union, while also showing the most important disproportions in development between regions in Poland.

In Poland, there are both industrial regions – which were once relatively well developed, but are now struggling with various problems (resulting from factors such as de-industrialization and depletion of sources of competitive advantages in industry and environmental barriers) – and rapidly developing post-industrial regions. The aim of this chapter is to compare the different types of Polish regions and assess the factors behind their competitiveness, such as the state and development of clusters, involvement in trade, innovation and investment attractiveness.

5.1. Regional Competitiveness and Industrial Clusters Development

Arkadiusz Michał Kowalski

The aim of this subchapter is to discuss the level of competitiveness of Polish regions compared with the EU average while taking into account the differences between Polish regions. In particular, this subchapter considers the issue of clusters, which in a modern economy are considered to be one of the main factors behind economic growth at the regional level. The subchapter aims to either validate or disprove the hypothesis that an effective model of Poland's regional development, one enabling the country to bridge its development gap to more affluent European Union countries, is a model based on

increasing the competitiveness of the so-called growth poles of the Polish economy and on creating conditions conducive to the diffusion of development impulses to less well-developed areas.

Theoretical basis of competitiveness in meso-economic terms

Competitiveness is a multidimensional concept, as evidenced by the large number of attempts in the literature to define this term. Without going into detailed theoretical discussion, this chapter uses a definition proposed in an OECD document, according to which competitiveness is defined as "ability of companies, industries, regions, nations, and supranational regions to generate, while being and remaining exposed to international competition, relatively high factor income and factor employment levels on a sustainable basis" (Hatzichronoglou, 1996, p. 20). Economic competitiveness and its determinants can be analyzed at three basic levels: microeconomic (competitiveness of an individual enterprise), mesoeconomic (competitiveness of a sector or region), and macroeconomic (competitiveness of an economy as a whole). The subject of the analysis carried out here is competitiveness at the mesoeconomic level.

Sectors and regions are the systems most often singled out in mesoeconomic studies (Budner, 2009, p. 8). This subchapter focuses primarily on the competitiveness of regions, but it is worth noting that both these levels are significantly interrelated. This is connected with the view that the development of a specific sector specialization is the key to a regional economy achieving a high competitive position. According to B. Jankowska (2009, pp. 113, 125), the competitive advantage of a sector can be either a cost-price advantage or a qualitative advantage, and its most important determinants are:

- interactions within the sector, reflected in the shape of the relationship between enterprises, in particular a situation based on simultaneous competition and cooperation, defined as coopetition;
- related industries (offering complementary products) and supporting sectors (including suppliers of machinery, equipment and materials), with a varying level of market player competitiveness and diverse internal relationships;
- institutional mesoinfrastructure, in particular business self-regulation organizations, typically operating in the form of chambers of commerce and trade associations.

All these are especially commonplace on the regional scale. This is largely due to the so-called economies of agglomeration, which relate to the positive effects associated with the location of businesses in close proximity to one another. This approach was originated by A. Marshall (1890), who analyzed three types of economies of agglomeration:

- the benefits of specialization, enabling the achievement of a high level of competence in one of the phases of the manufacturing process and economies of scale, connected with the emergence of specialized suppliers, for example;

– benefits associated with the formation of a local labor market with skills meeting the needs of businesses;
– benefits from the transfer of knowledge and the spreading of new ideas for activities in a specific sector.

The regional level plays a particularly important role in innovation, which in today's economy is regarded as a key determinant of economic competitiveness. Geographic proximity fosters linkages and cooperation between businesses and research centers, leading to knowledge spillovers, technology transfer and human capital development. These, in turn, lead to a strong tendency toward geographical concentration in innovation in the world economy. According to C. Karlsson and M. Andersson (2009, pp. 273–274), R&D is generally more concentrated geographically in the economy than industrial production. This is due to the fact that individual industries locate their R&D centers not in areas where they have their production facilities, but in places where other industries have their R&D centers. Knowledge creation and other types of innovation in an enterprise are more effective in large urban areas where there are universities, research and development centers and companies involved in R&D work. According to D. Harhoff (2000), a business organization can then benefit from the lower costs of obtaining knowledge from the external environment in its region compared with the potential costs of creating knowledge on its own or acquiring it from entities located far away. D.S. Siegel, P. Westhead and M. Wright (2003) showed that the cost of knowledge transfer is a function of what is referred to as geographic time distance. In connection with this, clusters of entities involved in R&D and innovation are a source of localized externalities. This means that the geography is now a key factor explaining the location decisions of firms when it comes to R&D (C. Karlsson, M. Andersson, 2009, p. 274).

An important source of knowledge about the regional polarization of development processes is the growth pole theory formulated by French economist F. Perroux (1964). This concept identifies sector-specific and territorial growth poles (also known as "motor units") where there is a concentration of economic activity. This leads to a situation in which economic growth is polarized in nature, which means there are locations (called growth poles) that develop quickly, while others grow at a much slower rate. The emergence of growth poles, however, has a positive impact on the economy as a whole, because it spurs development in other areas by encouraging investment, innovation and structural changes.

Disparities in the development of Polish regions

The multifaceted nature of competitiveness of an economy explains why we are dealing with many methods of measuring it. The most commonly used indicator to measure the size and economic strength of individual economies is the gross domestic product (GDP), which shows the value of goods and services produced. Table 1 ranks Polish regions in terms of this indicator.

Table 1
GDP in Polish regions at the NUTS 2 level, in thousands of euros

Region	2004	2005	2006	2007	2008	2009
Mazowieckie	41,876	52,254	58,834	67,542	78,407	67,930
Śląskie	28,293	32,424	35,411	40,454	47,784	40,513
Wielkopolskie	19,318	23,071	25,361	28,815	33,734	29,430
Dolnośląskie	15,762	19,126	22,017	25,474	29,445	25,522
Małopolskie	14,864	17,834	20,224	22,986	27,054	22,994
Łódzkie	12,749	15,190	16,846	19,324	22,549	18,918
Pomorskie	11,439	13,821	15,465	17,697	20,028	17,618
Kujawsko-Pomorskie	9,877	11,551	12,890	14,646	16,977	14,262
Zachodniopomorskie	8,412	10,076	11,008	12,297	14,536	12,106
Lubelskie	8,106	9,542	10,485	12,026	14,318	11,804
Podkarpackie	7,824	9,276	10,240	11,582	13,777	11,712
Warmińsko-Mazurskie	5,929	6,998	7,694	8,637	10,027	8,568
Świętokrzyskie	5,328	6,163	6,952	8,041	9,695	8,029
Podlaskie	4,802	5,695	6,270	7,221	8,271	7,141
Lubuskie	4,820	5,830	6,402	7,261	8,227	7,015
Opolskie	4,837	5,569	5,990	6,998	8,326	6,858
Poland	**204,237**	**244,420**	**272,089**	**311,002**	**363,154**	**310,418**

Source: Eurostat [nama_r_e2gdp], accessed Nov. 15, 2012.

As shown in Table 1, Mazowieckie makes up the largest regional economy in Poland, followed by Śląskie, Wielkopolskie, Dolnośląskie, Małopolskie and Łódzkie. In dynamic terms, Mazowieckie and Wielkopolskie, which are among the best performing regions in Poland, lead the way decisively in terms of the rate of GDP growth in the studied period. However, while the GDP shows the size of an economy in absolute terms, it does not reflect the standard of living of the population. A more reliable indicator used in the assessment of the competitive position of a region is GDP per capita. A low level of this indicator in an economy signifies poverty and is usually also an expression of socioeconomic backwardness. Table 2 shows the GDP per capita in Polish regions compared with the European Union average between 2004 and 2009.

As shown in Table 2, among the Polish regions at the NUTS 2 level, Mazowieckie, Dolnośląskie, Śląskie and Wielkopolskie had a GDP per capita exceeding the national average in 2009 (61% of the GDP per capita in the European Union). However, even the top performer, Mazowieckie, reported a lower figure than the EU average (97%). On the other hand, the lowest GDP per capita was in five provinces in the northeastern

and southeastern parts of the country, Lubelskie, Podkarpackie, Podlaskie, Warmińsko-Mazurskie, and Świętokrzyskie.

Table 2

GDP per capita as a percentage of the EU27 average (in PPS, current prices) in regions at the NUTS 2 level

Region	2004	2005	2006	2007	2008	2009
Mazowieckie	77	81	83	87	89	97
Dolnośląskie	51	53	55	59	61	66
Śląskie	57	55	55	58	61	65
Wielkopolskie	54	55	55	57	59	65
Pomorskie	49	50	51	54	53	59
Łódzkie	47	47	48	50	52	55
Zachodniopomorskie	47	48	47	49	51	53
Małopolskie	43	44	45	47	49	52
Lubuskie	45	46	46	48	48	52
Kujawsko-Pomorskie	45	45	45	47	49	51
Opolskie	43	43	42	45	48	50
Świętokrzyskie	39	38	39	42	45	47
Podlaskie	38	38	38	40	41	45
Warmińsko-Mazurskie	39	39	39	40	42	45
Podkarpackie	35	35	35	37	39	42
Lubelskie	35	35	35	37	39	41
Poland	**51**	**51**	**52**	**54**	**56**	**61**

Source: Eurostat [nama_r_e2gdp], accessed Nov. 15, 2012.

Indicators used in the analysis of regional disparities include the standard deviation, which is a classic measure of volatility, and the coefficient of variation, which measures the variation in the distribution of the value of feature Y depending on the arithmetic mean. The latter indicator is expressed by the following formula:

$$CV(Y) = \frac{SD(Y)}{\overline{Y}} = \frac{\sqrt{\sum_i \left(Y_i - \overline{Y}\right)^2}}{\overline{Y}}$$

where *CV(Y)* is the coefficient of variation of the studied feature *Y*, *SD(Y)* is the standard deviation, and $\overline{Y}$ the arithmetic mean. In Table 3, these measures are used for the analysis of regional differences in Poland.

Table 3
GDP per capita-related indicators in Polish regions

Indicator	2004	2005	2006	2007	2008	2009
GDP per capita for Poland (in PPS), % of the EU average	51	51	52	54	56	61
Standard deviation of GDP per capita in Polish regions at the NUTS-2 level	10.33441	11.17736	11.64403	12.18862	12.21406	13.64169
The coefficient of variation for GDP per capita in Polish regions at the NUTS-2 level	0.202635	0.219164	0.223924	0.225715	0.218108	0.223634

Source: Own calculations based on Eurostat data [nama_r_e2gdp].

As shown in Table 3, since Poland's accession to the European Union, there has been a convergence of incomes between Poland and other EU member countries, as evidenced by the growth of Poland's GDP from 51% of the EU average in 2004 to 61% of the EU average in 2009. However, this process has been accompanied by a deepening of internal regional disparities in the Polish economy – as reflected by an increasing standard deviation of GDP per capita in regions at the NUTS-2 in Poland, from 30.33 in 2004 to 13.64 in 2009, and by a rising coefficient of variation, from 0.20 in 2004 to 0.22 in 2009. In addition, this has been accompanied by growing disparities in development between metropolitan areas and other territorial units in each region. This process is well illustrated by the so-called Williamson hypothesis (1965), under which, in a typical model of development of a country, interregional divergence takes place in the early stages of the process, replaced by inter-regional convergence at later stages. One reason is the emergence of regional growth poles, or locations with faster economic growth than other areas of the country. Business clusters, which are discussed later in this subchapter, can play the role of regional growth poles.

Cluster development as a factor behind the competitiveness of Polish regions

While analyzing competitiveness at the mesoeconomic level, it should be noted that the performance of a regional economy is not determined by individual companies, but primarily by the functioning of whole industries and sectors. An effective model for the organization of economic activity in a given location in sector terms are clusters, which can be defined as "geographic concentrations of interconnected companies, specialized suppliers, service providers, firms in related industries and associated institutions (e.g. universities, standards agencies, and trade associations) in a particular field that com-

pete but also cooperate" (Porter, 1990). According to the approach of M. Porter (2001), clusters can be found in almost every national, regional and even metropolitan economy, chiefly in economically developed countries. Individual clusters, however, differ in size, stage of development, level of innovation and technological advancement, as well as the extent to which they impact the market. There are three basic characteristics that describe the functioning of clusters in an economy:

1) geographic concentration, which means that clusters develop in a particular region or neighboring regions;
2) sector concentration (specialization), which means that clusters are formed within one or several related sectors;
3) linkages and interactions between cluster participants, taking the form of coopetition, a process combining competition and cooperation.

The results of studies carried out for the European Commission (Sölvell, Ketels, Lindqvist, 2009) indicate a positive correlation between the existence of clusters in an economy and the GDP per capita. This correlation is particularly strong under a strong geographic concentration of industries, which is a source of "economies of agglomeration." These results were confirmed in studies conducted by M. Delgado, M.E. Porter, and S. Stern (2012). They show that the concentration of individual industries in clusters contributes to the growth of employment and wages as well as an increased number of patents and the establishment of new businesses. Moreover, these studies have found that clusters functioning in a given location have a positive impact on the economic growth of neighboring regions. The positive impact of cluster structures, extending beyond their participants, is related to the so-called spillover effects, which transform the entire local environment. These effects occur when activities undertaken by businesses are a source of benefits for other neighboring companies (Burt, 2010, pp. 37–38). In this way, clusters contribute to an improvement in what is called regional efficiency, a category comprising four aspects: economic, technical, social and environmental (S.L. Bagdziński, W. Kosiedowski, M. Marszałkowska, 1995, pp. 47–48). Clusters have an impact on regional economic efficiency mainly through:

– concentration of factors of production (especially financial and human capital) in sectors in which a region has competitive advantages, enabling the achievement of a critical mass for new investment and a further deepening of regional specialization;
– development of production networks consisting of specialized subcontractors and suppliers, usually small and medium-sized enterprises, and the development of innovation and business environment services;
– creation of a local culture of entrepreneurship and economic stimulation of the region, including the establishment of new businesses, in particular spin-offs;
– attracting skilled workers from outside the region and the development of an attractive labor market;
– an increase in exports from the region by stimulating the internationalization of local companies operating within clusters;
– making the region more attractive as a destination for foreign direct investment.

In today's globalizing economy, clusters are undergoing a process of internationalization, based on establishing cross-border cooperation between cluster initiatives located in different countries and regions. One of the important economic benefits of this process is an increased availability of opportunities for businesses operating within a cluster to access external sources of innovation (Kowalski, 2011). This is of paramount importance in the context of opening national innovation systems, a process reflected in the wider use of global technological achievements, based on enhancing the ability to collect, select and implement globally available knowledge and technology (Weresa, 2012).

Clusters influence regional social efficiency, mainly through their impact on the development of social capital. Specialized companies dealing with knowledge-based operations can use their social relationships, for example with partners from science and industry parks or clusters, in order to acquire external knowledge, which helps them compensate for the limitations in internal resources (Martínez-Cañas, Sáez-Martínez, Ruiz-Palomino, 2012, p. 73). Social capital is an important factor of production that influences the efficiency of enterprises and contributes to the development of cooperation in the economy (Padmasiri, 2012). One of the components of social capital is so-called relational capital, which consists of a range of diverse relationships between institutions, businesses and people based on the awareness of belonging to a given community and the potential for cooperation between culturally similar entities. Relational capital resources in a regional economy or in a cluster lead to the creation of a stable framework for multifaceted cooperation, thus contributing to the movement of knowledge, transfer of technology and an increased mobility of the work force. Empirical studies (Park, Vertinsky, Lee, 2012) have shown that an appropriate level of relational capital is a necessary, though insufficient, condition, for an effective transfer of tacit knowledge. Moreover, according to Kantanen (2012), relational capital resources are an important element in the development of an innovative environment. It is possible to note that clusters impact regional social efficiency through:

- raising the general living standards of society,
- improving the qualifications of the local population,
- creating new jobs in the region and increasing the level of local employment,
- motivating residents in the region to take socially effective action,
- increasing the level of trust in the region and developing social capital, including relational capital.

The impact of clusters on regional technical efficiency is related to the fact that the regional level is strictly related to innovation processes. Geographical proximity, which refers to the geographic distance between market players, generates positive externalities arising from the joint location of similar economic activities in a given local production system. Small geographic distances between market players facilitate direct interpersonal contacts that promote the exchange of knowledge, in particular tacit knowledge, and information. Empirical studies confirm that the external effects of the diffusion of knowledge are geographically limited, which means that firms located closer to the

source of knowledge generation are characterized by higher innovation than companies operating in other areas (Audretsch, Feldman, 1996). According to H. Bathelt et al. (2010), cooperation at the local level works best when it is supplemented by relationships with entities from other regions, providing ideas and impulses for innovation and introducing new products and services in a specific area. Geographical proximity has a positive impact on the occurrence of other types of proximities playing important functions in innovation processes: cognitive, organizational, social and institutional (Boschma 2005; Bahlmann, 2010) as well as technological (Greunz, 2003). Proximity is also an important aspect of a cluster because the intensity of individual types of proximity determines the emergence and development of various types of cluster structures. Clusters influence regional technical efficiency mainly through:

- speeding up the movement of knowledge, information and know-how as well as technology transfer and the diffusion of innovation to and within a region,
- increasing the pool of funds available in the region for innovation and putting them to better use thanks to synergy effects resulting from the interaction of local entities;
- developing research facilities and improving the range of educational opportunities, which encourages R&D and contributes to a higher level of skills among workers in a region;
- more advanced cooperation between research and development centers and enterprises implementing the results of this work in business practice;
- greater efficiency of research and development and innovation thanks to a concentration of resources (human, financial, knowledge), which promotes smart specialization,
- more pressure to innovate, especially in sectors where competitiveness is not by means of prices, due to increased competition on the local market resulting from a concentration of market rivals.

Clusters influence regional eco-efficiency mainly through having an impact on sustainable development and the creation of eco-innovations that make it possible to respond more quickly to environmental problems.

In Poland, there has been a dynamic increase in the number of cluster initiatives in recent years. In many cases, despite referring to the cluster concept and using the word "cluster" in their names, the real functioning of these initiatives significantly departs from the assumptions of the theoretical model proposed by M. Porter, and it is only possible to speak of attempts to form cluster structures. In practice, there are many barriers that hinder the launch of new clusters in many regions in Poland or lead to a situation in which existing cluster initiatives cannot go beyond the formative stage of development. According to a view widely voiced by entrepreneurs, the most serious obstacle to the development of clusters are financial barriers. Given the significant funds channeled for supporting clusters, including those available as part of Measure 5.1 of the Innovative Economy Operational Program – "Support for the development of supra-regional clusters" (€ 104 million) – it is necessary to modify the subjective evaluation of businesspeople and say that the main problem is not so much a lack of capital

as difficulties with putting it to a good use. The stereotypical view about a general lack of funds stems from factors including excessive bureaucracy and complicated and time-consuming procedures related to access to public funds. Experts on cluster development agree that cultural barriers, particularly the low propensity to cooperate and distrust of people deeply rooted in Polish society, are even more important than financial problems. Such a conclusion is confirmed by the results of various studies, including the European Social Survey. In Poland, in 2011, only 13.4% of those polled agreed with the statement that "most people can be trusted." Admittedly, this figure – identical as in 2009 – marked a slight increase from previous years: 11.5% in 2007 and 10.5% in 2005 and 2003 (Czapiński, Panek, 2011).

Economic policy making aimed at increasing the competitiveness of Polish regions

A territorial-based policy is growing in importance in the European Union; this policy can be defined as the real effects of carrying out sectoral and horizontal development initiatives as well as the results of regulations implemented at the national and international levels and felt at the local level (for example, the development of cities or the development of rural areas). In the context of Poland's economic policy, the polarization-and-diffusion model presented in the *Polska 2030. Wyzwania rozwojowe* (Poland 2030: Development Challenges) report (Boni, 2009) fits into the territorial-based policy approach. The polarization-and-diffusion model assumes that economic policy in Poland should, on the one hand, support growth poles in the economy (which lead to polarization processes), and on the other create conditions for diffusion, a process counteracting the negative effects of polarization (a polarization-and-diffusion mechanism for ensuring sustainable development). To avoid controversy, in its draft long-term strategy for the development of the country, *Polska 2030. Trzecia fala nowoczesności* (Poland 2030: The Third Wave of Modernity), the government adopted a redefined model of development based on "the principle of generational, territorial and innovation-related solidarity (a principle of equal opportunity and competitiveness for innovation)" (Boni, 2011, p. 14). In the context of territorial-based policy, the Poland 2030 report gives priority to solving the problem of differences between various areas of the country and the uneven pace of development. The report calls for territorial equality in terms of development, a process based on diffusion, or spreading the benefits generated by growth poles, accompanied by the development of capabilities for absorbing growth impulses in underprivileged areas. The propagation of development impulses from strong industrial centers across the economy could help avoid a situation in which "a low level of competitiveness in a large number of regions will indirectly lead to disturbances in the rate of development processes and to failure in taking advantage of the opportunities offered by the regional component of macroeconomic development" (Szlachta, 1997, p. 18).

Another important point of reference for a policy for supporting the competitiveness of Polish regions is a document entitled *Krajowa strategia rozwoju regionalnego 2010–2020: regiony, miasta, obszary wiejskie* (National Strategy for Regional Development 2010–2020: Regions, Cities, Rural Areas). The document, drafted by the Ministry of Regional Development (2010), emphasizes that the following factors are essential to spreading development processes across the economy:

- strengthening functional links between major urban centers in individual regions, on the one hand, and subregional and local centers, on the other, as well as between cities and surrounding areas.
- taking advantage of the endogenous potential and specific features of local areas by deepening socioeconomic specialization, which determines the comparative advantage of a region,
- stimulating opportunities for launching investment projects in the regional economy based on regional or local human resources, research, raw materials, etc.,
- building cooperation networks between the fastest and slowest developing regions, with a special emphasis on launching sustainable mechanisms of cooperation between research centers, enterprises and public authorities from these regions and on introducing incentives for leading institutions in individual areas of technology to share their experience and innovation with other centers,
- supporting economic development based on regional and local specializations, especially as part of cluster initiatives.

Cluster development policy as a tool for increasing the competitiveness and innovativeness of regions

One of the most important tools for implementing the territorial-based policy is support for clusters. The development of cluster policy in the European Union has involved the use of what is known as multi-level governance, which means a situation in which each level of public administration has a certain measure of autonomy and the tasks are divided between EU, national and local authorities. This system is in line with the general requirements of regional policy and with the European policy on socioeconomic cohesion. The system should guarantee a sufficient level of flexibility in implementing EU and national policies as well as ease in addressing these policies to appropriate levels of local government. The principle of subsidiarity should be fully utilized; it is based on delegating responsibility to the lowest possible level of government to ensure an effective implementation of tasks (Szlachta, Zaleski, 2009, pp. 169–170).

The most common types of activities undertaken as part of cluster policy are: the promotion of clusters as a model of either doing business or ensuring direct financial or non-financial support to existing clusters (Ferreira, Garrido Azevedo, Raposo, 2012). Clusters are an effective mechanism for concentrating resources and means, as a result of which they can act as growth poles. On the other hand, support for the development

of clusters is important in the context of efforts to ensure territorial cohesion, because they are a way to increase the absorption and diffusion of innovation from areas with the highest level of competitiveness to areas with a lower level of competitiveness. The positive examples of creating competitive clusters in many regions around the world encourage public authorities, especially those in less well-developed areas, to formulate economic policy strategies and instruments aimed at the development of cluster structures, which are seen as a way of overcoming structural difficulties. Meanwhile, clusters should be initiatives emerging as part of objective market relations in favorable conditions as far as location is concerned (Plawgo, 2007, p. 9). Various examples of clusters show that the most competitive initiatives, such as Silicon Valley, emerge as a result of a bottom-up approach by businesspeople who set up companies to take advantage of opportunities offered by new technology and make practical use of research findings, putting new products and services on the market. A huge role in these projects is played by private businesses ready to support risky ideas and initiatives. Support for the establishment of cluster structures may prove to be particularly effective in locations where cluster seeds are available, i.e. assemblages of companies involved in the manufacture and delivery of certain types of products or services between which cooperation ties begin to appear. Such structures most often draw from the greatest strengths of a regional economy and operate in areas where this economy displays competitive advantages over other areas. Consequently, support for the launch and development of clusters in such locations corresponds to a modern approach to regional policy under which state aid only covers selected locations with substantial development opportunities (Kowalski, Szlachta, 2007). This approach is part of a new economic policy paradigm related to the pursuit of a knowledge-based economy, which is reflected by the building of a competitive strength by regions relying primarily on endogenous development potential (Szlachta, 2009, p. 142).

Support for clusters fits into the concept of smart specialization of regions, which is an important part of the Europe 2020 strategy, under which it is necessary to "reform national (and regional) R&D and innovation systems to foster excellence and smart specialization, reinforce cooperation between universities, research and business, implement joint programming and enhance cross-border cooperation in areas with EU value added and adjust national funding procedures accordingly, to ensure the diffusion of technology across the EU territory" (European Commission, 2010).[1] The use of clusters in carrying out the "smart specialization" strategy could enable:

- concentration of resources in several key priorities for the regional economy and in sectors where the region has a competitive advantage,
- an increase of synergies between policies pursued at the European Union level and at the level of individual member states and regions,
- more efficient use of public funds by achieving the necessary critical mass of investment instead of having funds fragmented in many areas,
- strengthening of regional innovation systems, R&D effectiveness and knowledge flows.

[1] For more about this, go to Chapter 6 of this report.

The *National Strategy for Regional Development 2010 2020: Regions, Cities, Rural Areas* based on these guidelines provides for the concentration of support in clusters with the greatest competitive potential, i.e. those "currently showing international competitiveness or offering a real chance for building such competitiveness in the future" Ministry of Regional Development, 2010, p. 1481). At the same time, economic policy measures are expected to strengthen competitive potential and transform assemblages of enterprises into dynamic clusters with a high level of competition and cooperation (coopetition), interaction and externalities. The projected areas of support primarily include the following aspects of cluster functioning:

- R&D,
- international expansion of companies
- development of human capital in enterprises,
- stimulation of intra-sector cooperation,
- emergence of new businesses.

The strategy assumes that public intervention should also apply to supporting cluster organizations or other bodies dealing with the management and coordination of cluster activities, in particular with regard to access to common infrastructure. Those drafting the strategy decided that the regional level is the most important level for cluster policy, though it is also important to maintain complementarity with national policies in the field of industry, transport, foreign investment and support for education.

Synergy effects resulting from a combination of clusters and special economic zones (SEZ)

Another economic policy thrust that could strengthen the competitiveness of Polish regions is taking advantage of the synergies resulting from combining cluster support tools with regional assistance in special economic zones (SEZ). These two concepts share the following basic features:

- geographic concentration (regional dimension), which is the basis of both the cluster concept (as defined by M. Porter) and SEZ (which, however, are generally not formed in a single territory, but in several administrative territorial units);
- sector concentration (sector specialization), which is an essential attribute of clusters, while being less distinct in SEZs, though in most of them one or several dominant sector specializations have clearly emerged;
- establishment of local cooperative ties in the region, which are a fundamental element of the cluster concept and also play an important role in the functioning of SEZs. According to A.A. Ambroziak (2009, p. 131), continuous cooperation of companies managing SEZs and local market players contributes to both the implementation of strategic choices and the achievement of synergy and complementarity of decisions, and, consequently, to taking advantage of the strengths of the local system in economic terms, eliminating risks to the system's development

and increasing the external benefits related to an investment location; — enhancing the attractiveness of the regional economy to outside investors in terms of location.

The similarities between the cluster and SEZ concepts explain why the government's efforts in these two areas are interrelated. According to an Economy Ministry document (2009, p. 12), support for the development of clusters is one of the criteria for issuing a permit for operations in a SEZ. Cluster development can be a factor stimulating SEZ business and contributing to long-term benefits for enterprises operating within special economic zones. The key issue determining the possibility of setting up clusters in a given zone is whether the zone has a distinct specialization in a specific industry. An analysis of the business profiles of individual SEZs in Poland shows that some of them have a distinct sector specialization, which means they have high potential for the development of cluster structures, for example in the following areas: household appliances in the Łódź SEZ, white goods and automotive products in the Wałbrzych SEZ, and information and communication technology in the Cracow SEZ. It should also be noted that in some SEZs there are already sector clusters, but the area covered by the cluster usually does not correspond directly to the area occupied by the SEZ. Examples of clusters developed in Poland's special economic zones but covering only a part of the SEZ's area include: the "Aviation Valley" cluster, linked with SSE Euro-Park Mielec; the Lubuski Metal Cluster based in Gorzów Wielkopolski, linked with the Kostrzyn-Słubice SEZ; the Pomeranian ICT Cluster and the Crystal Park in Łysomice, which produces LCD panels – both linked with the Pomeranian Special Economic Zone; and the Małopolska Information Technology Cluster, linked with the Cracow Technology Park SEZ.

Summary and conclusions

Since its entry to the European Union in 2004, Poland has undergone an external convergence based on a reduction of the GDP per capita gap between Polish regions and the EU average. The country has also undergone an internal divergence based on increased disparities in the levels of GDP per capita between regions. Competitiveness in mesoeconomic terms covers two levels: the sector level and the regional level. While focusing on the competitiveness of regions, we cannot ignore the importance of sectors because the emergence of a specific sector specialization is an important factor in achieving a high competitive position by a given regional economy. Both systems singled out in mesoeconomic studies relate to clusters, whose characteristic feature is geographic and sector concentration of business. The importance of cluster structures as a factor behind the competitiveness of regions is shown, for example, by a positive correlation between the existence of clusters in a given economy and the GDP per capita – a correlation that increases with the intensification of geographic concentration of individual industries. Furthermore, the so-called spillover effects contribute to the positive impact of clusters on the economic growth of neighboring regions. The

analysis carried out in this section of the report shows that the concentration of factors of production (in particular, human capital and funds, both public and private) in competitive clusters makes it possible to strengthen their competitive advantages and further deepen regional specialization. Clusters can thus serve as growth poles. The dynamic growth in the number of cluster initiatives in Poland shows that there is a great interest in this model of doing business, though most of them are still at the formative stage of development. Consequently, particularly important are economic policy measures aimed at supporting clusters in Poland, including efforts to overcome the reluctance of business partners to work together and a low level of trust between businesses, which is one of the biggest barriers to the development of clusters.

5.2. Foreign Trade Performance of Polish Regions

Adam A. Ambroziak

Foreign trade at the regional level depends on the overall level of regional development, the degree of its internationalization and competitiveness, understood as an ability to compete on international markets. The purpose of this study is to either prove or invalidate a hypothesis that foreign trade perpetuates existing differences in the development of Poland's regions, and that state intervention carried out without a coherent approach adds to regional disparities.

Investment projects carried out by companies are one of the driving factors behind a country's economic development. This is particularly noticeable at the regional level. Such projects lead to an influx of new technology, facilitate the appropriate use of the local labor market, and promote ties with suppliers and customers. Experts studying foreign trade conducted by Poland's regions point out that the structure of a region's exports should be consistent with demand on key export markets targeted by the region's businesses; this helps build regional export opportunities and stimulates their future development (Gawlikowska-Hueckel, Umiński, 2005, p. 15). A key issue, therefore, is the location of businesses in regions resulting in the sale of goods and services both domestically and abroad. International integration, including foreign trade carried out at the state level, has a significant impact on the development of the regions where the exporting businesses are based.

When it comes to the location theory and the geographic location of economic activity, A. Weber argues that the main factors determining the location of businesses are transport and labor costs (Friedrich, 1929, p. 124). According to Weber, industry is oriented toward raw materials if, in the course of processing, the raw material loses much of its weight or if the cost of transporting the raw material is higher than the

cost of transporting the finished product. The main criticism of this concept is that it substantially simplifies things, primarily by disregarding the role of demand. A. Lösch is considered to be a pioneer of research into how the size of the market is important for the concentration of production; he expanded Weber's original theory to include a focus on demand. Lösch argued that industrial production is concentrated where there is a large market, which leads to a concentration of industry. In a large market, it is possible to generate large-scale sales revenue without creating a monopoly, according to Lösch. This guarantees intense competition, ensures good access to the market and leads to a reduction in company operating costs (Lösch, 1961, pp. 80–85; Zielińska-Głębocka, 2008, pp. 17–18). G. Myrdal has come up with a different approach to explain the location decisions of businesses: he argues that a concentration of industry in specific regions largely depends on the geographical and economic conditions created there (Myrdal, 1958, pp. 48–49). According to A. Marshall, the location of industry is mainly determined by important external benefits, especially those related to the geographic concentration of industry (Marshall, 1962, p. 221). In the context of concentration of economic activity, E.M. Hoover points out that manufacturers find it worthwhile to locate their businesses as closely as possible to their suppliers and markets in order to reduce transportation costs (Hoover, 1962, pp. 124–125).

All these theories clearly highlight the role of business location factors. Due to the uneven distribution of resources, coupled with the absence of corrective intervention action by the government, these factors result in regional differences. Government intervention leads to a change in the market conditions in which businesses function through an improvement in the attractiveness of regions that were previously less appealing to potential investors. The result is that businesses target specific locations, but these areas are often unprepared for such investment projects, in terms of either manpower or technology and telecommunication and transportation infrastructure. Sometimes government intervention may even deepen regional disparities. This is exemplified by what happens in special economic zones in Poland; their operations are often organized on the basis of suggestions from potential investors, not necessarily in line with the government's regional policy (Ambroziak, 2009).

Foreign trade can also contribute to an increase in regional differences. In the case of well-developed regions, foreign trade can enhance their attractiveness and competitiveness. On the other hand, weaker regions that are not attractive to businesses and are not among their potential investment destinations benefit less often from opportunities offered by foreign trade, thereby widening their gap with wealthier regions.

To conduct this analysis of foreign trade at the regional level, we used data on foreign trade and the socioeconomic situation of Poland's 16 provinces since the country's entry to the European Union. The data covers the 2004–2011 period and comes from the Customs Administration in Warsaw[2] and the Central Statistical Office (GUS).

[2] The data on trade in goods is based exclusively on information from the so-called SAD documents and the INTRASTAT declarations. These are the actual data without rounding in the case of businesses ex-

We also used Economy Ministry data on investment projects carried out in Poland's special economic zones as of the end of 2011. It seems that the eight-year period since Poland's EU entry is long enough for a preliminary analysis of the trade profile of the country's regions.

Regional imports

While analyzing the data on imports by companies located in each province, it is necessary to keep in mind that, first, these statistics are understated in relation to the data published by the GUS for Poland as a whole, and second, that they reflect the actual inflow of and demand for imported goods in specific regions only to a small extent. Rather, they point to the location of companies engaged in imports, which means that first of all they reflect the geographic distribution of key importers in Poland.

While keeping these reservations in mind, the data show that Poland's imports have grown significantly (Figure 1). This trend, however, was neither as stable nor as strong as in the case of exports. The average annual growth rate for the imports of Polish regions during the studied period increased by around 9%, although in 2009 imports were 8 percentage points lower than in 2008. In 2009, all of Poland's provinces except for Dolnośląskie recorded a strong decline in the value of imports, compared with the previous year.

The period after the economic crisis showed a strong development of trade. The value of imports started to increase dynamically, by 16%–17% on average compared with the previous year. In 2010–2011, fast import growth was recorded in individual provinces (in Kujawsko-Pomorskie, imports increased by 57% in 2010 over 2009; in Lubuskie they grew by 44%; in Podkarpackie, Opolskie, and Warmińsko-Mazurskie by 30%, in Podlaskie by29%, and in Dolnośląskie by 28%).

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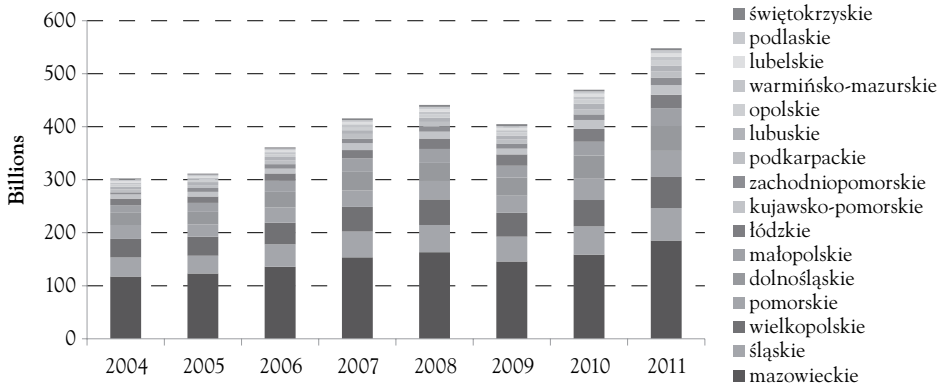
empt from the reporting obligation within the required time frame. Due to limited requirements for businesses to submit registered data, it is impossible to compile a full list of businesses engaged in foreign trade broken down by region. As a result, the available data are incomplete, and the trade of businesses not assigned to any region is around 10% for each year. This is due to several reasons.

First, the available foreign trade statistics are composed of two separate systems: INTRASTAT – system of statistics of trade with EU countries, and EXTRASTAT – system of statistics of trade with third countries. These systems, in addition to the fact that they cover various categories of foreign trade statistics, rely on different data sources. In order to reduce the burden of statistical obligations for businesses operating on the internal market and required to file declarations, a system of statistical thresholds has been developed defining the levels of annual sales above which declarations must be submitted. The introduction of this threshold has resulted in a reduction in the number of businesses required to submit declarations to around 12% of all businesses, and their trade in goods in terms of value accounts for about 98% of the total trade in goods with EU countries.

Second, a significant portion of the trade in goods is handled by foreign companies that only have fiscal representatives in Poland. These companies are only assigned a general Tax Identification Number (NIP) in Poland, and, consequently, their activity cannot be broken down by regions. Third, a separate issue is the confidentiality of data on foreign trade; businesses can apply to keep their sales data confidential. As a result, there is no possibility of identifying them and thus of assigning them to a specific region.

Figure 1
Imports by region, 2004–2011 (in billions of zlotys)



Source: Own elaboration based on data from the Customs Administration (*Izba Celna*) in Warsaw.

Regional exports

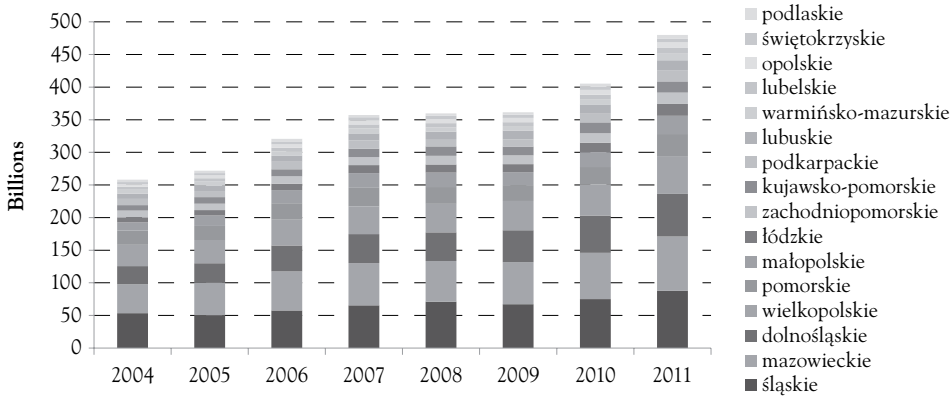
The data on exports, as opposed to imports, should be subject to a smaller margin of error when it comes to the share of individual regions in trade (admittedly, there is still the problem of incomplete data and their lower value compared with the GUS statistics). In this case, most businesses dealing with the manufacture of specific products look for export markets on their own, thus becoming not only producers, but also exporters. In this way, they reduce indirect costs and more quickly identify the expectations of markets to which they can adapt more efficiently.

A look at Poland's exports in the 2004–2011 period reveals a steady increase (Figure 2). The value of goods exported from Poland increased by between 12% and 18% annually on average during the studied period, except in 2008 and 2009, when the value of Polish sales abroad remained practically unchanged. This means that at the time of the economic crisis, when most countries worldwide were experiencing problems and struggled with limited domestic demand, Poland's regions maintained their overall exports at their 2007 level in terms of value.

The fastest export growth in year-on-year terms on average was noted in the following provinces: Dolnośląskie, Łódzkie and Małopolskie (each 13%), Opolskie (12%), Kujawsko-Pomorskie (11%) and Lubuskie, Mazowieckie, and Świętokrzyskie (each 10%). Podlaskie fared the worst in this comparison, with an average annual export growth of 6%. However, it is worth noting that during the economic crisis of 2009–2011, exports grew the fastest in Łódzkie and Małopolskie as well as in regions that were previously relatively poor performers in this area. In provinces such as Lubelskie, Podkarpackie, Podlaskie, Pomorskie, and Warmińsko-Mazurskie, foreign sales in selected years were in fact lower than in previous years. This could mean that the break in the overall

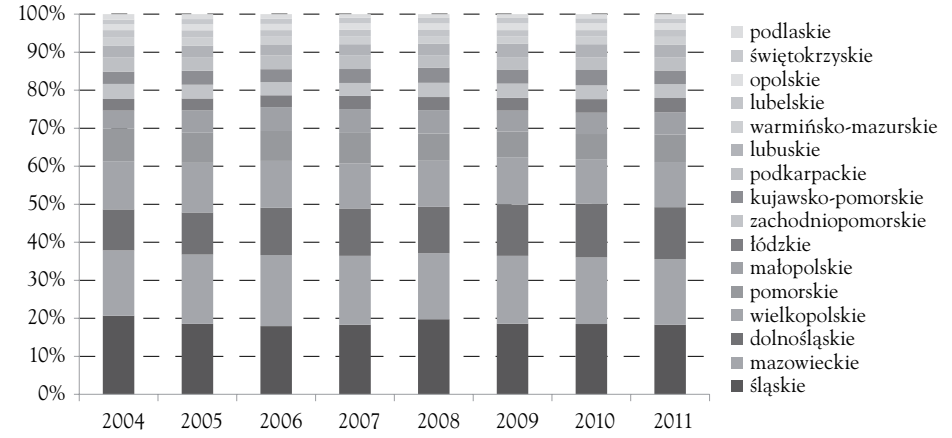
export growth in these regions during the economic crisis enabled them to develop areas of expertise whose importance in Poland's overall exports is growing.

Figure 2
The volume of exports by province, 2004–2011 (in billions of zlotys)



Source: As in Figure 1.

Figure 3
The percentage share of individual provinces in Poland's total exports, 2004–2011



Source: As in Figure 1.

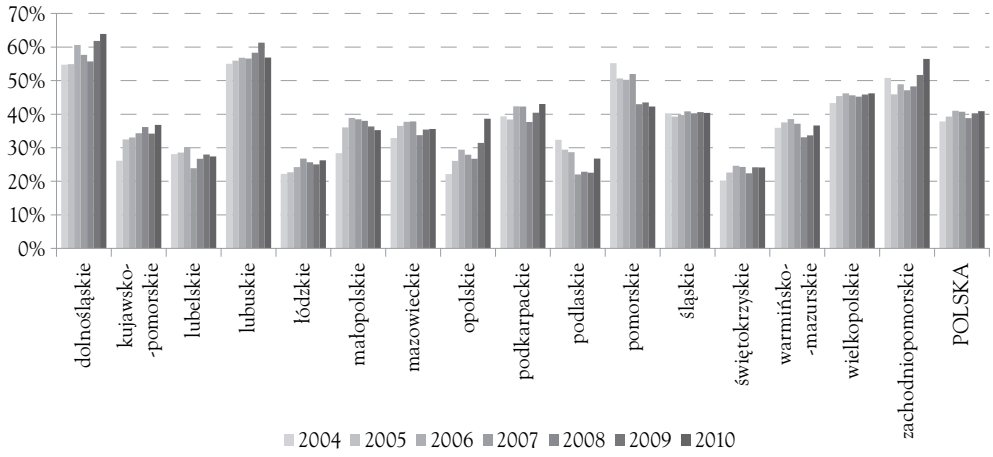
The structure of Poland's exports by province varies considerably. In 2004, Śląskie was the largest exporter in absolute terms; its sales abroad accounted for 20.7% of Poland's total exports, followed by Mazowieckie with 17.2%, Wielkopolskie with 12.7%, Dolnośląskie with 10.8%, and Pomorskie with 8.5% (Figure 3). Considering that in the

2004–2011 period the share of 14 provinces underwent no major change, Śląskie's contribution to Poland's total exports fell by 2.4 percentage points to 18.3% – in favor of Dolnośląskie, whose share increased by almost 3 percentage points to 13.6% in 2011.

In order to determine the degree of openness of a regional economy to foreign trade, we examined the relationship between the value of foreign sales in individual provinces to the total value of production sold in the 2004–2011 period. The proportion of exports in the total value of sold industrial production in all 16 provinces increased gradually over the studied period from 38.1% in 2004 to 41.1% in 2010 (Figure 4). The clear-cut leaders in this table in 2004 were: Lubuskie (56.1%), Pomorskie (55.5%), Dolnośląskie (54.8%), Zachodniopomorskie (50.8%), Wielkopolskie (43.1%), and Śląskie (40.2%). Over the years, the following provinces have significantly increased the percentage of exports in total sales: Dolnośląskie (to 63.9% in 2010), Zachodniopomorskie (to 56.5% in 2010), and Wielkopolskie (to 46.0% in 2010).

Figure 4

The value of exports as a percentage of the total value of production sold by Poland's provinces in 2004–2010



Note: No data available for 2011 in the GUS Regional Database (as of Jan. 31, 2013).

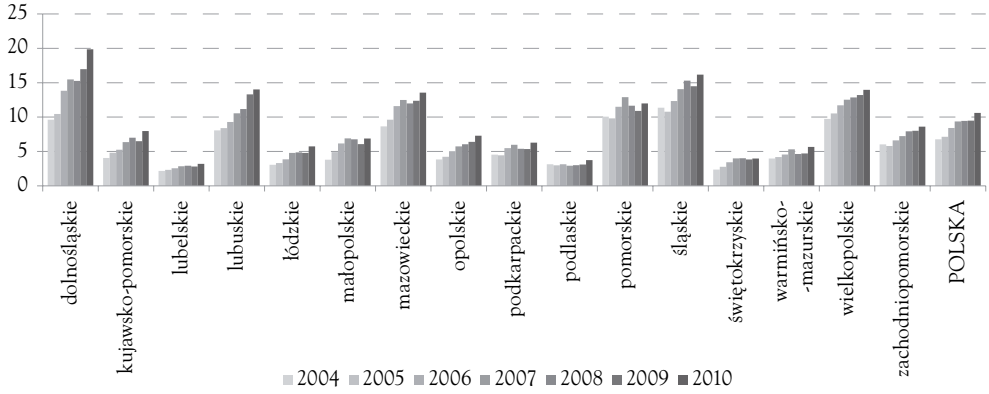
Source: As in Figure 1.

Provinces such as Świętokrzyskie, Opolskie, Łódzkie, Lubelskie, and Kujawsko-Pomorskie do not take full advantage of their export opportunities. In these provinces, the relationship between the value of exports and the total value of production sold remained at a low level in 2004–2010, well below the national average. A significant decrease in the importance of exports as a factor stimulating production was recorded in Poland in 2008, the first year of the economic crisis, primarily due to a major decrease in this indicator in Pomorskie (from 52.3% in 2007 to 43.4% in 2008) as well as in Mazowieckie (from 37.9% to 33.8%), Podkarpackie (from 42.6% to 38.0%),

and Warmińsko-Mazurskie (from 36.8% to 33.0%). In the case of these regions, this indicator confirmed their stronger dependence on domestic demand than on foreign demand for goods.

The trends discussed above are confirmed by an analysis of the relationship between the value of exports and the population of each province (Figure 5).

Figure 5
The value of exports by provinces per capita in 2004–2010 (thousands of zlotys)



Note: No data available for 2011 in the GUS Regional Database (as of Jan. 31, 2013).

Source: As in Figure 1.

Some interesting conclusions can be reached by analyzing the value of exported goods in terms of their GDP share. This indicator determines the role of exports in each region in Poland (Małopolskie Obserwatorium Gospodarki, 2011, p. 15). In 2004–2010, the average share of exports in Poland's GDP was around 30% (Figure 6). This means that the Polish economy as a whole is to a relatively large extent dependent on foreign sales. The most international-oriented provinces in terms of the relationship between the value of exports and the GDP at the beginning of the studied period (i.e. in 2004) were Pomorskie (42.5%), Śląskie (41.7%), Dolnośląskie (39.0%), and Wielkopolskie and Lubuskie (each 37.4%). On the other hand, the regions least oriented toward foreign sales were: Świętokrzyskie (12.7%), Lubelskie (13.0%), Łódzkie (13.8%), and Podlaskie (17.4%). This classification remained essentially unchanged throughout the analyzed period, though in some cases, the level of internationalization through exports has increased. This chiefly applies to Dolnośląskie, which in 2010 generated exports with a value equal to almost half of its GDP (47.5%), and another case in point is Lubuskie (44.8%).

Among the provinces which significantly increased their exports in relation to GDP during the studied period were also Kujawsko-Pomorskie (a rise from 18.8% to 25.6%) and Opolskie (from 18.4% to 24.6%). A decline in the exports-to-GDP ratio, on the

other hand, was recorded in the case of Pomorskie (from 42.5% to 33.7%), which is still among the frontrunners, though with steadily deteriorating results, as well as in the case of Lubelskie (from 13.0% to 12.8%), Mazowieckie (from 23.4% to 22.5%), and Podlaskie (from 17.4% to 13.9%).

Figure 6
Value of exports in provinces in relation to GDP in 2004–2010 (%)

Note: No data available for 2011 in the GUS Regional Database (as of Jan. 31, 2013).

Source: As in Figure 1.

The balance of trade by province

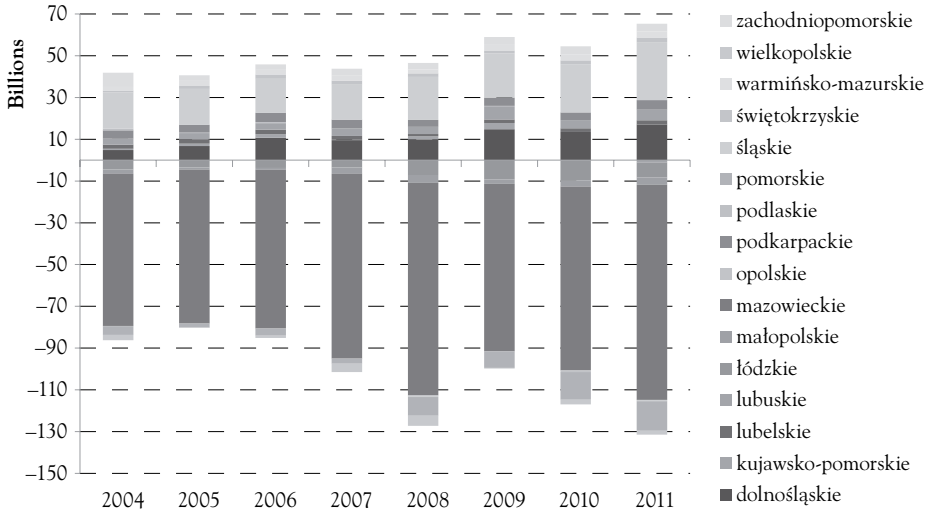
Given the volume of exports and imports in individual provinces, and keeping in mind the limitations of the data, which exclusively indicates the location of the companies involved in foreign trade, it is possible to assess the role of individual provinces in Poland's foreign trade balance (Figure 7).

Throughout the studied period, the trade of individual provinces had a varied impact on Poland's overall trade balance. In the early years, a surplus of imports over exports was recorded in Śląskie (ZL17.4 billion), Zachodniopomorskie (ZL6.4 billion), Dolnośląskie (ZL 4.8 billion), and Podkarpackie (ZL4.0 billion). The largest deficits were recorded in Mazowieckie (ZL72.9 billion) and Łódzkie (ZL4 billion). In the following years, until 2011, the trade deficit of several regions increased significantly: Mazowieckie's trade deficit rose to ZL103.0 billion, Pomorskie's to ZL14.2 billion, Łódzkie's to ZL7.3 billion, and Małopolskie's to ZL3.5 billion.

The above analysis does not mean that imports by the aforementioned regions were consumed only in these regions. These provinces, and especially the major urban centers they include, are particularly attractive to businesses involved in imports. Taking into account the development of roads in Poland and the possibility of reaching consumers

nationwide, an optimal location for a company importing goods from abroad is Łódzkie, which is located in the middle of the country and has freeway infrastructure that is undergoing further expansion. The Wielkopolskie, Małopolskie and Opolskie regions are relatively close to Poland's borders with other EU member states, which facilitates imports, in particular those from EU markets. The significant increase in imports to Pomorskie province is due to increased use of the seaports of Gdynia and Gdańsk by local importers. The high foreign trade deficit of Mazowieckie is in part due to a large number of companies from the trade services sector registered in the capital, which benefit from a well-developed and efficient network of administration and financial and business services. However, businesses importing goods as well as those active in the storage and distribution of goods imported from abroad often use warehouses located in less expensive regions. It should also be noted that the group of provinces recording a surplus of imports over exports has been joined by Kujawsko-Pomorskie (ZL1 billion in 2011) and Podlaskie (ZL400 million). In these two cases, the growth in imports has evidently been determined by the poor production performance of these regions, problems with finding employment, and the fact that many people have been forced to look for new jobs and often set up their own companies that focused on imports.

Figure 7
The balance of trade by province in 2004–2011 (in billions of zlotys)



Source: As in Figure 1.

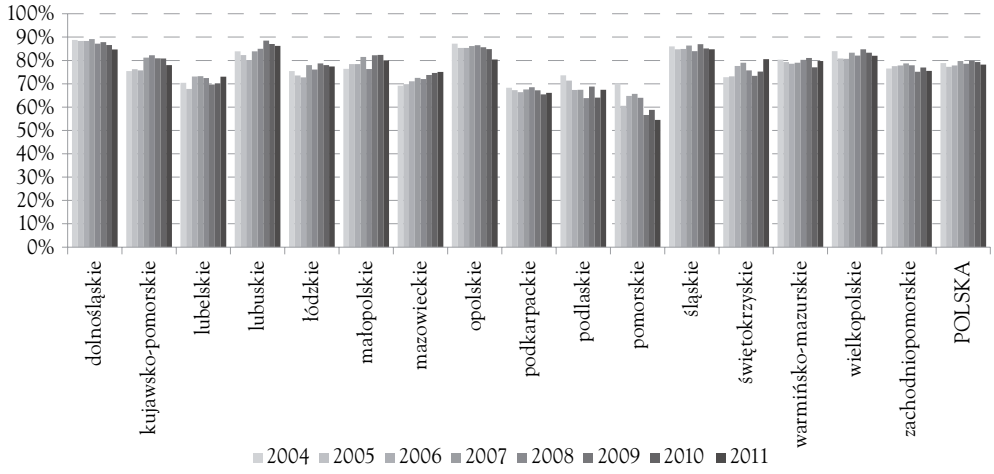
During the studied period, Dolnośląskie reported a relatively high increase in its positive foreign trade balance in 2011, compared with 2004, from ZL4.8 billion to ZL17.1 billion. Śląskie improved from ZL17.4 billion to ZL27.7 billion, and Lubuskie from ZL2.8 billion to ZL5.1 billion. These regions are where companies manufacturing

goods with a relatively high value and targeting mainly export markets are located, which leads to an increased surplus of exports over imports.

The geographical structure of exports by province

Poland's integration with the European Union began with the entry into force of the commercial part of the Europe Agreement, which led to creation of a free trade zone for manufactured goods at the end of 2001. Poland's EU entry required some additional adjustments in technical requirements, which slightly changed the terms of trade in such goods. As far as agri-food products are concerned, a partial and selective liberalization process took place while Poland was an associate member of the EU, and once the country joined the bloc, EU markets fully opened to these products. The advanced process of trade liberalization meant that the EU was Poland's main trading partner from the mid-1990 s onward, with a 78%–80% share in the total value of Poland's foreign trade. Similar trends were noted at the regional level. For each province, the EU was the main external buyer of goods (Figure 8).

Figure 8
The share of the EU in the total exports of Poland's provinces, 2004–2011 (%)



Source: As in Figure 1.

Shortly after Poland entered the EU, the highest share of the EU in total goods exports was noted in Dolnośląskie (89%), Śląskie (86%), and Lubuskie and Wielkopolskie (each 84%). The lowest level of sales to the EU, though also relatively high, was in Podkarpackie (68%), Mazowieckie (69%), and Lubelskie and Pomorskie (each 70%). Due to the economic crisis in the European Union, the rate at which sales on the EU

internal market grew decreased slightly, but the EU's share in Polish province exports remained at more or less the same level, with the exception of Pomorskie (where a decrease from 66% in 2007 to 57% was noted in 2009) and Świętokrzyskie (from 79% to 73%). In subsequent years, in nine provinces sales to the EU were lower in relation to overall exports. Notably, in the case of Pomorskie, the EU's share in total exports fell to 55% in 2011 largely due to the province's specific mix of goods exported and the fact that its main customers are based outside the European Union.

In terms of the country as a whole, the geographic structure of the provinces' foreign trade is not very diversified. Poland, as a member of the EU, is strengthening its economic ties with other countries in the bloc, through specialization in both inter- and intra-industry trade. However, the dependence of the country as a whole on what happens on its main export markets may not be the best option, especially given the troubled situation and the economic and financial problems in the eurozone. Consequently, finding more non-European export markets should increase the security of industry in Poland's provinces.

In order to more precisely determine the level of Polish provinces' ties with the European Union, we calculated the so-called revealed comparative advantage indices.[3] For this purpose, we examined the relation between a region's share in Poland's exports to other EU countries and the region's share in Poland's overall exports (Table 4). An analysis of the data on the revealed comparative advantage shows a correlation between the location of a region and the intensity of its export ties with Poland's closest and largest trading partners.

Table 4

The revealed comparative advantage of Poland's regions in exports to EU member states in relation to the regions' overall exports

	2004	2005	2006	2007	2008	2009	2010	2011
Dolnośląskie	1.13	1.14	1.13	1.12	1.11	1.10	1.09	1.08
Kujawsko-Pomorskie	0.96	0.99	0.97	1.02	1.05	1.01	1.02	1.00
Lubelskie	0.89	0.88	0.94	0.92	0.92	0.87	0.88	0.93
Lubuskie	1.06	1.06	1.03	1.05	1.08	1.11	1.10	1.10

[3] The revealed comparative advantage index is the most widely used instrument to measure a country's competitive position in the international trade of goods. The concept of the revealed comparative advantage involves a search for product groups in exports where a country has a particularly strong position in comparison to its overall exports worldwide. The index has been used to estimate the position of Poland's provinces in trade with the EU by researchers including K. Gawlikowska-Heuckel and S. Umiński, *Handel Zagraniczny Małopolski 2008* (The Foreign Trade of Małopolska Province in 2008), Urząd Marszałkowski Województwa Małopolskiego, Kraków 2009. The revealed comparative advantage index for a specific region in exports to a given market compared with other regions, was calculated using the following formula: $RCA = \frac{Wk/W}{PLk/PL}$, where W*k* is the value of exports from a given province to market *k*, W is the value of exports of a given region, PL*k* is the value of Poland's overall exports to market *k*, and PL is the value of Poland's total exports.

	2004	2005	2006	2007	2008	2009	2010	2011
Łódzkie	0.96	0.95	0.93	0.98	0.97	0.99	0.98	0.99
Małopolskie	0.97	1.02	1.01	1.02	0.97	1.03	1.04	1.02
Mazowieckie	0.88	0.90	0.91	0.91	0.92	0.92	0.94	0.96
Opolskie	1.11	1.10	1.10	1.08	1.10	1.07	1.07	1.03
Podkarpackie	0.87	0.87	0.85	0.85	0.87	0.84	0.83	0.85
Podlaskie	0.93	0.92	0.87	0.85	0.81	0.86	0.81	0.86
Pomorskie	0.89	0.78	0.83	0.82	0.81	0.71	0.74	0.70
Śląskie	1.09	1.10	1.09	1.08	1.07	1.09	1.07	1.08
Świętokrzyskie	0.92	0.95	1.00	0.99	0.96	0.92	0.95	1.03
Warmińsko-Mazurskie	1.02	1.03	1.01	0.99	1.02	1.01	0.97	1.02
Wielkopolskie	1.06	1.05	1.04	1.04	1.04	1.06	1.05	1.05
Zachodniopomorskie	0.97	1.00	1.00	0.99	0.99	0.94	0.97	0.97

Note:

	An index equal to or exceeding 1 means a comparative advantage in trade with the EU

Source: Own elaboration based on data from the Customs Administration (*Izba Celna*) in Warsaw.

Analyzed data for the 2004–2011 period show that the provinces most strongly oriented toward exports to EU member countries are Dolnośląskie, Kujawsko-Pomorskie, Lubuskie, Małopolskie, Śląskie, and Wielkopolskie. Not surprisingly, this means that the group of regions in which the EU has a strong share in overall province exports mainly included provinces in western Poland.

On the other hand, some provinces, especially those located in the eastern part of Poland, have much greater exports to the Commonwealth of Independent States (Table 5). These include Podlaskie, Podkarpackie, Lubelskie, Mazowieckie, Kujawsko-Pomorskie, Łódzkie, Świętokrzyskie and, intermittently, Małopolskie. It should be noted, however, that since Poland joined the EU, the revealed comparative advantage index in exports to CIS countries has gradually decreased for all of these regions. This means that the share of exports to countries beyond Poland's eastern border, though still significant, is falling in these regions, which is further proof of the strong pro-EU trend in the exports of Poland's regions.

The study also revealed a comparative advantage of two provinces, Pomorskie and Zachodniopomorskie, in exports to EFTA countries in relation to overall exports (Table 6). The indices for these two provinces are significant, compared with other provinces. This is mainly due to the specific features of the shipbuilding industry goods produced and offered by these two provinces.

Table 5

The revealed comparative advantage of Poland's regions in exports to the CIS in relation to the regions' overall exports

	2004	2005	2006	2007	2008	2009	2010	2011
Dolnośląskie	0.31	0.35	0.36	0.43	0.48	0.43	0.44	0.43
Kujawsko-Pomorskie	1.50	1.40	1.45	1.14	1.01	1.24	1.08	1.22
Lubelskie	2.11	1.95	1.78	1.70	1.81	2.61	2.22	1.76
Lubuskie	0.91	1.08	1.23	1.16	0.98	0.85	0.91	0.93
Łódzkie	1.85	1.75	1.69	1.47	1.51	1.69	1.67	1.59
Małopolskie	1.39	1.02	0.81	0.79	1.15	1.04	0.98	1.06
Mazowieckie	2.08	1.91	1.83	1.82	1.64	1.76	1.72	1.58
Opolskie	0.57	0.58	0.67	0.54	0.58	0.52	0.49	0.46
Podkarpackie	2.03	1.91	1.86	1.95	1.79	2.01	1.79	1.64
Podlaskie	2.47	2.67	2.91	2.74	2.91	3.41	3.63	2.94
Pomorskie	0.54	0.57	0.55	0.60	0.58	0.85	0.69	0.85
Śląskie	0.33	0.37	0.50	0.57	0.71	0.43	0.58	0.70
Świętokrzyskie	1.31	1.40	1.31	1.33	1.42	1.50	1.44	1.34
Warmińsko-Mazurskie	0.87	0.87	0.90	0.88	0.99	1.03	0.92	0.96
Wielkopolskie	0.66	0.74	0.76	0.82	0.81	0.71	0.80	0.79
Zachodniopomorskie	0.43	0.50	0.49	0.52	0.47	0.55	0.46	0.63

Note:

	An index equal to or exceeding 1 means a comparative advantage in trade with the CIS

Source: Own elaboration based on data from the Customs Administration (*Izba Celna*) in Warsaw.

Table 6

The revealed comparative advantage of Poland's regions in exports to EFTA countries in relation to the regions' overall exports

	2004	2005	2006	2007	2008	2009	2010	2011
Dolnośląskie	0.50	0.51	0.56	0.44	0.42	0.53	0.69	0.52
Kujawsko-Pomorskie	0.76	0.73	0.83	0.86	0.84	0.70	0.71	0.54
Lubelskie	0.31	0.32	0.31	0.35	0.35	0.37	0.37	0.28
Lubuskie	0.43	0.38	0.61	0.65	0.60	0.49	0.60	0.46
Łódzkie	0.61	0.63	0.66	0.78	1.23	0.70	0.66	0.46
Małopolskie	0.68	0.46	0.41	0.44	0.40	0.42	0.40	0.41
Mazowieckie	0.50	0.36	0.44	0.48	0.55	0.50	0.55	0.57

	2004	2005	2006	2007	2008	2009	2010	2011
Opolskie	0.59	0.61	0.68	0.74	0.66	0.60	0.42	0.33
Podkarpackie	0.35	0.38	0.42	0.58	0.62	0.59	0.53	0.36
Podlaskie	0.50	0.50	0.60	0.74	0.86	0.56	0.76	0.75
Pomorskie	4.87	5.83	5.22	5.10	5.11	5.71	4.95	6.45
Śląskie	0.41	0.38	0.41	0.40	0.56	0.42	0.52	0.37
Świętokrzyskie	0.95	0.83	0.65	0.55	0.75	0.53	0.74	0.81
Warmińsko-Mazurskie	1.21	0.94	0.91	0.82	0.84	0.84	1.04	0.64
Wielkopolskie	0.73	0.71	0.75	0.83	0.86	0.85	0.98	0.88
Zachodniopomorskie	2.67	2.75	3.24	2.96	2.18	3.18	2.80	1.55

Note:

	An index equal to or exceeding 1 means a comparative advantage in trade with EFTA countries

Source: Own elaboration based on data from the Customs Administration (*Izba Celna*) in Warsaw.

The findings confirm the conclusions of some previous reports on regional trade to the effect that "it is possible to see a general rule whereby mainly regions in western Poland have highly intensive ties with EU15 countries. This appears to confirm a hypothesis known from the theory of trade that regions 'tend toward' sales markets that are the closest to them". (Gawlikowska-Hueckel, Umiński, 2009, p. 64).

The commodity pattern of exports by province

While analyzing the commodity structure of exports of Poland's provinces, it is necessary to keep in mind that commercial intermediaries play a significant role among entities involved in foreign trade. This fact did not matter in the analysis of the overall exports of individual provinces. However, the following detailed analysis of exports by commodity groups will be limited to groups of goods offered in each category covered by the Polish Classification of Activities (PKD) along with directly related services, while excluding other services, among them retail and wholesale trade services.

An important gauge of the foreign trade performance of Poland's provinces and the country as a whole is the structure of products offered in exports. To analyze the commodity structure of exports, we used an OECD classification that makes it possible to determine the technological advancement of sectors involved in trade at the international level. This classification divides manufacturing industries according to the share of advanced technology in the production process, dividing sectors into high-, medium-high, medium-low and low-technology ones.

This analysis of the structure of exports of Polish regions makes it possible to evaluate their involvement in the exports of individual products, as well as their

specialization in offering goods from high-, medium-high, medium-low and low-technology industries.

In order to determine the export profile of Polish regions, we calculated the revealed comparative advantage indices. The commodity pattern of exports is taken to reflect the differences in the relative costs of production as well as in non-cost factors and it is also assumed that this pattern reveals the advantages of specific exporters in sales abroad. A revealed comparative advantage (RCA) index greater than 1 means that the share of a given province in the exports of a particular group of products is larger than this sector's share in Poland's overall exports. This appears to testify to the comparative advantages of the region in exporting products from a given sector. The index measures the intensity of the export specialization of a given region in relation to Poland as a whole. When the index refers to countries from a given part of the world or the world as a whole, such an interpretation could not be entirely correct, because any changes in the indicator could result from not only varying productivity, but also from changes caused by an export stimulation policy. However, when it comes to the situation of provinces, the exports of all of them are treated in the same way if instruments for supporting sales abroad are applied at the national level.

The revealed comparative advantage (RCA) index measures more than just the comparative advantage according to an approach developed by British political economist David Ricardo. A change in the relative proportion of exports may also be due to a change in the position of companies active in the sector; such a change can be achieved through an improved operating efficiency, cost optimization or the adoption of a better strategy. These factors are particularly important in sectors with a small number of competing firms (Posłuszny, Portal gospodarczy: finanse.wnp.pl; accessed Feb. 5, 2013). Another case in point are those Polish regions which are home to special economic zones (Ambroziak, 2009). Consequently, in addition to the RCA for the exports of specific industries in 2011,[4] we also examined the relative intensity of the cumulative investment of a specific sector in special economic zones in a given region for that same year. For this purpose, we established the relation between a given sector's share in total SEZ investment in a given region and this sector's share in total SEZ investment nationwide (Table 7).

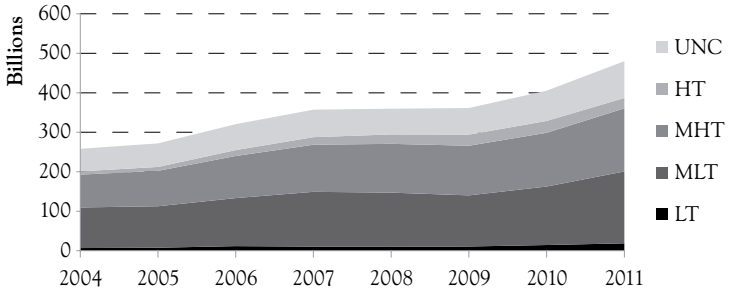
Between 2004 and 2011 no radical qualitative change occurred in Poland's exports (Figures 9 and 10). While the export performance of some regions changed, others maintained their previous position. The main contributing factors are Poland's eight years of EU membership with all its consequences, such as functioning on the EU internal market and the use of a common commercial policy toward third countries, combined with the development of regions resulting from the allocation of European

4 The revealed comparative advantage index of a given province in exporting goods and services from industry *i*, compared with the position of the remaining provinces in exporting goods and services from the same industry, was calculated according to the following formula: RCA , where W*i* is the value of goods and services exported from industry *i* in a given province, W is the value of exports of a given province, PL*i* is the value of exports of industry *i* across Poland, and PL is the value of Poland's exports.

funds. Other factors have included the symptoms of an economic crisis in Poland and changes in the attractiveness of individual regions to both domestic and foreign investors.

Figure 9

The structure of Poland's exports in the 2004–2011 period by level of technology (in billions of zlotys)



Note: LT – low-tech industries, MLT – medium-low-tech industries, MHT – medium-high-tech industries, HT – high-tech industries, UNC – unclassified.

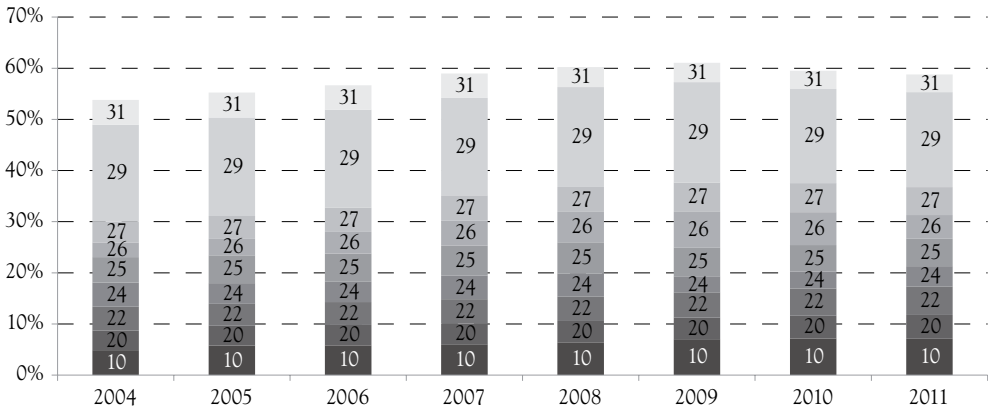
Source: As in Figure 1 and Eurostat: Glossary: High-tech; High-technology aggregations based on SITC Rev. 4, http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Glossary:High-tech

The proportion of high-tech industry exports has increased steadily, from 4.1% in 2004 to 6.8% in 2011 (Figure 9). It should be stressed, however, that during the crisis, the figure reached 9.6% in 2009 and 9.1% in 2010. At the beginning of the period, among the provinces that led the way in the exportation of such products were Pomorskie (46.3% of total high-tech industry exports in 2004) and Mazowieckie (30% in 2004 and 48% in 2005–2006). In the following years, with an evident acceleration in regional development and new foreign investment projects, the role of these regions in the export of high-tech industry products decreased in favor of Dolnośląskie, Wielkopolskie, Małopolskie and Kujawsko-Pomorskie; the contribution of these provinces rose significantly. Dolnośląskie noted a 25-fold rise to 25% in 2011; Wielkopolskie reported a more than twofold rise to 12%; Małopolskie improved threefold to 10%; and Kujawsko-Pomorskie rose to 10% in 2010, followed by a fall to 5.2% in 2011 (Figure 11).

Among high-tech industry products, from the point of view of Poland as a whole, the most important were goods from the electronic, optical and computer industry, with a share ranging from 7.0% in 2009 to 4.6% in 2011. Almost all of these regions (with the exception of Wielkopolskie) had a relatively high revealed comparative advantage index in relation to other regions, as well as a relatively high intensity of SEZ investment in the sector. This demonstrates the positive effect SEZs have on improving the structure of production and exports of regions in favor of new technology.

Figure 10

The structure of Poland's exports in the 2004–2011 period by PKD sectors accounting for more than 4% of total annual exports in any of the years in the 2004–2011 period



Note: PKD 2007 sectors
01 – Crop and animal production, hunting and related service activities
02 – Forestry and logging
03 – Fishing
05 – Mining of coal and lignite
06 – Extraction of crude oil and natural gas
07 – Mining of metal ores
08 – Other mining and quarrying
09 – Mining support service activities
10 – Manufacture of food products
11 – Manufacture of beverages
12 – Manufacture of tobacco products
13 – Manufacture of textiles
14 – Manufacture of wearing apparel
15 – Manufacture of leather and related products
16 – Manufacture of wood and of products of wood and cork, except furniture, manufacture of articles of straw and plaiting materials
17 – Manufacture of paper and paper products
18 – Printing and reproduction of recorded media
19 – Manufacture of coke and refined petroleum products
20 – Manufacture of chemicals and chemical products
21 – Manufacture of basic pharmaceutical products and pharmaceutical preparations
22 – Manufacture of rubber and plastic products
23 – Manufacture of other non-metallic mineral products
24 – Manufacture of basic metals
25 – Manufacture of fabricated metal products, except machinery and equipment
26 – Manufacture of computer, electronic and optical products
27 – Manufacture of electrical equipment
28 – Manufacture of machinery and equipment n.e.c.
29 – Manufacture of motor vehicles, trailers and semi-trailers, with the exception of motorcycles
30 – Manufacture of other transport equipment
31 – Manufacture of furniture
32 – Other manufacturing
33 – Repair and installation of machinery and equipment

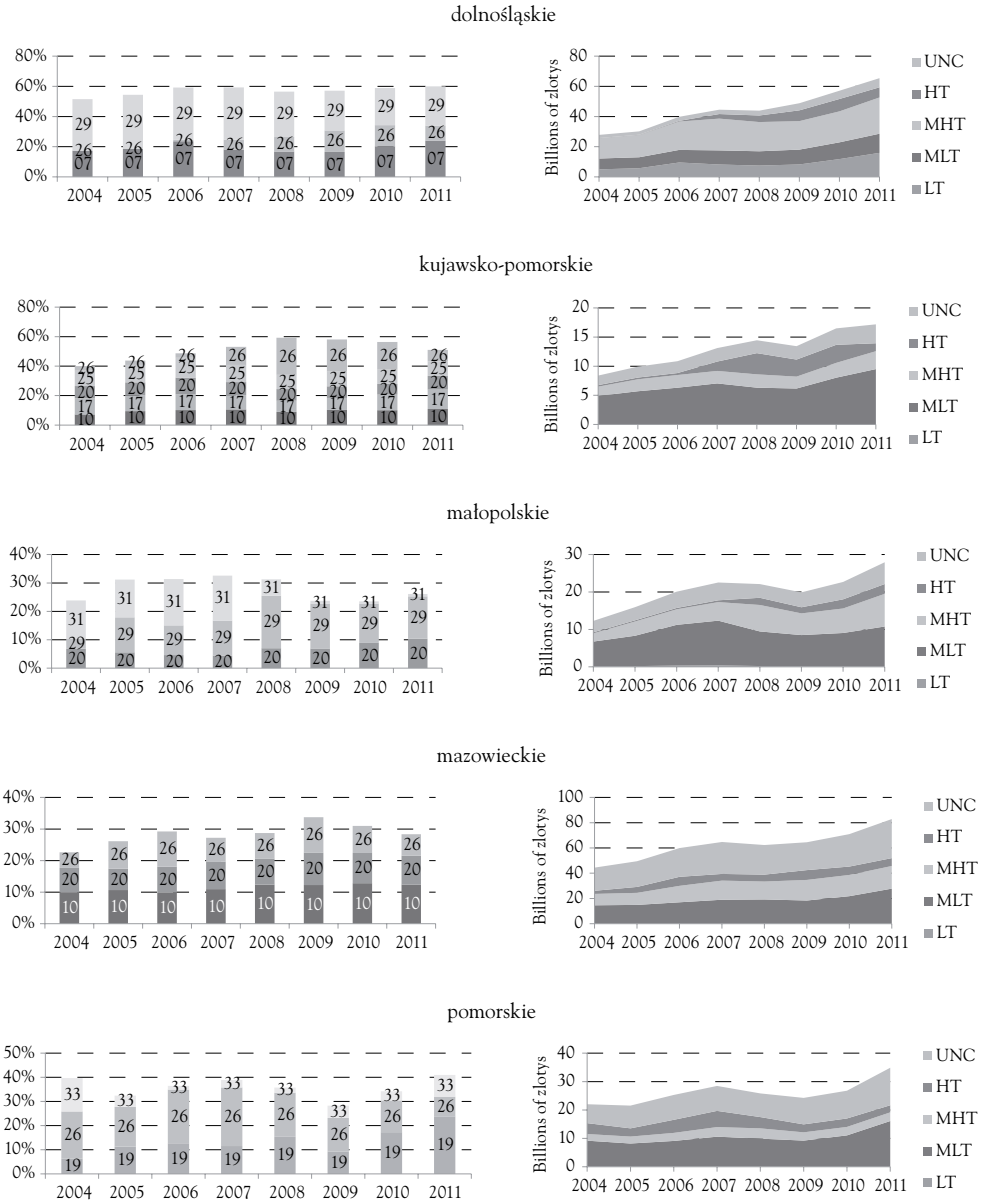
Source: As in Figure 1.

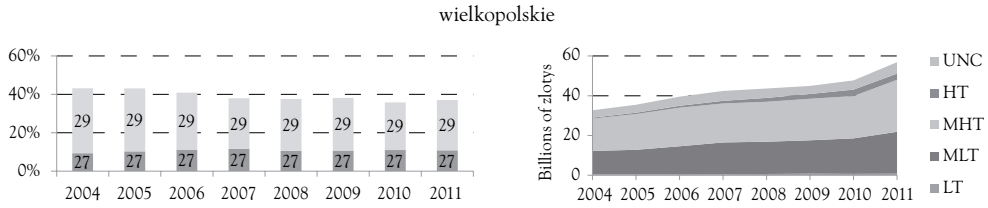
Specialized pharmaceutical industry products accounted for just over 1% of Poland's total exports in 2010, followed by 0.9% in 2011. A definite comparative advantage in the trade of such products in 2011 was found in Łódzkie (1.17), Pomorskie (1.32) and Wielkopolskie (5.10). At the same time, these three regions had the intensity of SEZ investment in the specialized pharmaceutical industry, at 1.59, 3.55 and 1.34 respectively. Thus, despite the relatively small role of pharmaceuticals in these regions'

exports, their comparative advantage in relation to other regions is significant, and SEZ investment strengthens it further.

Figure 11

The structure of exports in selected Polish provinces, 2004–2011 (in billions of zlotys and %)





Left graph: PKD sectors accounting for more than 10% of a region's total exports in any of the years in the 2004–2011 period; PKD 2007 Polish Classification of Activities – see note for Figure 10.
Right graph: LT – low-tech industries, MLT – medium-low-tech industries, MHT – medium-high-tech industries, HT – high-tech industries, UNC – unclassified.

Source: As in Figure 1.

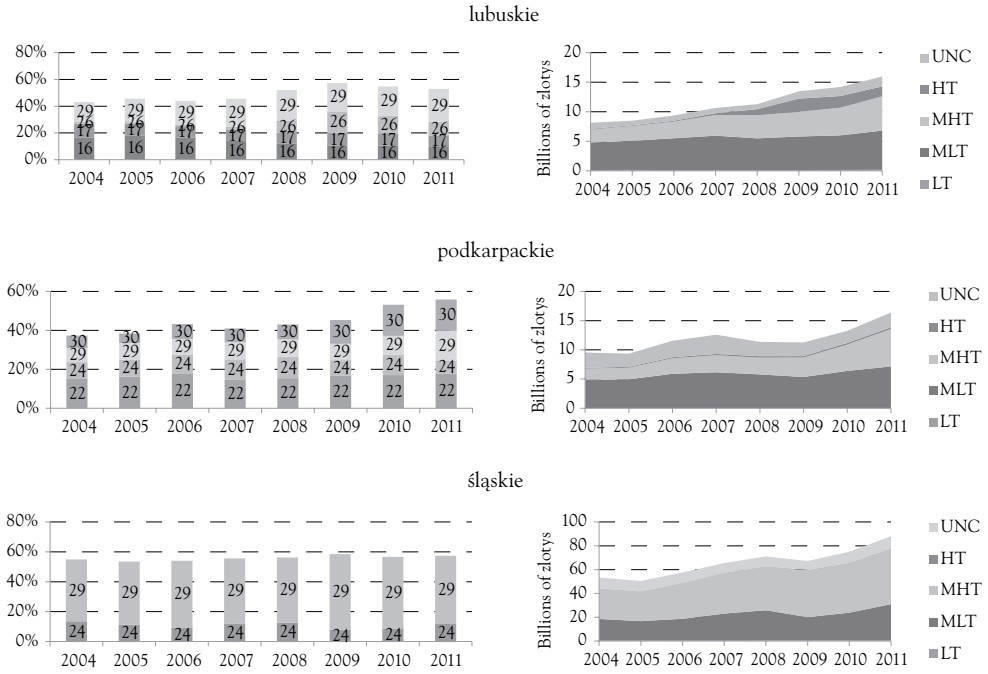
In 2004–2011, exports of products from medium-high technology industries remained at a relatively constant level, within 41.3%–42.7% of Poland's total exports. The following provinces contributed the most to this result: Śląskie province (28.5% of the total exports of medium-high tech industry products in 2011), Wielkopolskie (16.4%), Dolnośląskie (15%), and Mazowieckie (11.2%) (Figure 11). During the studied period, this structure remained basically unchanged. Śląskie was the only province to join the list of regions previously leading the charge in exporting high-tech industry products. Other regions developed at a similar pace, especially in those manufacturing and export sectors that benefited from investment made prior to Poland's EU entry.

Among products from medium high-tech industries, motor vehicles, trailers and semitrailers dominated, as well as components and parts for the automotive industry, accounting for 18.4%–19.6% of Poland's total exports. And despite the economic crisis and decreased demand for cars in the initial stage of the crisis, these exports maintained their position, primarily thanks to incentives for customers used by some EU countries in the form of old car scrapping programs and subsidies for the purchase of new cars. As a result, in 2004–2011, there was a relatively high proportion of motor vehicles and their parts and components in the exports of individual regions, ranging from 24% to 35% in Dolnośląskie, 14.9–21.7% in Lubuskie, 3.6%–14.9% in Małopolskie, 7.2%–15.5% in Podkarpackie, and 24.8%–33.8% in Wielkopolskie, to 41.4%–50.5% in Śląskie) (Figure 12). In the case of cars, a revealed comparative advantage was noted in the exportation of cars from Dolnośląskie (1.43) and Śląskie (2.45) regions, where the intensity of SEZ investment in the automotive sector is slightly higher. However, despite the existence of SEZ businesses in the automotive sector, the RCA index for Małopolskie and Podkarpackie did not exceed 1. This does not mean this industry is unimportant in these regions, but that they are definitely not among the leaders in comparison with other Polish regions. It should also be noted that, in the case of Łódzkie and Wielkopolskie, the RCA indices were 1.35 and 1.45 respectively, with a relatively lower level of SEZ investment in the automotive industry. This shows that the value of exports is much higher than the value of SEZ investment, testifying to high usage of the existing production capacity. Still, the success or disadvantage of

each of these regions in exports is most often determined not by a well-developed and stable automotive industry, with many production facilities, but by individual investors (e.g. those active in Wielkopolskie and Podkarpackie provinces).

Figure 12

The structure of exports in selected Polish provinces, 2004–2011 (in billions of zlotys and %)



Left graph: PKD sectors accounting for more than 10% of a region's total exports in any of the years in the 2004–2011 period; PKD 2007 Polish Classification of Activities – see note for Figure 10.
Right graph: LT – low-tech industries, MLT – medium-low-tech industries, MHT – medium-high-tech industries, HT – high-tech industries, UNC – unclassified.

Source: As in Figure 1.

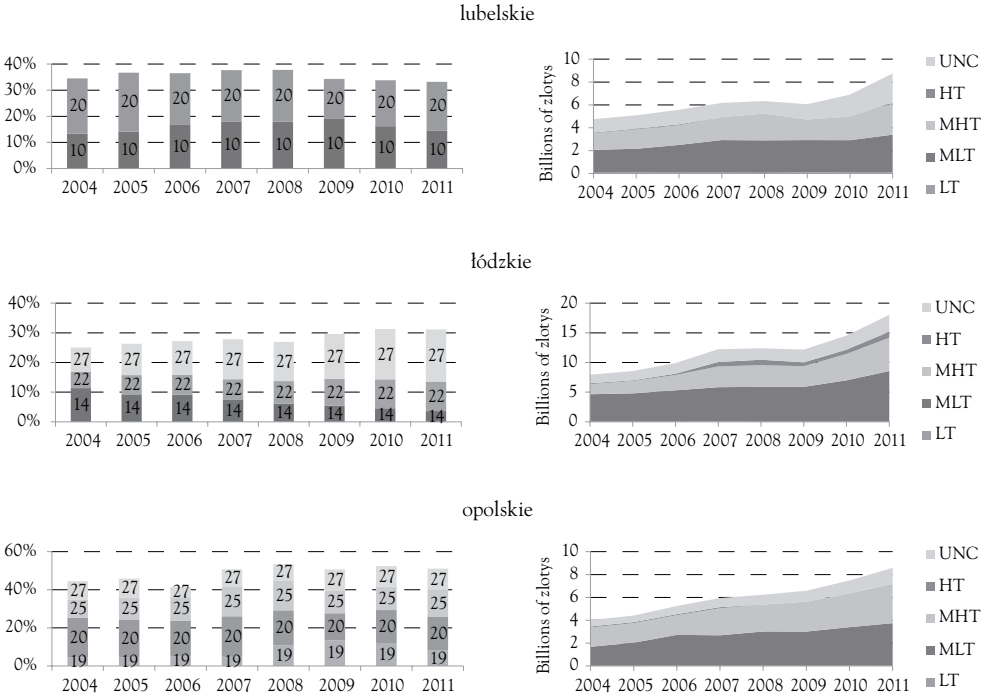
The group of products from medium high-tech industries with a relatively high share in Poland's total exports also includes chemicals and chemical products (up by 1.2 percentage points to 4.6% in 2011 compared with 2004) as well as products from the "manufacture of electrical equipment" sector (up by 1.5 percentage points to 5.5% in 2011). Chemicals and chemical products play a special role in the exports of Lubelskie (18.6% of the region's total exports in 2011), Opolskie (17.6%), and Małopolskie (10.4%) (see Figure 13). In addition to these three regions, a high revealed comparative advantage was also noted in Zachodniopomorskie, Kujawsko-Pomorskie, and Mazowieckie. In the case of Lubelskie, the intensity of SEZ investment in the "chemicals and chemical

products" sector reached an unusually high level of 10.28. In the case of other provinces exporting chemicals and chemical products, it is difficult to find a clear link between exports and SEZ investment. In these provinces, production and sales on the domestic and foreign markets appear to be highly diversified.

As far as electrical equipment is concerned, it is slightly more prominent in the exports of Łódzkie (17.5%), Opolskie (11.2%), and Wielkopolskie (10.9%) (see Figure 13). These regions also have the greatest revealed competitive advantage in relation to other regions in Poland. Moreover, in these regions there is no SEZ investment in the production of electrical equipment, which means that the efficiency and international competitiveness of regions in this industry is mainly due to endogenous factors rather than external support from the state.

Figure 13

The structure of exports in selected Polish provinces, 2004–2011 (in billions of zlotys and %)



Left graph: PKD sectors accounting for more than 10% of a region's total exports in any of the years in the 2004–2011 period; PKD 2007 Polish Classification of Activities – see note for Figure 10.
Right graph: LT – low-tech industries, MLT – medium-low-tech industries, MHT – medium-high-tech industries, HT – high-tech industries, UNC – unclassified.

Source: As in Figure 1.

Notably, there is a negative trend in the structure of exports by Polish regions reflected by a small fall in the role of medium-low technology industries in total exports (from 51.1% in 2004 to 47.1% in 2011) in favor of an increased role of low-tech industries. The exporters with the greatest comparative advantages in the exports of low-value added agricultural products are Zachodniopomorskie (RCA = 4.17), Wielkopolskie (3.30), Lubelskie (2.48), Lubuskie (1.61) and Warmińsko-Mazurskie (1.58). In the fish sector, Zachodniopomorskie (10.40) and Pomorskie (5.63) top the list.

As for medium low-tech industries, the main representatives of this category of products in Poland's exports were food industry goods, which recorded a significant increase from 4.9% in 2004 to 7.1% in 2011. However, this relatively high increase did not offset a decline in the position of beverages and tobacco products, clothing, leather and leather products and wood, furniture and metals. It is also difficult to grasp the relationship between SEZ investment in the food industry and the revealed comparative advantages of regions in exporting food industry products.

The aforementioned decline in the position of medium low-tech industries was noticeable during the economic crisis of 2008–2010, when the position of low-technology industry goods, including raw materials and no-value-added agri-food products, increased by 1.5 percentage points to 4.9% in 2011. This was mainly due to a higher share of exports from the "metal ore mining" sector (the share increased from 1.9% in 2004 to 3.3% of Poland's total exports in 2011). The increase was the most strongly influenced by increased exports of metal (copper) ores in the Dolnośląskie region, both in relative terms and in absolute terms, from 72.4% in 2004 to 84% (with an RCA of 7.34). Another contributing factor was that Śląskie maintained its 5% contribution to the exports of low-technology industry goods, specifically coal and coke (RCA = 5.45) (see Figure 14). The group of provinces exporting natural resources also includes Wielkopolskie, which does not take advantage of its high revealed comparative advantage in oil and gas exports (RCA = 8.09), settling for a less than 1% share of these products in the region's overall exports.

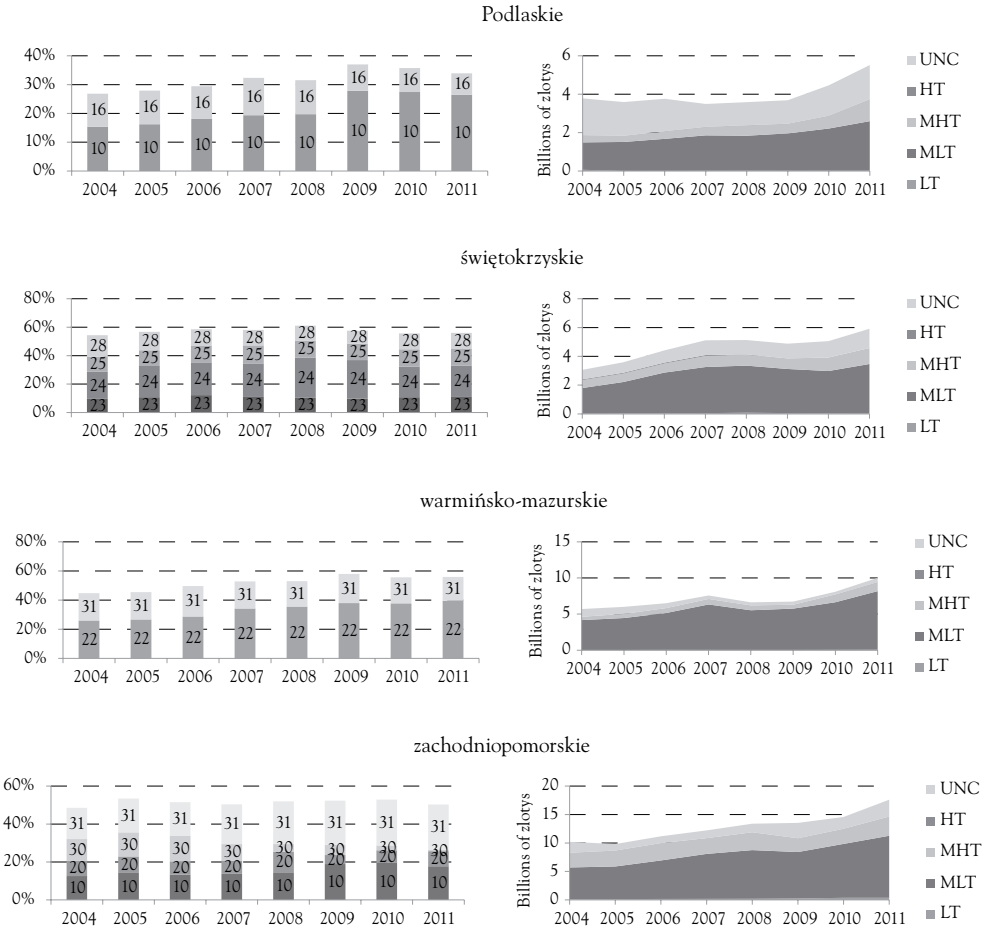
Among Poland's provinces, alongside those that specialize in exporting specific high or medium low-technology products as well as attractive raw materials (coal, copper), are also those regions that, on account of their exports, should be classified among exporters of low or possibly medium low-technology products. This applies to Podlaskie, Świętokrzyskie, Warmińsko-Mazurskie, and Zachodniopomorskie provinces. In the case of Podlaskie and Zachodniopomorskie, products from the agri-food processing sector account for a significant portion of their exports (26.5% and 17.7% respectively); in Zachodniopomorskie, furniture exports also figure prominently (at 23.8%). Notably, Pomorskie, in comparison with other provinces, also has a revealed comparative advantage in exporting wood and cork products (4.19), as well as machinery (2.49) and electrical equipment (1.74).

In Świętokrzyskie, metals are still the most important export item (22.1% in 2011), in addition to machines and equipment and other non-metallic mineral products, which, with a revealed comparative advantage for the exports of these goods, shows that the

region takes advantage of its economic potential. Warmińsko-Mazurskie's exports are chiefly based on rubber and plastic products (39.6%) as well as furniture (16.4%), which means those goods in which the region achieved the highest RCA indices (7.22 and 4.86 respectively).

Figure 14

The structure of exports in Polish provinces, 2004–2011 (in billions of zlotys and %)



Left graph: PKD sectors accounting for more than 10% of a region's total exports in any of the years in the 2004–2011 period; PKD 2007 Polish Classification of Activities – see note for Figure 10.
Right graph: LT – low-tech industries, MLT – medium-low-tech industries, MHT – medium-high-tech industries, HT – high-tech industries, UNC – unclassified.

Source: As in Figure 1.

Summary

The above analysis confirms the hypothesis that foreign trade reinforces the existing differences in the development of Poland's regions, and an inconsistent state intervention policy adds to this trend.

Based on the study, it is possible to formulate several conclusions about Polish provinces' trade ties with abroad.

First, the most developed regions in western Poland as well as some northern and southern regions had the largest share in Poland's overall exports, in both absolute and relative terms, in relation to sold production as well as gross domestic product. This confirms the rule that the more developed a region is, the more open it is and the more involved it is in foreign trade, thus contributing to the country's economic growth. At the same time, weaker regions are far less focused on foreign trade, which aggravates their already difficult situation in terms of development.

Second, the study showed that, in terms of foreign trade, Poland's regions generally tend toward export markets that are geographically close, which positively validates some theories on the location of investment projects. Our study also confirms the results of previous studies conducted in this area (Gawlikowska-Hueckel, Umiński, 2005, p. 76; Gawlikowska-Hueckel, Umiński, 2008, p. 57; Gawlikowska-Hueckel, Umiński, 2009, p. 63). Despite Poland's eight years as an EU member, foreign investors focusing on selling their goods on the EU internal market still do not perceive Poland as a homogenous, stable country with considerable demand potential and locate their investment projects close to the border with Germany or the Czech Republic. Provinces in northern Poland, in turn, have closer ties with Norway, which is part of the EFTA, and provinces in eastern Poland have ties with the Commonwealth of Independent States, mainly Russia and Ukraine.

Third, the export orientation of Polish provinces has its justification in the structure of goods sold abroad, based on a number of relationships. More affluent regions, better prepared for modern investment projects and having a labor force that is better qualified and better suited to meet the expectations of future employers, as well as having ties with science and research centers, offer products from high and medium high-technology industries. These goods attract buyers mainly in EU and EFTA countries, which has enabled these regions to specialize in exports to markets within the European Economic Area.

Less developed regions, on the other hand, whose industry is based on raw materials and agricultural products, offer products mainly for the domestic market, becoming – in the case of some products – a provider of simple components for manufacturers in other Polish regions. Due to the relatively small openness and low level of internationalization of these regions, the main foreign buyers of their goods are members of the Commonwealth of Independent States, as a result of which manufacturers in these regions are not forced to embrace technological change. It seems that provinces in east-

ern Poland should be increasingly attractive not only because of their cheaper labor, but also because of the improving qualifications of local employees, mainly thanks to training programs financed from European Union funds. Also, much of the transport infrastructure has been upgraded with EU funds, which should encourage investors and prospective exporters to seek investment opportunities in the less affluent eastern Polish provinces that have been largely bypassed by investors so far. However, the existing trade ties will not change the existing specialization of Poland's provinces: these ties reinforce the positive trends in the development of high-tech production in richer regions that export their products to EU and EFTA countries, while not providing any incentives or imposing changes in production in weaker regions that focus on exports to the CIS.

Fourth, it seems that a certain incentive to alter the specialization of the poorer regions and, consequently, the structure of their exports, could be state aid granted both from European funds and as part of special economic zones, especially as poorer regions with lower GDP per capita can obtain more support. However, the problem is that it is often investors themselves who decide where subzones of SEZs should be created, in line with the principle of agglomeration and the tenets of P. Krugman's new economic geography theory; as a result, new technologies are coming to wealthy provinces. Some high-tech investment projects can also be found in the eastern part of Poland, but these are isolated cases. In such situations, the investor can monopolize the local labor market, which could have serious social consequences for the region. It can therefore be argued that state aid offered to regions in Poland is ineffective in terms of changing the structure and direction of exports and is not producing the expected results.

In summary, the analysis shows that international trade is an important factor influencing the competitiveness and attractiveness of Poland's provinces. State intervention, including in the form of special economic zones, has clearly failed to reduce regional disparities and improve conditions for international trade, particularly in eastern Polish regions, as seen in Table 7.

Table 7

A comparison of the revealed comparative advantage indices of Poland's provinces in exports and the intensity of SEZ investment in selected industries in 2011

		dolnośląskie	kujawsko-pomorskie	lubelskie	lubuskie	łódzkie	małopolskie	mazowieckie	Opolskie	podkarpackie	podlaskie	pomorskie	śląskie	świętokrzyskie	warmińsko-mazurskie	wielkopolskie	zachodniopomorskie
01	A	0.30	0.69	2.48	1.61	0.73	0.46	0.69	0.97	0.09	0.69	0.16	0.24	0.10	1.58	3.30	4.17
02	A	2.16	0.00	0.00	7.68	0.12	0.40	0.45	0.00	0.09	0.08	0.97	0.02	0.38	0.00	0.26	6.29
03	A	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.63	0.00	0.00	0.62	1.66	10.40
05	A	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.45	0.00	0.00	0.00	0.00
06	A	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.02	0.00	0.00	0.00	8.09	0.00
07	A	7.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
08	A	1.68	1.44	0.00	0.00	1.26	1.85	0.38	0.00	1.75	0.13	0.00	0.07	24.18	0.10	1.00	0.16
09	A	0.00	0.00	0.00	3.22	0.00	11.86	0.63	0.00	2.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	A	0.22	1.57	2.10	0.62	1.22	1.21	1.78	0.88	0.29	3.83	0.51	0.32	0.45	1.14	1.24	2.41
10	B	0.42	.	.	1.54	1.25	1.03	1.48	12.22	0.27	0.94	0.75	0.67	0.04	0.40	2.22	0.04
13	A	1.37	2.70	0.17	1.19	4.76	0.36	0.17	0.78	0.08	0.97	0.34	0.54	0.71	0.92	1.99	0.79
13	B	1.23	.	.	6.54	3.88	.	0.02	.	0.16	3.19	.	.	.	0.01	.	0.99
16	A	0.23	0.76	1.71	5.64	0.33	0.54	0.12	1.59	2.45	4.19	1.45	0.24	1.23	2.60	1.37	3.20
16	B	0.05	.	.	0.45	.	0.23	0.07	4.09	4.12	14.01	0.15	0.04	.	0.81	0.02	10.10
17	A	0.81	6.57	0.32	4.01	0.63	0.48	0.68	0.40	0.09	0.70	1.96	0.08	1.01	0.21	1.10	0.62
18	A	0.05	1.79	0.96	0.34	2.66	3.64	1.67	1.56	0.22	1.62	0.20	0.22	0.31	3.21	0.71	1.00

17–18	B	0.91	4.12	0.04	2.63	0.74	2.13	4.15	.	0.27	0.57	2.31	0.17	1.95	0.47	0.19	0.10
20	A	0.37	2.04	4.10	1.15	0.92	2.28	2.00	3.87	0.73	0.04	0.13	0.22	0.02	0.06	0.38	1.65
21	A	0.29	0.00	0.33	0.40	1.17	0.66	0.75	0.00	0.79	0.00	1.32	0.00	0.00	0.00	5.10	0.02
20–21	B	1.19	0.31	10.28	.	1.34	1.22	0.84	.	0.72	.	3.55	0.40	0.48	0.17	1.59	0.84
22	A	0.95	1.40	0.42	0.34	1.84	0.66	0.65	0.83	3.26	0.70	0.49	0.74	0.51	7.22	0.87	0.45
22	B	0.88	0.90	0.12	1.68	1.27	0.31	0.22	0.04	1.01	0.48	0.44	0.44	0.20	5.71	0.58	3.20
23	A	0.36	0.09	0.07	1.26	2.11	1.89	0.51	0.62	1.32	0.18	0.18	1.76	5.73	1.08	1.02	0.57
23	B	0.36	0.91	.	0.15	2.85	0.39	2.00	0.02	0.14	.	0.63	1.38	4.13	0.18	1.59	1.02
24	A	0.10	0.35	0.18	0.42	0.21	1.87	0.56	0.63	1.66	0.02	0.01	3.15	5.70	0.14	0.16	0.14
25	A	0.90	1.86	1.43	1.30	1.11	1.50	0.50	2.69	0.93	0.38	1.05	1.05	2.29	1.11	0.61	1.32
24–25	B	0.84	0.47	3.86	0.85	1.73	1.02	0.75	2.08	1.39	0.17	0.73	0.73	1.51	0.83	2.05	0.31
26	A	2.21	1.75	0.06	2.26	1.01	1.93	1.51	0.01	0.23	0.05	1.31	0.11	0.01	0.12	0.19	0.02
27	A	0.85	0.18	0.07	0.19	3.29	0.60	1.36	2.10	0.05	1.74	0.14	0.67	0.19	0.14	2.03	1.05
26–27	B	1.37	3.68	.	1.11	0.84	0.40	2.04	.	0.41	0.19	3.80	0.19	.	0.11	0.79	0.07
28	A	0.99	0.86	1.72	1.35	0.52	0.78	0.78	1.51	0.98	2.49	0.97	0.58	3.80	2.77	1.41	0.54
28	B	1.92	.	0.02	1.46	1.81	1.24	0.05	0.80	0.18	1.53	0.19	0.75	0.05	0.07	.	0.06
29	A	1.43	0.11	0.21	1.35	0.22	0.82	0.09	0.34	0.85	0.13	0.08	2.49	0.36	0.02	1.45	0.14
29	B	1.21	.	0.14	0.44	0.12	1.34	0.01	.	1.05	.	0.03	2.35	0.58	.	0.44	0.04
31	A	0.34	1.49	1.71	0.68	0.62	0.24	0.20	0.39	1.05	0.61	0.50	0.14	0.06	4.86	2.67	6.65
32	A	0.93	2.97	0.16	0.66	3.61	0.52	0.59	0.09	1.25	0.76	0.28	0.33	0.09	0.11	2.46	1.23
31–32	B	1.13	.	.	0.42	0.15	0.29	0.01	.	4.04	2.02	.	.	2.66	4.56	5.95	.

Explanation: A: The revealed comparative advantage of a province in exporting products and services from a given PKD sector in comparison to other provinces; B: The intensity of SEZ investment in a specific industry in a given region in relation to the level of SEZ investment in that industry in all provinces in Poland.

Source: Own calculations based on Customs Administration and Economy Ministry data.

5.3. Regional Innovation Systems and Innovation Policy: Polish Regions Compared with Other Regions in the EU

Marzenna Anna Weresa

The competitiveness of both national and regional economies is based on the innovativeness of businesses and their ability to innovate and put their innovative products and services to commercial use. This is confirmed by both theory and numerous empirical studies (e.g., Porter, 1990; Lubiński, Michalski, Misala, 1995; Atzei, Groepper, Novara, 1999; Edquist, McKelvey, 2000; Bossak, 2001; Castellacci, 2008; Bieńkowski, Weresa, Radło, 2010; De Grauwe, 2010; Misala, 2011; Weresa, 2012). This subchapter aims to assess the innovativeness of Polish regions compared with selected regions in other European Union countries. Answers to the following questions are sought:

– How do Polish regions fare in the EU in terms of innovation and how has their position changed over the past five years?
– What is the role of regional innovation strategies and regional innovation policy in shaping the innovativeness of Polish regions?

The analytical framework of this study is delineated by the concept of the regional innovation system and the concepts of innovation capacity and innovation position. In broad terms, regional innovation systems (RIS) are understood as a set of interactions that occur in the process of creating, applying and disseminating knowledge between the public and private sectors represented by formal institutions and other organizations operating in the existing institutional order (Howells, 1999; Evangelista et. al., 2002; Doloreux, Parto, 2004). Innovation capacity is defined for the purposes of this analysis as potential conditions for creating new ideas and putting them to commercial use, while innovation position is understood as the effects of combining the creativity of the nation with financial resources in a specific business and institutional environment (Weresa, Gomułka, 2006). The selection of regional innovation systems representing different countries in the world economy as a point of reference for a comparative analysis of the functioning of regional innovation systems in Poland will be made on the basis of a typology of regions comprising 240 regions from 23 countries across the world;[5] these regions are classified into three groups with a similar innovation profile (Ajmone Marsan, Maguire, 2011). The study is based on statistical data from the OECD Regional Database (http://www.oecd-ilibrary.org/statistics). The measures describing regional innovation systems used for comparisons are two groups of indicators describ-

[5] The typology covers 240 regions singled out at the NUTS 2 level of disaggregation (EC, 2007). These regions come from 23 countries, and their GDP makes up 78% of the total GDP of OECD countries, and the population represents 71% of the total population in OECD countries.

ing the innovation capacity of regions (measures of innovation expenditure) and their innovation position (result-based measures)[6] (see Table 8).

Table 8

Indicators of the innovation capacity and innovation position of regional innovation systems in the world economy

Indicator	
Innovation capacity	Innovation position
– * R&D expenditure in the region as % of regional GDP – Business R&D expenditure – Number of R&D workers in the business sector per 1,000 employees – % of households in the region with broadband internet access – % of the work force with a higher education in the region	– Employment in high-tech industries as % of total employment in the region – Employment in knowledge-intensive services as % of total employment in the region – Number of patents under the Patent Cooperation Treaty (PCT) per 100,000 residents – Patents in collaboration with other inventors in the region as % of the total number of joint patents – Patents in collaboration with other inventors in the country as % of the total number of joint patents – Patents in collaboration with other inventors from abroad as % of the total number of joint patents – Foreign patents owned by domestic residents, i.e. patents obtained under the PCT by at least one foreign inventor and one applicant from the region as % of the total number of patents owned by inventors from the region (i.e., filed by a resident from the region) – Domestic patents owned by foreign residents, i.e. patents obtained under the PCT by at least one inventor from the region and one applicant from abroad as % of the total number of patents for inventions developed in the region

Source: Own elaboration.

To ensure comparability of the measures, all the indicators used for the analysis have been relativized by relating them to the region's GDP or population, or are expressed as a percentage of the total.

Moreover, the analysis takes into account the characteristic features of regional innovation systems related to the functioning of regional institutions, regional autonomy in funding research and innovation from public funds and the powers of regional authorities in education, R&D, and science and technology and innovation policy.

[6] The methodology is more widely discussed in Weresa, 2012.

The role of Polish regions internationally in terms of innovation

Before we determine the innovation position of Polish regions, let us briefly discuss the typology of regional innovation systems. This will make it possible to indicate the position of Polish regions internationally in terms of innovation and select regions that can be used as a benchmark for evaluating the innovativeness of Polish regions. The regions were singled out at the NUTS 2 level of disaggregation (EC, 2007). The typology of regional innovation systems is based on the identification of similarities between regions according to 12 indicators describing their competitiveness and innovativeness. The measures of the competitiveness of a region are GDP per capita, unemployment, population density, employment structure by business sector, and public sector employment. Innovativeness is described by indicators such as R&D spending, the enrollment ratio, the number of patents, and employment in high-tech industries and knowledge-intensive services. Using the hierarchical cluster analysis method, regions in the world economy were divided into three main groups with similar economic and innovation profiles. Each of these three categories was broken down into smaller subgroups. The classification developed in this way made it possible to single out the following types and sub-types of regions in the global economy (Ajmone Marsan, Maguire, 2011, pp. 14–15):

1. **Knowledge hubs**
   1a. metropolitan knowledge hubs
   1b. regional knowledge and technology hubs
2. **Industrial production zones**
   2a. service and natural resource regions in knowledge-intensive countries
   2b. medium-tech manufacturing and service providers
   2c. U.S. states with average science and technology (S&T) performance
   2d. traditional manufacturing regions
3. **Non-S&T-driven regions**
   3a. structural inertia or deindustrializing regions
   3b. Primary-sector-intensive regions (driven by agriculture, forestry, etc.)

Knowledge hubs are the most innovative regions in the world, characterized by a strong development of science and technology and relatively high competitiveness as measured by GDP per capita (over $ 40,000 in purchasing power parity terms at constant 2000 prices). This type of regional innovation system (RIS) can be broken down into two subgroups, which differ in the structure of the economy. **Metropolitan knowledge hubs** – nine metropolitan areas in seven countries worldwide: London, Washington, Brussels, Vienna, the capital region of Seoul, Prague in the Czech Republic, and three German metropolises (Berlin, Bremen and Hamburg) – are characterized by high population density (more than 3,000 inhabitants per square kilometer) and a prevalence of knowledge-intensive services in the economy. The second subgroup

comprises regional knowledge and technology hubs, where the dominant role is played by high-tech industries. This subgroup is composed of 29 regions in nine countries: four regions in Sweden, three each in Britain, Germany and Finland, two regions in France, and one each in Denmark, the Netherlands and South Korea, as well as 11 U. S. states (Ajmone Marsan, Maguire, 2011, p. 17). None of the Polish regions has a sufficiently high level of innovation to be included in this group of regional innovation systems.

The second type of regional innovation systems according to the classification developed by G. Ajmone Marsan and M. Maguire (2011) are **industrial production zones**. Compared with knowledge hubs, these regions have a relatively lower level of prosperity; in 2009, GDP per capita was around $ 33,000 on average (PPP in constant 2000 prices). This category of industrial production zones is made up of four subgroups of regions. The first subgroup comprises service and natural resource regions in knowledge-intensive countries. The subgroup is made up of 28 regions from 10 countries: seven regions in Norway, four each in Sweden, Denmark and Canada, three in the Netherlands, two in South Korea, and one each in Britain, Finland, Luxembourg and Slovakia. These regions are relatively well equipped with highly qualified labor and specialized in knowledge-intensive services. Knowledge-intensive services account for more than half of the total work force in each region (Ajmone Marsan, Maguire, 2011).

Industrial production zones also cover medium-tech manufacturing and service regions with a slightly lower level of GDP per capita (around $ 25,000 on average in 2000 prices at PPP). This group has 49 regions from 12 countries (18 regions in France, seven each in Germany and Britain, four in Spain, two each in Belgium, Ireland, Italy, Canada and South Korea, and one each in Greece, Portugal and Hungary).

A specific subgroup among industrial production zones are 38 U. S. states with average science and technology performance. The characteristic features of this group, which set it apart from other industrial production zones, include a relatively higher level of competitiveness as measured by GDP per capita ($ 43,000 on average), a higher percentage of GDP spent on R&D (about 1.6% on average) and relatively proportional development of high- and medium-high-technology industries and services.

Another subgroup classified as industrial production zones are regions driven by traditional industries, chiefly medium-low and low-technology industries. These regions, however, have a relatively high level of GDP per capita (roughly $ 25,000 on average). This subgroup comprises 30 regions in seven countries: 10 regions in Italy, eight in Austria, seven in the Czech Republic, two in Hungary, and one each in the United States, South Korea and Slovakia.

No Polish region was classified among industrial production zones. All were classified into the third group of regional innovation systems labeled as **non-S&T-driven regions** in the typology by G. Ajmone Marsan and M. Maguire (2011). These regions have a relatively lower level of GDP per capita (in 2009, less than $ 20,000 on average in constant 2000 prices, in PPP terms). Science, technology and innovation are not critical to the development of these regions, as evidenced by the low ratio of R&D expenditure to GDP (0.5%–0.8%) and a relatively small proportion of those employed

in high- and medium-high-technology industries and knowledge-intensive services (far below 30% on average). But this is not a homogeneous group. The first subgroup singled out within this category are structural inertia or deindustrializing regions. This subgroup includes four Polish regions: Śląskie, Dolnośląskie, Zachodniopomorskie and Pomorskie. In addition, this subgroup includes 34 regions from other countries: 13 from Spain, eight from Italy, four from Canada, three each from Germany and Hungary, two from Slovakia, and one from France (see Table 9).

Another subgroup of regional innovation systems not driven by science and technology sectors is based on primary sectors. This subgroup contains the remaining Polish regions (12 regions), in addition to three regions from Greece, three from Portugal, and one from Hungary (see Table 9). Primary sectors such as agriculture, forestry, fisheries and low-technology industries account for a significant proportion of employment in these regions. In this subgroup, innovativeness measured with the intensity of R&D expenditure in relation to GDP and patenting indicators is the lowest among all 240 analyzed regions (Ajmone Marsan, Maguire, 2011, pp. 16–17).

Table 9

Polish regions compared with other regions in the EU according to the typology of regional innovation systems

Type of region	Member regions	Code of region	Country
1. Knowledge hubs			
Metropolitan knowledge hubs	Vienna (Wien)	AT13	Austria
	Brussels (Région de Bruxelles-Capitale)	BE1	Belgium
	Prague (Praha)	CZ01	Czech Republic
	Berlin	DE3	Germany
	Bremen	DE5	Germany
	Hamburg	DE6	Germany
	London	UK1	Britain
Regional knowledge and technology hubs	Baden Württemberg	DE1	Germany
	Bavaria (Bayern)	DE2	Germany
	Hessen	DE7	Germany
	Capital region of Denmark (Hovedstaden)	DK01	Denmark
	Etelä-Suomi	FI18	Finland
	Länsi-Suomi	FI19	Finland
	Pohjois-Suomi	FI1A	Finland
	Île-de-France	FR10	France
	Midi-Pyrénées	FR62	France

Type of region	Member regions	Code of region	Country
Regional knowledge and technology hubs	Zuid-Nederland	NL4	Netherlands
	Stockholm	SE11	Sweden
	Östra Mellansverige	SE12	Sweden
	Sydsverige	SE22	Sweden
	Västsverige	SE23	Sweden
	East of England	UKH	Britain
	South East England	UKJ	Britain
	South West England	UKK	Britain
2. Industrial production zones			
Service and natural resource regions in knowledge--intensive countries	Sjælland	DK02	Denmark
	Syddanmark	DK03	Denmark
	Midtjylland	DK04	Denmark
	Nordjylland	DK05	Denmark
	Itä-Suomi	FI13	Finland
	Luxembourg	LU00	Luxembourg
	Noord-Nederland	NL1	Netherlands
	Oost-Nederland	NL2	Netherlands
	West-Nederland	NL3	Netherlands
	Småland med öarna	SE21	Sweden
	Norra Mellansverige	SE31	Sweden
	Mellersta Norrland	SE32	Sweden
	Bratislavský Kraj	SK01	Slovakia
	Scotland	UKM	Britain
Medium-tech manufacturing and service providers	Flanders (Vlaams Gewest)	BE2	Belgium
	Wallonia (Région Wallonne)	BE3	Belgium
	Lower Saxony (Niedersachsen)	DE9	Germany
	North Rhine-Westphalia (Nordrhein-Westfalen)	DEA	Germany
	Rheinland-Pfalz	DEB	Germany
	Saarland	DEC	Germany
	Saxony (Sachsen)	DED	Germany
	Schleswig-Holstein	DEF	Germany
	Thuringia (Thüringen)	DEG	Germany
	Basque Country (País Vasco)	ES21	Spain
	Comunidad Foral de Navarra	ES22	Spain

Type of region	Member regions	Code of region	Country
Medium-tech manufacturing and service providers	Madrid (Comunidad de Madrid)	ES30	Spain
	Catalonia (Cataluña)	ES51	Spain
	Champagne-Ardenne	FR21	France
	Picardy (Picardie)	FR22	France
	Upper Normandy (Haute-Normandie)	FR23	France
	Central Region (Centre)	FR24	France
	Lower Normandy (Besse- Normandie)	FR25	France
	Burgundy (Bourgogne)	FR26	France
	Nord-Pas-de-Calais	FR30	France
	Lorraine	FR41	France
	Alsace	FR42	France
	Franche-Comté	FR43	France
	Pays de la Loire	FR51	France
	Brittany (Bretagne)	FR52	France
	Poitou-Charentes	FR53	France
	Aquitaine	FR61	France
	Limousin	FR63	France
	Rhône-Alpes	FR71	France
	Auvergne	FR72	France
	Provence-Alpes-Côte d'Azur	FR82	France
	Attica	GR3	Greece
	Közep-Magyarország	HU10	Hungary
	Border, Midland and Western	IE01	Ireland
	Southern and Eastern	IE02	Ireland
	Liguria	ITE3	Italy
	Lazio	ITE4	Italy
	Lisbon (Lisboa)	PT17	Portugal
	North East England	UKC	Britain
	North West England	UKD	Britain
	Yorkshire and the Humber	UKE	Britain
	East Midlands	UKF	Britain
	West Midlands	UKG	Britain
	Wales	UKL	Britain
	Northern Ireland	UKN	Britain

Type of region	Member regions	Code of region	Country
Traditional manufacturing regions	Burgenland	AT11	Austria
	Lower Austria (Niederösterreich)	AT12	Austria
	Carinthia (Kärnten)	AT21	Austria
	Styria (Steiermark)	AT22	Austria
	Upper Austria (Oberösterreich)	AT31	Austria
	Salzburg	AT32	Austria
	Tyrol (Tirol)	AT33	Austria
	Vorarlberg	AT34	Austria
	Střední Čechy	CZ02	Czech Republic
	Jihozápad	CZ03	Czech Republic
	Severozápad	CZ04	Czech Republic
	Severovýchod	CZ05	Czech Republic
	Jihovýchod	CZ06	Czech Republic
	Moravia (Střední Morava)	CZ07	Czech Republic
	Moravskoslezko	CZ08	Czech Republic
	Közép-Dunántúl	HU21	Hungary
	Nyugat-Dunántúl	HU22	Hungary
	Piedmont (Piemonte)	ITC1	Italy
	Lombardy (Lombardia)	ITC4	Italy
	Provincia Autonoma Bolzano/Bozen	ITD1	Italy
	Trento	ITD2	Italy
	Veneto	ITD3	Italy
	Friuli-Venezia Giulia	ITD4	Italy
	Emilia-Romagna	ITD5	Italy
	Tuscany (Toscana)	ITE1	Italy
	Umbria	ITE2	Italy
	Marche	ITE3	Italy
	Západné Slovensko	SK02	Slovakia
3. Non-S&T-driven regions			
Structural inertia or deindustrializing regions	Brandenburg	DE4	Germany
	Mecklenburg-Vorpommern	DE8	Germany
	Saxony-Anhalt (Sachsen-Anhalt)	DEE	Germany
	Galicia	ES11	Spain
	Principado de Asturias	ES12	Spain

Type of region	Member regions	Code of region	Country
Structural inertia or deindustrializing regions	Cantabria	ES13	Spain
	La Rioja	ES23	Spain
	Aragón	ES24	Spain
	Castilla y León	ES41	Spain
	Castilla-La Mancha	ES42	Spain
	Extremadura	ES43	Spain
	Valencia (Comunidad Valenciana)	ES52	Spain
	Balearic Islands (Illes Balears)	ES53	Spain
	Andalusia (Andalucía)	ES61	Spain
	Región de Murcia	ES62	Spain
	Canary Islands (Canarias)	ES70	Spain
	Languedoc-Roussillon	FR41	France
	Dél-Dunántúl	HU23	Hungary
	Észak-Magyarország	HU31	Hungary
	Észak-Alföld	HU32	Hungary
	Abruzzo	ITF1	Italy
	Molise	ITF2	Italy
	Campania	ITF3	Italy
	Puglia	ITF4	Italy
	Basilicata	ITF5	Italy
	Calabria	ITF6	Italy
	Sicily (Sicilia)	ITG1	Italy
	Sardinia (Sardegna)	ITG2	Italy
	Silesia (Śląskie)	PL22	Poland
	West Pomerania (Zachodniopomorskie)	PL42	Poland
	Lower Silesia (Dolnośląskie)	PL51	Poland
	Pomerania (Pomorskie)	PL63	Poland
	Stredné Slovensko	SK03	Slovakia
	Východné Slovensko	SK04	Slovakia
Regions driven by primary sectors (such as agriculture, forestry, etc.)	Voreia Ellada	GR1	Greece
	Kentriki Ellada	GR2	Greece
	Nisia Aigaiou – Kriti	GR4	Greece
	Dél-Alföld	HU33	Hungary
	Łódź Province (Łódzkie)	PL11	Poland

Type of region	Member regions	Code of region	Country
Regions driven by primary sectors (such as agriculture, forestry, etc.)	Mazovia (Mazowieckie)	PL12	Poland
	Lesser Poland (Małopolskie)	PL21	Poland
	Lublin Region (Lubelskie)	PL31	Poland
	Subcarpathia (Podkarpackie)	PL32	Poland
	Świętokrzyskie	PL33	Poland
	Podlasie (Podlaskie)	PL34	Poland
	Greater Poland (Wielkopolskie)	PL41	Poland
	Lubuskie	PL43	Poland
	Opolskie	PL52	Poland
	Kuyavia-Pomerania (Kujawsko-pomorskie)	PL61	Poland
	Warmia and Mazuria (Warmińsko-mazurskie)	PL62	Poland
	Norte	PT11	Portugal
	Centro	PT16	Portugal
	Alentejo	PT18	Portugal

Note: The table includes only EU regions. A full classification of 240 regions worldwide is available in: Weresa, 2012.

Source: Compiled on the basis of Ajmone Marsan, Maguire (2011), pp. 15–17.

The above analysis of the role of Polish regions in a classification based on innovation indicators shows that these regions have a low level of innovation. Moreover, the analysis makes it possible to select regions from other EU countries to offer adequate comparisons with Polish regions. It seems that, while assessing the innovativeness of Polish regions, it is worth comparing their position with, first, that of other regions classified into the same group in the presented typology. Second, they should especially be compared with regions in countries that, like Poland in the 1990 s, underwent a system transition and were preparing for membership in the European Union, and subsequently joined the bloc in 2004, together with Poland. In other words, the evaluation of the innovative position of Polish regions will be made in comparison with other regions representing the same type of regional innovation system. Moreover, the most innovative Polish regions will be compared with other regions in other new EU member states in Central Europe (the Czech Republic, Hungary, and Slovakia).

While comparing regional innovation systems and looking at the role of Polish regions in the EU in terms of innovation, it should be noted that there are considerable differences in Europe in the autonomy of regions in science and technology and innovation policy and in the involvement of regional authorities in financing R&D. The general rule in EU countries is that efforts are made to increase the participation of regions in the financing of R&D and in innovation policy (EC, 2012). However, there

are different approaches in individual member states in this area. The involvement of regional and local authorities in the financing of R&D varies considerably and ranges from 5.8% in Greece to 63.4% in Denmark (Table 10). Poland is among countries with moderate decentralization of R&D. The share of regions in R&D expenditure from public coffers stood at 33.3% in 2009. This was slightly more than in the Czech Republic (26.6%) and Hungary (23.2%), but less than in Germany (37%) and Spain (49.5%). Over the past decade, all Polish regions have developed regional innovation strategies, but their efforts to implement the assumptions made in these documents have been relatively inefficient. This is due to the way in which the national innovation system in Poland functions. So far regulations adopted at the central level have allowed a relatively small level of activity by regions in developing and carrying out their own innovation policy (Sroka, Kwieciński, 2007, p. 26).

Table 10

The role of regional and local funds in financing science, technology and innovation in selected countries in 2009 (as a percentage of public expenditure from the regional or local budget)

Country	Share of regional and local funds in financing science technology and innovation (%)
Denmark	63.4
Spain	49.5
Sweden	46.9
Finland	40.1
Germany	37.0
Belgium	36.6
Netherlands	34.4
Poland	33.3
Austria	31.4
Italy	31.1
Britain	27.5
Czech Republic	26.6
Hungary	23.2
France	20.7
Portugal	13.1
Greece	5.8

Note: Only countries for which statistics are available are listed in the table.

Source: Own calculations based on OECD (2011), pp. 122 and 274–317.

The innovation capacity and position of Polish regions with structural inertia or deindustrialization

In the typology of regional innovation systems developed by G. Ajmone Marsan and M. Maguire (2011), the group of structural inertia or deindustrializing regions includes four Polish regions: Dolnośląskie, Śląskie, Pomorskie and Zachodniopomorskie. This category also includes three regions from Hungary (Dél-Dunántú, Észak-Magyarország, Észak-Alföld), two regions from Slovakia (Východné Slovensko and Stredné Slovensko), three regions from Germany (Sachsen-Anhalt, Mecklenburg-Vorpommern, Brandenburg), one from France (Languedoc-Roussillon), 13 from Spain, and eight from Italy.

The evaluation of the innovation capacity and position of Polish regions compared with other regions across the EU will be made on the basis of the most recent statistical data available as this report goes to press, i.e. as of the end of 2007.

Comparing the indicators of the innovation capacity of the four Polish regions with one another and comparing them with those of other regions in the EU classified into this group (see indicators Nos. 1–4 in Figure 15 and Table 11), it can be seen that, in terms of private sector involvement in financing R&D, two Polish regions, Pomorskie and Śląskie, fared relatively well compared with other members of the studied group. The indicators were 45.4% and 42.4% respectively in 2007 and were higher than those for German regions classified into the group (Sachsen-Anhalt, Mecklenburg-Vorpommern, Brandenburg), but lower than in many regions of Spain (e.g. Rioja, Castilla y León, Aragon, and Región de Murcia) and in Hungarian regions (Észak-Magyarország, Észak-Alföld), as well as Slovak region Stredné Slovensko. Poland's Pomorskie stands out among the four Polish regions with structural inertia or deindustrialization in terms of the number of R&D workers in the business sector in relation to total employment, but this figure is not spectacular compared with other members of the group. In 2007, there were nearly nine research workers per 1,000 employees in Pomorskie, the same figure as in two regions in Hungary (Észak-Alföld and Dél-Dunántú), but far fewer than in many Spanish regions (such as Castilla y León, Rioja, and Galicia), though more than in Slovakia (in the Východné Slovensko and Stredné Slovensko regions) or Hungary's Észak-Magyarország.

The innovation position of the four Polish regions with structural inertia or deindustrialization can be assessed by analyzing the employment rates in high-tech industries and knowledge-intensive services and indicators based on patent statistics (see Table 8).

Among the four analyzed regions, Pomorskie clearly leads the way in terms of the percentage of those employed in high-tech industries and knowledge-intensive services (Figure 15). In 2007, the share of high-tech industry workers in the total number of employees in Pomorskie was 9.3%, which puts the region in second place after Hungary's Eszak-Magyarország among European regions with structural inertia or deindustrialization. Knowledge-intensive services accounted for 28% of the total number of those

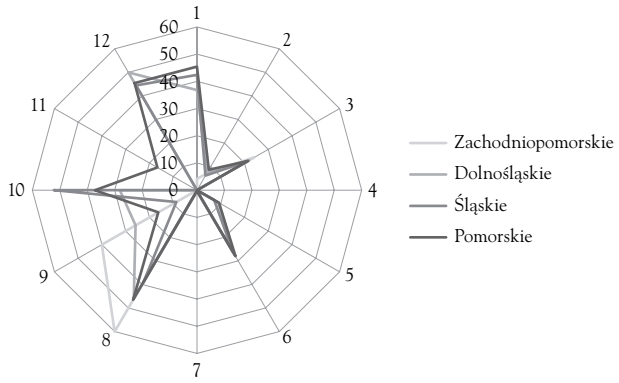
working in Pomorskie, which is the best result among the four Polish regions included in this group and a relatively good showing compared with other EU regions in this group (10th place among 34 EU regions with structural inertia or deindustrialization) (Table 11). However, patent statistics are not a strength of Polish regions. The number of PCT patents per 100,000 residents in all four Polish regions was below 1, which is one of the lowest indicators in the studied group of regional innovation systems. Regions from Slovakia and Hungary reported similar poor indicators. Spain's Rioja leads the way in the studied group of regions in terms of the number of PCT patents in relation to the population (in 2007, there were 26.6 PCT patents per 100,000 inhabitants). A relatively good position is also held by three German regions included in this group (Brandenburg 9.8; Mecklenburg-Vorpommern 5.1, and Sachsen-Anhalt 4.5 in 2007; see Table 11). Polish regions, in turn, lead the way in terms of cooperation in patenting, especially when it comes to cooperation with foreign inventors. Two indicators describing this type of activity in Śląskie and Dolnośląskie (i.e. joint PCT patent applications with other inventors from abroad as a percentage of the total number of joint patents and national patents owned by foreign residents, PCT patents obtained by at least one inventor from the region and one applicant from abroad as a percentage of the total number of patents for inventions developed in the region) are among the highest in the studied group of regions. One of the factors strengthening international cooperation in the field of patenting is the presence of foreign investors and the technology transfer accompanying foreign direct investment (Weresa, 2012).

In summary, the analysis of the innovation capacity and position indicators makes it possible to conclude that Polish regions rank in the middle of the group of European regions with structural inertia or deindustrialization. In comparison with other regions in this group located in other new EU countries, the Polish regions occupy a position similar to that of the Slovak regions, while faring slightly worse than the Hungarian regions. The reason for this uninspiring innovation position of the Polish regions classified into the group of regions not driven by science and technology and displaying structural inertia or deindustrialization is that the regional innovation system is not fully developed, especially in terms of its institutional aspect, accompanied by limited opportunities for independent innovation policy-making. Regional innovation strategies were developed relatively recently and no effective mechanisms for implementing them have emerged. This problem is exemplified by the Dolnośląskie region. The regional innovation strategy in Dolnośląskie is assessed as unrealistic because it is inadequately based on the region's endogenous resources and insufficiently promotes cooperation with other regions (Sroka, Kwieciński, 2007). Network connections in the system are not fully developed, and funds for innovation policy come mainly from the central budget and EU structural funds (Regional Innovation Monitor, 2011). Although Dolnośląskie has a relatively well-developed network of academic business incubators and is home to four technology parks and a thriving technology transfer center at the Wrocław University of Technology, the region does not stand out in terms of most innovation indicators in comparison with other European regions. Similar conditions are found in other Pol-

ish regions; the transformation of Poland's R&D sector has been slow in coming and Polish regions, even though they have a relatively high level of autonomy in innovation policy under law, rarely take full advantage of their powers in this area.

Figure 15

Comparison of Polish regional innovation systems displaying structural inertia or deindustrialization, as of 2007



Legend for indicators 1–12:
Innovation capacity
1 – The business sector's share in R&D spending (%)
2 – Number of R&D workers in the business sector per 1,000 employees
3 – Percentage of the labor force in the region with tertiary education
4 – Percentage of households in the region with broadband internet access
Innovation position
5 – Employment in high-tech industries as % of total employment in the region
6 – Employment in knowledge-intensive services as % of total employment
7 – Number of PCT patents per 100,000 residents
8 – PCT patents obtained jointly with other inventors in the region as % of the total number of joint patents in the region
9 – Joint PCT patent applications with other inventors in the country as % of the total number of joint patents in the region
10 – Joint PCT patent applications with other inventors from abroad as % of the total number of joint patents
11 – Foreign patents owned by domestic residents, i.e. PCT patents obtained by at least one inventor from abroad and one applicant from the region as % of the total number of patents owned by inventors from the region (i.e., filed by a resident of the region)
12 – Domestic patents owned by foreign residents, i.e. PCT patents obtained by at least one inventor from the region and one applicant from abroad as % of the total number of patents for inventions originating from the region

Source: Own elaboration based on the database http://www.oecd-ilibrary.org/statistics, accessed Jan. 10, 2013.

Table 11

The innovativeness of Polish regions in comparison with other regional innovation systems across the EU displaying structural inertia or deindustrialization, as of 2007

REGION	Innovation capacity indicators				Innovation position indicators							
	The business sector's share in R&D spending (%)	Number of R&D workers in the business sector per 1,000 employees	Percentage of the labor force with tertiary education	Percentage of households with broadband internet access	Employment in high-tech industries as % of total employment	Employment in knowledge-intensive services as % of total employment	Number of PCT patents per 100,000 inhabitants	Patents obtained jointly with other inventors in the region as % of the total number of joint patents	Patents obtained jointly with other inventors in the country as % of the total number of joint patents	Patents obtained jointly with other inventors from abroad as % of the total number of joint patents	Patents obtained jointly with other inventors from abroad as % of the total number of patents	Patents obtained jointly with foreign inventors as % of the total number of foreign patents
Languedoc-Roussillon	..	..	28.58	..	1.82	38.35	4.83	50.47	36.11	13.42	6.45	21.81
Brandenburg	26.56	..	27.45	40	5.71	32.88	9.82	33.93	60.10	5.98	9.41	9.78
Mecklenburg-Vorpommern	29.26	..	22.67	56	4.28	32.10	5.08	52.52	42.21	5.28	6.67	15.27
Sachsen-Anhalt	30.12	..	21.63	57	7.15	26.96	4.49	45.64	47.32	7.05	8.62	13.04
Dél-Dunántúl/Southern Transdanubia	21.79	9.05	16.81	42	8.48	25.66	1.59	33.33	53.92	12.75	11.11	40.74
Észak-Magyarország/Northern Hungary	50.62	5.78	15.96	44	11.43	25.10	1.08	40.35	59.65	0.00	..	26.32
Észak-Alföld/Northern Great Plain	50.00	9.39	17.56	43	6.87	25.39	1.13	44.95	35.78	19.27	7.14	32.14
Zachodniopomorskie	**4.15**	**7.09**	**24.18**	**..**	**7.35**	**27.70**	**0.19**	**60.00**	**40.00**	**0.00**	**..**	**..**
Dolnośląskie	**36.80**	**7.52**	**22.00**	**..**	**9.10**	**27.03**	**0.45**	**46.07**	**25.84**	**28.09**	**..**	**50.00**
Śląskie	**42.37**	**6.19**	**21.01**	**..**	**7.24**	**26.16**	**0.14**	**39.13**	**8.70**	**52.17**	**..**	**44.44**

Pomorskie	**45.42**	**8.64**	**21.50**	**..**	**9.26**	**28.02**	**0.26**	**46.51**	**16.28**	**37.21**	**16.67**	**45.45**
Stredné Slovensko	55.08	6.10	12.70	40	8.09	21.43	0.51	20.93	20.93	58.14	..	41.67
Východné Slovensko	39.72	6.96	13.23	41	8.34	23.80	0.77	38.89	0.00	61.11	20.00	53.33
Andalucía	37.07	12.09	26.55	46	2.12	26.91	1.60	84.89	6.04	9.07	4.35	14.49
Galicia	55.34	16.14	32.25	38	5.14	25.52	1.29	65.00	18.75	16.25	5.26	12.20
Principado de Asturias	45.61	13.97	35.35	51	2.72	24.28	1.06	34.69	57.14	8.16	7.69	13.33
Cantabria	34.29	3.09	36.89	55	4.50	25.53	1.36	80.00	0.00	20.00	..	44.44
Rioja	63.26	6.76	32.79	48	5.09	25.09	26.62	78.82	8.68	12.50	..	40.63
Aragon	55.20	15.85	35.86	51	6.83	27.49	..	..	..	..	..	..
Castilla y León	58.97	16.96	33.09	41	4.85	24.88	0.95	45.69	24.14	30.17	12.50	31.58
Castilla-La Mancha	49.66	8.29	24.92	44	2.72	23.74	1.65	50.00	25.89	24.11	..	30.95
Extremadura	16.44	8.43	25.44	39	0.80	24.61	..	..	..	..	..	..
Comunidad Valenciana	39.76	13.16	28.11	47	4.09	23.53	3.07	67.49	17.38	15.12	3.52	18.78
Baleares	23.78	5.84	22.34	58	1.41	28.14	1.25	66.67	6.67	26.67	..	14.29
Región de Murcia	50.99	11.52	25.19	44	2.40	19.57	2.17	71.60	12.35	16.05	..	11.43
Canarias	22.66	7.56	26.63	53	0.76	26.27	0.70	75.00	18.75	6.25	7.69	6.67
Abruzzo	..	..	15.89	37	7.28	26.57	3.19	54.24	26.55	19.21	17.65	36.92
Molise	..	..	16.50	26	7.57	27.18	0.47	50.00	50.00	0.00	..	..
Campania	..	..	14.71	37	5.32	29.06	1.26	50.68	38.78	10.54	4.92	31.19
Puglia	..	..	14.13	29	3.66	27.48	1.38	50.43	45.30	4.27	..	16.87
Basilicata	..	..	14.71	26	5.99	30.55	0.64	38.89	50.00	11.11	..	14.29
Calabria	..	..	17.33	26	1.68	30.82	1.05	62.26	24.53	13.21	5.00	3.85
Sicilia	..	..	14.78	34	2.37	31.80	0.80	50.79	38.89	10.32	..	23.21
Sardegna	..	..	12.97	36	2.23	29.59	0.98	34.21	55.26	10.53	..	35.71

Source: Own elaboration based on the database http://www.oecd-ilibrary.org/statistics, accessed Jan. 10, 2013.

The innovation capacity and position of Polish regions driven by primary sectors

The majority of Polish regions are classified into the second subtype of regional innovation systems: non-S&T-driven regions. These **regions are based on primary sectors**. This subgroup, in addition to 12 Polish regions (Mazowieckie, Lubelskie, Opolskie, Łódzkie, Podkarpackie, Świętokrzyskie, Podlaskie, Wielkopolskie, Kujawsko-Pomorskie, Lubuskie, Małopolskie, and Warmińsko-Mazurskie), contains three regions from Greece (Voreia Ellada, Kentriki Ellada and Nisia Aigaiou – Kriti), one region from Hungary (Dél-Alföld), and three Portuguese regions (Norte, Centro and Alentejo) – see Table 9.

If R&D expenditure is taken as the basic indicator of innovation capacity, it turns out that three regions stand out among the group of regions driven by primary sectors. These are Poland's Mazowieckie and two Portuguese regions, Centro and Norte. In 2007, R&D expenditure in these regions in relation to the regional GDP exceeded 1%, while in other regions the figure ranged from 0.1% in Lubuskie and Świętokrzyskie to 0.92% in Małopolskie. In 2000–2007, however, there were significant changes in this indicator, in both Poland's Mazowieckie and in the Portuguese regions Centro and Norte. In the Mazowieckie region, a drop was recorded in R&D expenditure from 1.44% of GDP in 2000 to 1.1% in 2007, while in both Portuguese regions expenditure increased. In the case of Centro, the increase was from 0.6% of GDP in 2000 to 1.1% in 2007, and in the case of Norte from 0.23% to 1%. In terms of the business sector's share in total R&D expenditure, Świętokrzyskie is at the forefront of the studied group, with 62% in 2007. Podkarpackie comes next with 55.6%, followed by Portugal's Centro with 53.2% (Table 11). In the Norte region, the figure was 46.6% in 2007, while in Mazowieckie it was only 29.2%.

Another key indicator of innovation capacity is the number of R&D workers. Among the regions classified as not driven by science and technology and based on primary sectors, Mazowieckie had the largest number of R&D workers in the business sector in relation to total employment (14.7 per 1,000 employees in 2007), followed by Małopolskie (10.8) and Hungary's Dél-Alföld (10.5).

A strong point of the innovation capacity of Polish regions classified among non-S&T-driven regions based on primary sectors is labor force education. In this respect, Mazowieckie is the undisputed leader in the analyzed group of regions: 29.8% of the work force in the region had a university education in 2007. Greece's Vorreia Ellada comes in second, followed by Poland's Małopolskie (22.2%), Podlaskie (21.4%) and Łódzkie (21.2%). It is worth noting that Polish regions advanced in terms of this indicator over the 2000–2007 period. For example, in Mazowieckie, the indicator doubled, rising from 15.4% in 2000.

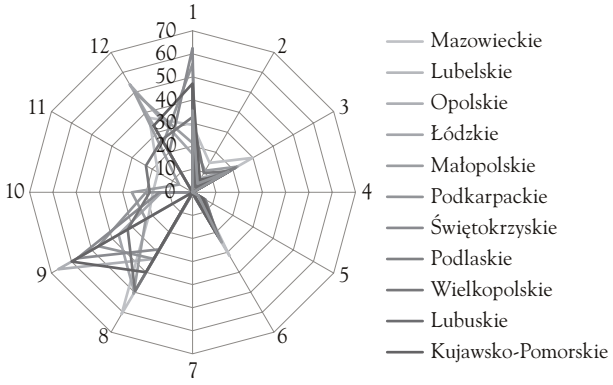
The evaluation of the innovative position of Polish regions driven by primary sectors should begin with an analysis of the structure of employment. The proportion of

workers in high-tech industries in total employment is relatively low in all the provinces, like in other regions in this group (see Table 12 and Figure 16), and remained relatively stable from 2000 to 2007, hovering at around 1.7%–4%. Exceptions include three Polish regions, Opolskie, Podkarpackie and Wielkopolskie, as well as Hungary's Dél-Alföld, where this indicator was around (or even above) 6% in 2007, a level similar to that in regions defined as regional knowledge hubs in the typology developed by G. Ajmone Marsan and M. Maguire (2011). On the other hand, employment in knowledge-intensive services remained at a relatively lower level in regions driven by primary sectors. The best result in this group of regions was recorded by Mazowieckie, where 31% of the work force was employed in knowledge-intensive services, but this figure is still below the average for regional knowledge hubs (over 40%). Notably, in the 2000–2007 period, in all non-S&T-driven regions based on primary sectors, employment in knowledge-intensive services grew rapidly from a dozen or so percent of total employment in 2000 to over 20% in 2007.

Another measure of innovation position that increased in the 2000–2007 period in all regions in the analyzed group is the number of PCT patents obtained. Polish regions, however, were not among the leaders in this group in terms of the number of patents per 100,000 residents. Hungary's Dél-Alföld tops the list (with an increase in the indicator from 0.68 patents per 100,000 inhabitants in 2000 to 1.8 in 2007). Portugal's Norte region is second (with an increase from 0.39 patents per 100,000 population in 2000 to 1.07 in 2007). In terms of co-patenting, Opolskie and Kujawsko-Pomorskie are among the leaders when it comes to joint patents with domestic inventors, and Łódzkie and Małopolskie lead the charge in terms of cooperation with foreign inventors (see Table 12 and indicators 9–12 in Figure 16).

Figure 16

Comparison of Polish regional innovation systems driven by primary sectors – state of play as of 2007



Legend for indicators Nos. 1–12 as in Figure 15.

Source: Own elaboration using the database http://www.oecd-ilibrary.org/statistics, accessed Jan. 10, 2013.

Table 12

The innovativeness of Polish regions in comparison to other regional innovation systems driven by primary sectors in the EU – state of play as of 2007

REGION	Innovation capacity indicators				Innovation position indicators							
	The business sector's share in R&D spending (%)	Number of R&D workers in the business sector per 1,000 employees	Percentage of the labor force with tertiary education	Percentage of households with broadband internet access	Employment in high-tech industries as % of total employment	Employment in knowledge-intensive services as % of total employment	Number of PCT patents per 100,000 inhabitants	Patents obtained jointly with other inventors in the region as % of the total number of joint patents	Patents obtained jointly with other inventors in the country as % of the total number of joint patents	Patents obtained jointly with other inventors from abroad as % of the total number of joint patents	Patents obtained jointly with other inventors from abroad as % of the total number of patents	Patents obtained jointly with foreign inventors as % of the total number of foreign patents
Voreia Ellada	..	..	24.44	27	1.74	21.96	0.43	28.36	38.06	33.58	44.44	45.71
Kentriki Ellada	..	..	18.60	20	1.36	19.69	0.63	55.07	18.84	26.09	13.33	27.27
Nisia Aigaiou – Kriti	..	..	20.21	29	0.72	20.47	0.60	43.90	29.27	26.83	..	45.45
Dél-Alföld/Southern Great Plain	38.75	10.48	8.09	48	5.71	24.05	1.81	45.96	32.30	21.74	9.52	46.67
Mazowieckie	**29.21**	**14.69**	**29.82**	**..**	**4.16**	**31.80**	**0.68**	**60.98**	**21.95**	**17.07**	**17.14**	**37.25**
Lubelskie	**12.73**	**7.11**	**19.75**	**..**	**2.34**	**20.95**	**0.09**	**..**	**..**	**..**	**..**	**..**
Opolskie	**23.39**	**4.25**	**17.83**	**..**	**6.58**	**21.43**	**0.03**	**33.33**	**66.67**	**0.00**	**..**	**..**
Łódzkie	**16.63**	**6.63**	**21.17**	**..**	**4.08**	**23.70**	**0.31**	**50.00**	**36.67**	**13.33**	**..**	**53.85**
Małopolskie	**21.35**	**10.82**	**22.24**	**..**	**4.59**	**25.11**	**0.36**	**50.72**	**23.19**	**26.09**	**6.67**	**50.00**
Podkarpackie	**55.58**	**3.78**	**18.14**	**..**	**6.47**	**20.19**	**0.12**	**33.33**	**46.67**	**20.00**	**..**	**25.00**

Świętokrzyskie	62.50	2.34	18.64	..	3.31	16.93	0.28	28.57	57.14	14.29	..	20.00
Podlaskie	14.77	5.09	21.38	..	3.48	21.98	0.25	..	..	..	..	..
Wielkopolskie	32.59	9.67	18.34	..	6.14	22.08	0.29	49.43	32.18	18.39	23.08	26.32
Lubuskie	46.48	2.51	17.95	..	5.39	21.40	..	..	..	..	..	..
Kujawsko-Pomorskie	47.10	6.26	14.84	..	5.02	20.46	0.09	40.00	60.00	0.00	..	33.33
Warmińsko-Mazurskie	35.44	4.31	18.02	..	2.87	22.87	..	..	..	..	..	..
Norte	46.68	9.43	11.69	45	3.40	19.47	1.07	67.24	12.07	20.69	10.53	24.53
Centro (P)	53.16	9.52	10.94	39	3.81	18.11	0.75	54.41	27.94	17.65	12.50	28.00
Alentejo	47.71	6.90	12.14	37	2.94	22.09	0.26	100.00	0.00	0.00	..	..

Source: Own elaboration using the database http://www.oecd-ilibrary.org/statistics, accessed Jan. 10, 2013.

To wrap up, on the basis of the comparative analysis of the innovativeness of Polish regions classified as non-S&T-driven regions based on primary sectors, it is possible to identify three regions leading the way in the studied group in terms of innovation capacity and position. Among them is Poland's Mazowieckie, alongside Hungary's Dél-Alföld and Portugal's Norte.

Mazowieckie's solid position compared with other regions in the analyzed subgroup can be attributed to three key factors determining the development of the regional innovation system. The first factor is foreign direct investment and the accompanying transfer of technology. GUS data show that Mazowieckie has more than half of the share capital of firms with the involvement of foreign investors (GUS, 2012d). The second factor is Mazowieckie's strength based on its use of national research infrastructure, resulting from the fact that the region's largest city Warsaw is at the same time the capital of Poland and home to a host of scientific institutions and research centers. Third, Mazowieckie has relatively well-developed network connections, both local (regional) and global (Radosevic, 2000, pp. 7–8, 13; Boeckhout, 2004, p. 10). Also important is a significant share of EU structural funds in financing regional innovation policy tools (Boeckhout, 2004, p. 10; Regional Innovation Monitor, 2011).

Among innovation policy tools in Mazowieckie that can be cited as an example of best practices is the "Mazovian Innovator" program carried out between 2008 and 2011 and the "Building a Network of Science-Business Collaboration" program. The former program involved a system of support for new innovative companies and grants for outstanding young researchers. The latter program focuses on financing applied research and development (Regional Innovation Monitor, 2011). The combination of these two programs (support for innovation and knowledge transfer) results in a set of effective instruments aimed at stepping up innovation and thus improving the competitiveness of the region.

Summary and conclusions

The analysis of the functioning of regional innovation systems in Poland points to their relative underdevelopment and low innovativeness in comparison with most EU regions, including many regions in new member states. All Polish regions are classified among **non-S&T-driven regions**; four of them can be classified into the subgroup of regions displaying structural inertia or deindustrialization, and the development of the remaining regions is driven by primary sectors. The indicators of both innovation capacity and innovation position and changes in these indicators in the 2000–2007 period confirm that regional systems in Poland are at a stage of transition and not fully formed. The nucleus of a new relationship between regional systems and the national innovation system in Poland has only begun to form in the last five years. Among factors important to the emerging new structure of regional innovation systems in Poland, an important role is played by foreign direct investment as part of the transfer of knowledge from outside the economic system. While assessing regional innovation policy, it should

be emphasized that the importance of this policy has been limited so far. Innovation policy tools tend to have a nationwide impact and stem from national strategic documents, while the implementation of innovation policy is supported by the co-financing of its tools from EU structural funds. No specific tools are available to strengthen the strengths of individual regions and remove barriers to innovativeness.

5.4. Polish Regions and Their Investment Attractiveness in the EU

Hanna Godlewska-Majkowska

Regions develop according to logical patterns marked out by their past, type of economy and socioeconomic potential. As a result of the instability of the geographic system (changes in the center-periphery arrangement) and the interference of development waves from the past, the development paths of the regions have become unstable. Therefore, regions at different levels of economic development can achieve similar investment attractiveness. Economic development is driven by investment. The ability to absorb investment capital depends on the investment attractiveness of a region, which is largely shaped by location factors. The investment attractiveness of regions therefore varies in time and space. This is reflected in the competitive advantages and barriers to competition in individual regions; some of these are universal in nature, while others are temporary or specific to a particular area.

This section of the report aims to evaluate the investment attractiveness of Polish regions compared with other regions across the EU, using our own indicators of investment attractiveness of regions at the NUTS2 level. In addition, a typology of EU regions has been offered and an attempt has been made to identify competitive advantages and barriers to competition.

The following assumption is the starting point for the discussion: regions at different levels of economic development may be similar in terms of investment attractiveness. Regions with a similar economic origin but at different levels of economic development display similar competitive advantages and sociocultural barriers to competition while showing diversity resulting from their specific development experiences.

Investment attractiveness – competitiveness – economic development

Investment is a driver of the economic development of regions. Investment treated as a source of increasing physical capital is a foundation for the development of the

economic base of regions. It is an important factor behind regional development, particularly when newly emerging, developing or modernized enterprises contribute to the creation of new jobs and when revenue generated at the microeconomic level produces a multiplier effect in the region.

To attract investment and take full advantage of its local (regional) investment potential, a region should be attractive to investors and competitive. In business practice and science, the terms investment attractiveness and competitiveness of regions are often used interchangeably. As defined by the European Commission, a region's competitiveness is "the ability to produce goods and services ready to compete on international markets, while maintaining a high and sustainable level of income." Moreover, the competitiveness of an economy is expected to "provide its population with high and rising standards of living and a high level of employment for all those willing to work, on a sustainable basis." At the same time, the level of activity cannot threaten the equilibrium in the economy or be a burden on the prosperity of future generations (European Commission, 2000, pp. 23–24). In turn, according to T. Marszał and T. Markowski (1998, p. 133), the essence of competitiveness is that it is based on the ability of market players to adapt to changing economic conditions in order to improve or maintain their market position. In this context, regional development is understood as a steady improvement of the competitiveness of businesses and of the standards of living of the population and an increase in the economic potential of regions, while contributing to the development of the country.

The competitive position of regions is therefore measured by their market share. A region is competitive in a given period if its market share does not decrease. When the region is a market participant, for example in terms of direct investment, and competes with other regions on the investment market, then we are dealing with direct competition. Whether or not a region is competitive depends on whether its share in the value of direct investment at a given time does not decrease.

Competitiveness can be related to the economic performance of companies active in a region. If the market position of companies in the region does not deteriorate, and they do not report losses, then the sector they represent is competitive in a specific area, and thus the region is indirectly competitive in a given market segment. Such an approach is called the indirect competitiveness of a region. It is useful in determining strategic regional specializations. Factors that could be considered critical in building the competitiveness of a region include an extended structure of the economy formed by companies capable of competing on international markets, foreign investment, domestic investment (both public and private), technical infrastructure, social infrastructure, R&D, natural resources, business environment, human capital, entrepreneurship, and innovation (Szlachta, 1997; Klamut, ed., 1999; Kosiedowski, ed., Pakulska, 2005; Poniatowska-Jaksch, 2006).

These factors combined contribute to investment attractiveness. According to the Gdańsk Institute for Market Economics, investment attractiveness is "the ability to persuade investors to choose a region as an investment destination" (Gawlikowska-Hueckel, Umiński, 2000). This short and concise definition is the essence of investment

attractiveness. However, it blurs the difference between investment attractiveness and the competitiveness of regions. Therefore, assuming that investment attractiveness refers to the ability to meet the expectations of investors involved in the region and that investor satisfaction can be looked at in terms of the location advantages of a site as well as in terms of the expected results of the investment project carried out, we suggest that investment attractiveness be divided into potential investment attractiveness and actual investment attractiveness.

Potential investment attractiveness is based on a set of regional location advantages[7] that have an impact on the achievement of an investor's objectives (for example, in the form of low business costs, high sales revenues, net profitability, and the competitiveness of an investment project). The actual investment attractiveness of a region is its ability to create customer/investor satisfaction and bring about the absorption of financial and physical capital in the form of investment. Actual investment attractiveness can be measured with the effectiveness of financial, physical, human, and natural capital outlays.[8]

The investment attractiveness of a region is therefore a condition for the inflow of investment and thus the region's ability to compete on the market for direct investment. Competitiveness, in turn, translates into economic development.

Regional economies develop in a complex manner. Their development is not a continuous process because scientific progress triggers development waves that spread at different times. Development waves propagate at different speeds and often overlap in regions. Depending on the absorption capacity of regions for innovation, their openness to the diffusion of innovation, factors of production possessed, and the extent to which the regional economy is linked with the national and international environments, different kinds of regional modifications emerge in how development waves propagate geographically; these modifications have been described in terms of a model by researchers including Kondratieff.

As shown by regional studies, the global crisis that began in 2007 has hit hardest in the regions with the strongest international connections, while regions with relatively less open economic and geographic structures were more resistant to adverse changes in their external environment (Strzelecki, Legutko, 2010). This upset a general rule in regional development based on the fact that regions that are already well developed tend to be developing the strongest and fastest, while economically weak regions are developing at the slowest rate. This mechanism is reflected, for example, by the theory of cumulative causation, also known as vicious circle theory (Gałazka, 2011). The theory of cumulative causation is based on the premise that development processes feature cause-and-effect feedback loops, which results in a cumulative causation process. Positive changes lead to growth in the regional economy, while negative changes make the regional economy

[7] Location advantages are the specific characteristics of a given area that have an impact on investment spending and business costs, the value of production, and taxation. If location advantages are not measurable but influence the location decisions of investors, they become location determinants. More on this in: Godlewska, 2005.

[8] More about this in Godlewska-Majkowska, ed., 2008 and 2009.

contract. In addition, there is inertia among geographic structures, as a result of which a development path chosen in the past determines the further model of development for a long time and inhibits alternative development paths. This mechanism is described by the concept of path dependence (Gwosdz, 2004, pp. 433–456).

The excessive costs of veering off a specific trajectory, combined with increased economic, geographic, social, and environmental barriers resulting from a move from economies to diseconomies of scale, cause well-developed regions to backpedal, especially those specialized in industrial functions. Such a decline is difficult to overcome without an inflow of investment.

In highly economically developed regions there are also other processes that have an impact on their development. The most important of these is the gradual aging of the population, which is often not offset by an increase in immigration. This especially applies to industrial regions. Such regions stand the chance of overcoming development barriers if they accept a new development wave through the creation of location advantages significant for new promising business sectors.

The digital revolution, globalization, and telecommuting have created development opportunities for poorly economically developed regions that are still free from depopulation and population aging. This is facilitated by the opening up of regional communities to innovation. In the process, these regions can skip certain development waves and transform themselves from agricultural to service regions while bypassing the industrialization phase, especially when it comes to heavy industry.

Highly economically developed regions, particularly those with advanced urbanization processes, develop differently. These areas tend to absorb one development wave after another because they are capable of creating high demand for goods and services, including demand in new sectors. They also offer significant economies of agglomeration (urbanization, co-location and economies of scale). However, even in their case, economies of scale could easily degenerate into diseconomies of scale, due to depleted infrastructure reserves, environmental degradation, population aging, and the loss of competitiveness by traditional business sectors. These processes have an impact on the location advantages of regions and their ability to compete on the international market for direct investment.

Methodological introduction

In order to capture geographical variations in the investment attractiveness of regions in the European Union, we used measures referring to innovation, human capital and the market attractiveness of regions. The indicators of potential investment attractiveness (PIA) refer to the key location advantages that can turn into a source of competitive advantages for the investor with regard to a specific type of activity, thanks to the low costs of doing business, favorable conditions in the supply of factors of production, or a convenient location with regard to sales markets.

The indicators of potential investment attractiveness are designed to evaluate various features specific to a site that have an impact on the functioning of companies in this area.

The PIA indicators computed in this section are based on three main components, called microclimates. These are human capital microclimate, market microclimate, and innovation microclimate.

To calculate the human capital microclimate, the following sub-indicators were used:
- economic activity rate – the number of employees per 100 working-age population,
- labor productivity in terms of pay,
- average working time,
- long-term unemployment rate (over 12 months)
- percentage share of population aged over 65 in total population,
- gross value added per employee,
- change in population in 2007–2009 relative to the 2007 population level,
- annual salary per employee.

The market microclimate is based on the following variables:
- GDP per capita in purchasing power parity terms relative to the EU average,
- population density,
- number of automobiles per head of population,
- number of businesses relative to employment.

The innovation microclimate, in turn, has been defined on the basis of indicators such as:
- percentage share of those working in science and technology in total employment
- R&D expenditure (per capita in euros)
- number of those employed in the science and technology sector per 1,000 inhabitants.

The calculations were made on the basis of the weighted correlation method, which makes it possible to limit the subjectivity of the final estimates.[9]

The main difficulty while selecting the indicators was the lack of a sufficient number of observations for statistical units at the NUTS2 level. Despite these difficulties, the indicator is based on a total of 15 diagnostic variables, which seems to be a sufficiently broad basis for comparisons. The calculations were made for 2009 using the weight-correlation method. As a result of the application of the method, the weight for the human capital microclimate was set at 0.54209, for the market microclimate at 0.69844 and for the innovation microclimate at 0.88675.

The composite indicators and the corresponding microclimate ratings were divided into classes based on the arithmetic mean and multiplicity of one-half of the standard deviation. Group A comprises territorial units that were rated the highest when they reached a value exceeding the average plus the standard deviation. Group B is made up of regions rated in the range between the average plus the standard deviation and the average plus one-half of the standard deviation. Group C and Group D are separated

[9] More about the method in: Godlewska-Majkowska, ed., 2010 and 2011.

by the arithmetic mean. Group F covers units graded lower than the arithmetic mean minus the standard deviation.

The typology of EU regions in terms of investment attractiveness

Based on the statistical analysis of data and the investment attractiveness indicator PIA_EU, it is possible to assess the investment attractiveness of European Union regions according to the division into statistical regions at the NUTS2 level (Map 1).

Map 1

Investment attractiveness of EU regions measured with the PIA_EU indicator in 2010

Note: Regions the most attractive to investors were marked with the darkest color; the less attractive a region is to investors, the lighter the color.

Source: Own elaboration.

The highest-rated regions include the most economically developed metropolitan areas such as London, Paris, and Luxembourg, as well as the capital regions of Sweden, Finland, Spain, the Czech Republic, and Slovakia. Prague, Luxembourg, Stockholm, and Åland received the top straight-A ratings for their human capital, market and innovation microclimates. These metropolitan areas received the highest ratings in all categories. Of special note is Åland (Aland Islands), part of Finland, which, thanks

to its convenient geographical location, has built a competitive economy based on trade, transport, and tourism.

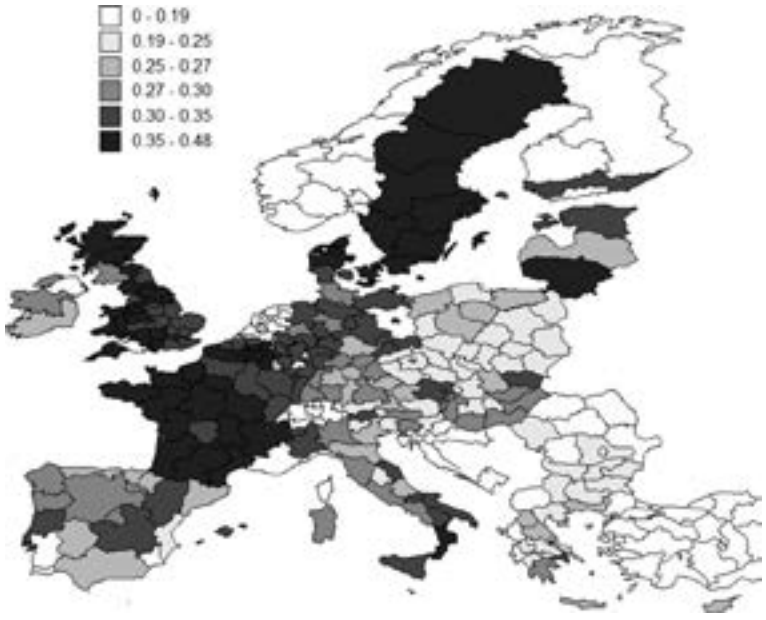
Also very attractive are regions that got straight As or Bs for human capital, market, and innovation. These are Flemish Brabant (Vlaams-Brabant), the Capital Region of Denmark (Hovedstaden), Hamburg, the Autonomous Community of Navarre (Comunidad Foral de Navarra), the Community of Madrid (Comunidad de Madrid), Vienna, Western Finland (Länsi-Suomi), Southern Finland (Etelä-Suomi), Inner London, Berkshire, Buckinghamshire and Oxfordshire, and North Eastern Scotland. In most cases, these are regions with universal location advantages, dominated by big European cities.

Group A also includes other European regions. However, their partial ratings indicate that there are certain disadvantages to the investor. Their demographic background is symbolized by the rating D for the demographic capital microclimate in the case of: the Capital Region of Brussels (Région de Bruxelles-Capitale), Wallonian Brabant (Brabant Walloon) and Utrecht. Other regions such as Stuttgart and Karlsruhe may be hampered by market difficulties, while the Aosta Valley (Valle d'Aosta) may fail to meet expectations in terms of innovation.

Among regions leading the way in terms of investment attractiveness, regions with advanced service development processes dominate (Map 2).

Map 2

The share of modern services in employment in EU regions in 2009



Note: Regions with the largest share of the service sector in employment are marked with the darkest color; the smaller the share of services, the lighter the color.

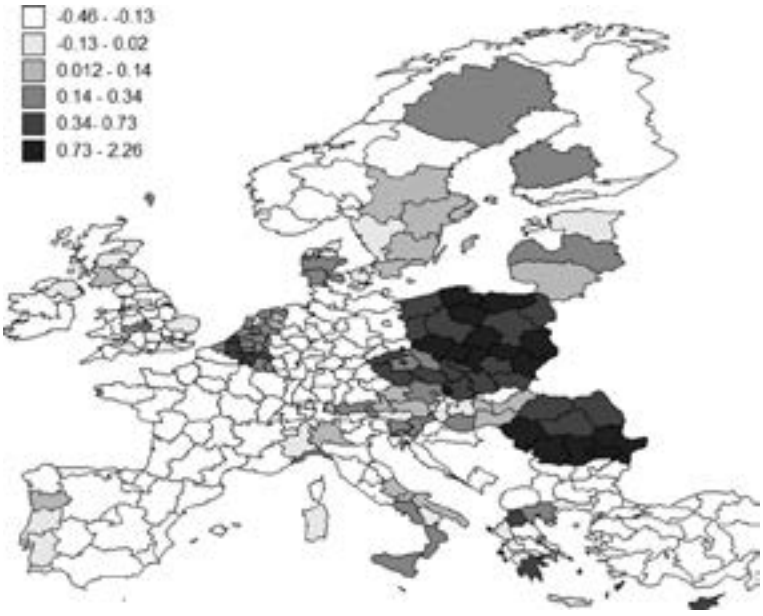
Source: Own elaboration.

Services contribute three-quarters of the gross value added in this group on average, and the share of the service sector is the largest in metropolitan regions (95% in London, 90% in Brussels). Only a few regions in this group show a significant role of industry in the regional economy. These include regions such as North Eastern Scotland, Western Finland, the Autonomous Community of Navarre, and the Basque Country. Industry also has a major impact on regional labor markets in some regions. In addition to the aforementioned Spanish regions, among the regions with the highest investment attractiveness, a significant share of industry in total employment is found in the Bratislava region and the Madrid region, which is largely because these regions form metropolitan industrial districts. German regions with strong industrial traditions, Stuttgart, Karlsruhe, and Darmstadt, also stand out in connection with the role of metropolization processes in investment attractiveness. Regions with long-standing industrial traditions that have undergone industrial restructuring and developed modern technologies also stand a chance of attracting investors.

Among the regions with the highest level of attractiveness, there are major differences in the gross value of assets. The clear leader is London, where this value showed an upward trend in the 2004–2009 period, despite the crisis and London's inclusion in the global economy (Map 3).

Map 3

Change in the gross value of fixed assets in EU regions, 2004–2009



Note: Regions with the greatest changes in the gross value of fixed assets were marked with the darkest color; the smaller the change, the lighter the color.

Source: Own elaboration.

Another standout region is South Finland, due to the development of modern technology in the Helsinki conurbation. The highest growth indicators, in turn, were recorded in regions such as Bratislava Country, Prague, Wallonian Brabant, Luxembourg, and the Vlaams region. On the other hand, the gross value of fixed assets decreased strongly in Bedfordshire and Hertfordshire in Britain, the Åland Islands, and the Aosta Valley in Italy.

Regions classified into group B also display high investment attractiveness. These are generally areas surrounding large cities and catering for them in the broad sense. They usually offer lower costs of doing business, which generates a succession of economic–especially industrial–functions.

The most comprehensive location advantages are offered by regions that received above-average ratings for all the evaluated microclimates. These include the Antwerp region (Antwerpen), Tyrol, Oost-Vlaanderen, Attika, Aragón, Rhône-Alpes, Lazio, Steiermark, Övre Norrland, Bedfordshire and Hertfordshire, Surrey, and East and West Sussex.

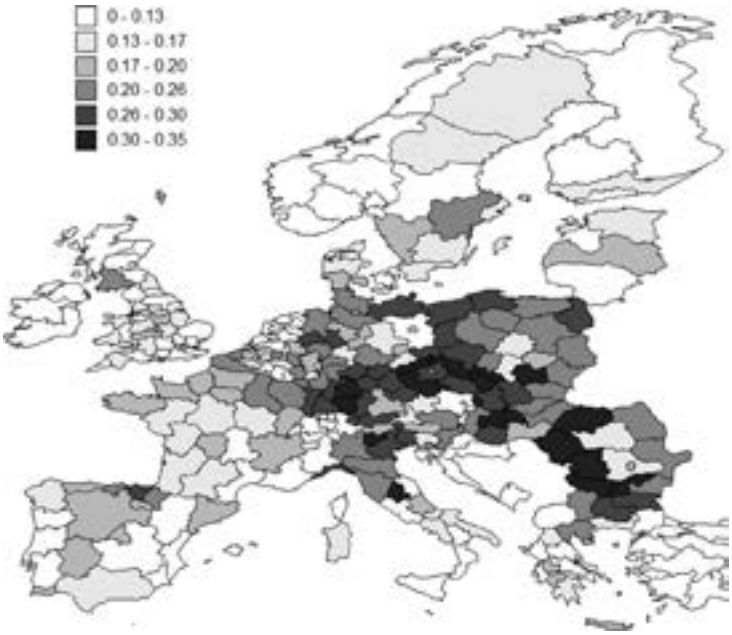
It is also possible to distinguish affluent regions with attractive labor resources, but developing an innovative economy at a slow pace. These include Italian regions Piedmont, Liguria, Lombardy, Veneto, and Emilia-Romagna.

Group B also covers regions that do not meet expectations in terms of labor resources due to population aging or labor market tension. Compared with regions in Group A, Group B regions have a higher share of industry (Map 4). This particularly applies to Tübingen, Liguria, Tyrol, Veneto and Mittelfranken. These also include urbanized, metropolitan regions (Berlin), based on the maritime industry (Bremen, Antwerp), as well as regions with agricultural functions (Steiermark, Rhône-Alpes Region, Tyrol, Attika, Emilia-Romagna, Lombardy), where agriculture has launched a value-added chain.

At the same time Group B regions had good indicators in terms of the gross value of fixed assets in 2004–2009. Zuid in the Netherlands led the way in terms of the value of fixed assets and a number of regions increased their gross value of fixed assets by at least 20%. These were the Oost and West regions in Belgium; Liguria, Groningen and Noord in the Netherlands; and Övre Norrland in Sweden. On the other hand, the gross value of fixed assets in the British regions classified into this group as well as in Piedmont decreased. This is probably due to the barriers identified in the study: the market barrier in the case of the British regions, and the innovation barrier in the case of Piedmont. This latter barrier probably affects other Italian regions classified into Group B as well.

The structure of the population by employment also shows an evident predominance of services, due to the fact that this group includes urban regions such as Berlin, Bremen, and London.

Map 4
The share of industry in employment in 2009



Note: Regions with the largest share of industry in employment are marked with the darkest color; the lower the share, the lighter the color.

Source: Own elaboration.

Regions in Group C are even more varied in structural terms. They can be divided into:

- capitals and capital regions of medium-developed European Union countries, especially regions surrounding these countries' capital cities (Bucharest, Lisbon, Central Hungary, and Poland's Mazowieckie);
- restructured industrial regions that are raw material suppliers or were dominated by light industry in the past (Alsace, East Wales, Provincia Autonoma, Trento, Friuli-Venezia Giulia, and Umbria);
- agricultural regions in which manufacturing has also developed;
- influence zones of large Western European cities, such as Outer London.

Their overall rating is above average. However, these regions display selective investment attractiveness because the evaluation of individual microclimates is often varied. This group of attractiveness comprises a relatively large number of regions (55). Among the Polish regions, only Mazowieckie has been classified into this group. The region received above-average ratings for human and market capital. However, Mazowieckie's showing in terms of innovation is below average. A similar situation occurred in other regions in this group, i.e. Jihovýchod, Voreio Aigaio, Galicia, Castilla

y León, Cataluña, Pays de la Loire, Abruzzo, Provincia Autonoma Bolzano/Bozen, Umbria, Marche, Cyprus, Lisbon, Bucharest (Bucuresti – Ilfov), Småland med öarna, and Norra Mellansverige. This shows that Mazowieckie is capable of competing with other metropolitan regions in a united Europe, especially those with similar economic structures. This particularly applies to the Bucharest region.

In terms of their ability to attract investment, measured by the gross value of fixed assets, regions such as Piedmont and Bucharest stand out, while the following regions stand out in terms of dynamic growth in this indicator: Bucuresti (225.50%), Mazowieckie (65.90%), Jihovýchod (48.40%), Cyprus (43.40%), Gelderland (27.40%), Niederösterreich (23.90%), Limburg (23.00%), Limburg (22.40%), and *Střední Čechy* (21.80%). The British regions (North Yorkshire, Southern and Eastern, Southern Wales, and Essex) recorded a decrease in the gross value of fixed assets.

Another group of regions are regions rated below the EU average – Group D. Among Polish regions, only Pomorskie has been classified into this group. The group includes many regions that developed thanks to investment in industry in the past – as exemplified by regions in southeastern Spain, northern France (e.g., Basse-Normandie and Picardy), northeastern and eastern Germany (e.g. Schleswig-Holstein), Scotland and North Ireland, and North West Czech Republic. The characteristic features of this group include low population density, depopulation and a low level of prosperity as measured by GDP per capita. In most these regions, there is no expenditure on the development of an innovative economy, and low labor productivity is not conducive to new investment projects. Relatively numerous among these regions are industrial regions that were once dominated by coal mining and metallurgy, and those that are undergoing restructuring, such as Saarland, Saxony (Leipzig and Chemnitz), Thuringia, Central Moravia (Strední Morava) and North West Czech Republic (Severovýchod), and Greater Manchester. This group also includes southern European regions specializing in tourism (Crete, Sardinia, and Castile-La Mancha).

The vast majority of these regions, however, have location advantages that make them attractive to specific markets. In 2009, the gross value of fixed assets was the highest in Britain's Border, Midland, and Western region, and the fastest growth in this indicator in the 2004–2009 period in this group was displayed by Ionia Nisia, Strední Morava, Namur, South West Czech Republic, Liège, Denmark's Zealand, South Denmark (Syddanmark), Luxembourg, Severovýchod, Friesland, Kentriki Makedonia, and Overijssel.

The next group of attractiveness, E, includes Polish regions such as Dolnośląskie, Śląskie, Małopolskie, Łódzkie, Pomorskie, and Zachodniopomorskie. The group also includes Latvia and Lithuania, Moravian Silesia in the Czech Republic, Eastern Germany, and Münster, Lüneburg, Weser-Ems, South West Spain, North East France, many coastal areas of Greece, South Italy: Sicily, Calabria, Campania, Apulia (Puglia) and some regions in Britain. A characteristic feature of this group is its low innovation score. Polish regions included in this category did not receive microclimate ratings above the EU average. In a detailed evaluation, Polish regions are distinguished by high labor productivity relative to pay and a relatively long working time.

Among the aforementioned regions, the highest gross value of fixed assets was recorded in the Italian regions of Campania, Sicily, and Apulia. The fastest growth in the value of fixed assets, on the other hand, was noted in Poland's Śląskie and Dolnośląskie regions, as well as in Latvia and Campania.

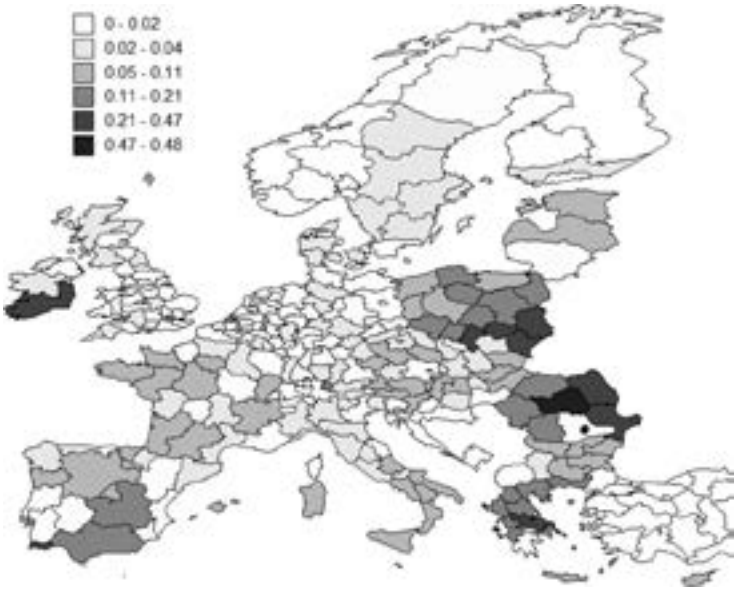
Group E regions vary considerably in terms of economic structure. This group includes both poorly economically developed regions and problem industrial regions.

The most heavily industrialized regions in this group are Dytiki Macedonia, North East (Severozapad) and Poland's Malopolskie province.

The last group of regions, F, includes a relatively large number of Romanian, Bulgarian, Greek, Portuguese, Slovak, and Hungarian regions as well as Poland's Lubelskie, Podkarpackie, Świętokrzyskie, Podlaskie, Opolskie, and Kujawsko-Pomorskie. Many of these are agricultural regions (Map 5).

Map 5

The share of agriculture and forestry in total employment



Note: Regions with the largest share of agriculture and forestry in total employment are marked with the darkest color; the lower the share, the lighter the color.

Source: Own elaboration.

Despite their low overall assessment, these regions too can offer benefits to investors thanks to access to attractive labor resources. Such an advantage is held by Poland's Podkarpackie, Świętokrzyskie, Podlaskie, and Kujawsko-Pomorskie. In addition, above-average human capital ratings were given to regions such as Região Autónoma dos Açores and Madeira in Portugal, West Slovakia (Západné Slovensko), North East

Romania (Nord-Est), and North West Romania (Nord-West). These regions have different economic structures but share a low level of economic development, reflected in the agricultural nature of their economies (especially Centru and South West Oltenia), or the need to restructure the economy, which was earlier based on unprofitable industries (West Slovakia, and Poland's Kujawsko-Pomorskie and Świętokrzyskie provinces).

EU enlargement created an opportunity for the regions in Group F. This is especially true of Kujawsko-Pomorskie, where in 2004–2009 the gross value of fixed assets increased by 132%. This was the highest increase in this group. Moreover, a significant increase in the gross value of fixed assets was noted in regions such as Sud Muntenia in Romania (by 116%), West Romania (Vest – 107%), and Poland's Lubelskie (93%), Opolskie (87%), and Świętokrzyskie (85%). An increase, though much smaller, was also noted in other regions in Romania and Slovakia. At the same time, in other regions in the group, the gross value of fixed assets decreased. This applies to Madeira and the Central Region in Portugal and to Greece's Dytiki Ellada and Sterea Ellada. Portugal's Norte region leads the way in terms of the gross value of fixed assets.

Improved conditions of doing business environment as a result of the harmonization of laws and diffusion of organizational, marketing and process innovation, as well as the flow of funds spent under the cohesion policy, explain the increase in the real attractiveness of regions in EU10 countries in recent years, as well as decreases in regions earlier covered by EU structural assistance but experiencing development difficulties as a result of losing competitiveness and having insufficiently innovative economies. Regions with investment attractiveness two grades lower than suggested by the achieved level of economic development include the Portuguese island of Madeira (Região Autónoma da Madeira), Germany's Lower Bavaria (Niederbayern), Oberpfalz, Lower Franconia (Unterfranken), Swabia (Schwaben), the Weser-Ems region, Düsseldorf, Münster, Arnsberg, and Saxony-Anhalt.

In addition, the group includes Italy's Bolzano, Trent, and Friuli-Venezia Giulia regions as well as Greece's Sterea Ellada and Zeeland in the Netherlands. The main barrier to the development of these regions is demography. These are areas with low population density, relatively short working time, and high wages. This hinders an increase in competitiveness. However, these regions have an above-average level of economic activity of the population, a good relationship between labor productivity and wages, a relatively high level of income, and strong demand for manufactured goods. These characteristics are their competitive advantages. The investment attractiveness assessment method makes it possible to identify the strengths and weaknesses of each region, and thus determine their competitive advantages and barriers to development.

Among the EU regions are also those with higher IAS ratings than those for the level of economic development measured by GDP per capita. These are three regions in the Czech Republic: Jihozápad, Jihovýchod, and Střední Czechy, Denmark's Zealand, Spain's Ciudad Autónoma de Ceuta region, Midi-Pyrénées in France, as well as Poland's Pomorskie, the Länsi-Suomi and Pohjois-Suomi regions in Finland, Sweden's Sydsverige, and Britain's Cheshire and Outer London.

Most regions in this group have a high level of occupational activity, a low level of long-term unemployment, a favorable demographic structure, and entrepreneurship. Labor resources are therefore the main source of their competitive advantages. At the same time, they may fail to meet the expectations of investors with regard to criteria such as the level of prosperity and real demand for manufactured goods because of a low level of GDP per capita and low saturation of the market with automobiles.

Competitive advantages and barriers to competition can also be determined by historical factors. This is particularly evident in the case of industrial regions, which were or still are based on coal and steel. Conurbations have emerged in these regions that have had a positive effect on metropolization processes, infrastructure development, and population concentration. On the other hand, the single-track development of the economic base has been accompanied by a low quality of human capital, and the natural environment has reached a critical state due to industrial pollution and underinvestment in municipal infrastructure and services. Depending on the regional policy pursued in individual countries, such areas have been restructured, and some have undergone redevelopment. This is reflected by the investment attractiveness of these regions and by their advantages and barriers to competitiveness.

Regions based on coal and steel have relatively low investment attractiveness regardless of how well developed they are economically. Only Düsseldorf and Alsace received a C rating. A grade of D went to Saarland, Moravian Silesia, Leipzig, and Nord Pas de Calais; Poland's Śląskie as well as South Yorkshire and Chemnitz were all rated E. Most of the coal- and steel-based regions received low ratings for the human capital microclimate, in particular for short working time, low labor productivity relative to wages, structural unemployment (which especially affects those long-term unemployed), depopulation, low GDP per capita (with the exception of the Ruhr region and Alsace), low business intensity, and low capital and human resources involvement in the development of an innovative economy. While the market barrier is local or regional in nature, the low quality of human capital is universal, due to a long-standing practice of training staff in a narrow specialization for the needs of a specific industry. This barrier is deepened by an aging population and an outflow of workers subject to job cuts in unprofitable sectors of the economy.

Poland's Śląskie stands out against this background with its low rate of long-term structural unemployment, combined with a low level of aging population and low labor costs. Weaknesses, on the other hand, include a low level of economic activity of the population and unsatisfactory labor productivity. These features are typical of the Śląskie region; they result from a long-term specialization in mining and metallurgy, on the one hand, and the development of the large Katowice conurbation, on the other. The Katowice conurbation has managed to modify its path of development thanks to external benefits. Śląskie province has an economy based on services and industry, with particular importance of market services (46% of gross value added in the region, with the national average for Poland at 50%), including trade and repairs

(19%, with the national average at 20%). Manufacturing made the largest contribution to the creation of regional value added (21%, with the national average at 19%). This means that investment attractiveness varies in industrial regions, which can be attributed to differences in the advancement of economic restructuring in regions based on sunset industries. Successful restructuring ensures the continuation of the current path of development, but on the basis of new technologies, new products, and using organizational or marketing innovations. Such a success has been achieved by the Rhine regions in Germany and France; this, however, is attributable to a long-term recovery process initiated several decades ago.

Service regions yield a similar picture. If servicization refers to historically shaped competitive advantages that form a region's economic base, then a region can develop further specialization by expanding its economic base while maintaining its identity. Such examples can be provided by an analysis of the investment attractiveness of metropolitan areas in new EU member states. The dynamic inflow of investment to regions such as Bucharest, Central Hungary (Közép-Magyarország), Mazowieckie, and Bratislava_(Bratislavský Kraj) confirms the importance of their location advantages. These include a high level of economic activity of the population, a favorable demographic structure of the population, low structural unemployment, high labor productivity, growing demographic potential, an attractive market (as confirmed by the purchasing power of the population), entrepreneurship, and a focus on research and development. The weaknesses of these regions include high labor costs and low productivity in relation to the level of wages. However, the relatively high level of prosperity, developing labor market and a focus on innovation among companies make these regions stand out in terms of attractiveness. Prague and all the metropolitan areas in western and northern Europe acquired an A rating in terms of the PIA_EU indicator, Berlin got a B grade, and the capital regions of Poland, Romania, and Hungary were given a C.

Mazowieckie owes its higher score than other Polish regions to the Warsaw conurbation. The fact that the region is home to the capital, combined with the high location advantages of Warsaw's suburbs, means Mazowieckie's economy is based on services and industry, with a particular importance of market services. They are responsible for 64% of the gross value added in the region, compared with the national average of 50%. Of this, trade and repairs contribute 20%, with the national average at 20%. Manufacturing plays a small role in generating value-added in the region: 11%, with the national average at 19%.

The analysis of attractiveness indicators also reveals that some regions have a higher-than-expected appeal due to their location near major industrial centers or along a major European transport route, or based on the use of local resources in industry and services. This applies to regions such as Midi-Pyrénées, South Czech Republic (Jihovýchod and Jihozapad), Central Czech Republic, a region surrounding Prague, West Finland, as well as coastal regions important for Baltic states, such as South Sweden, Zeeland in Denmark (south of Copenhagen), and Poland's Pomorskie.

Conclusion

Investment attractiveness depends on the location advantages of regions at various taxonomic levels. They refer to the factors and conditions of a location in terms of business activity. Resources available in a given area and investment conditions create competitive advantages. Investment attractiveness is not synonymous with competitiveness, because competitiveness is the ability to compete with other market players. This explains why attractiveness is defined by investment advantages and competitiveness by market share. The investment attractiveness of regions is strongly associated with their economic development. The only exceptions to this rule are regions with a disturbed development cycle.

As shown in the study, the attractiveness of regions in Europe is heavily dependent on the level of economic development, including in particular on urbanization and industrialization. Regions develop according to logical patterns mapped out by their past, type of economy and socioeconomic potential. This relationship occurs on a feedback basis. Therefore the most attractive locations in Europe include large metropolitan areas and restructured, or even redeveloped, industrial districts. Big cities and their conurbations are usually the drivers of development, which means places with universal investment values. The investment attractiveness of regions has a stable geographical arrangement and is subject to slow evolution, strengthening the existing differences. This is due to the inertia of geographic structures, particularly when it comes to the development of the settlement system and infrastructure. However, the development paths of the regions become unstable as a result of the instability of the geographic arrangement (changes in the center-periphery arrangement) and penetration of development waves across Europe with different speeds. This type of development difficulty is exemplified by some Central European regions that were once well developed.

Polish regions are among the less attractive in the European Union; the only exception is Mazowieckie, which was the only Polish region to be rated above average (Group C). None of the Polish regions were among the European regions in the highest group of investment attractiveness (groups A and B). Group A, which comprises regions with the highest investment attractiveness and also those leading the way in the development of services, includes two regions from new EU member states: the Prague region (Praha) in the Czech Republic and Slovakia's Bratislava region (Bratislavský Kraj). Group B, with high location attractiveness and a relatively greater involvement of industry in the regional economy, includes only one region from the new EU countries: Central Czech Republic (Střední Czechy). Among the Polish regions, Mazowieckie ranked the highest in terms of investment attractiveness, classified into Group C (in which investment attractiveness is above the EU average). The region received above-average ratings in terms of human capital and the market criterion, but was below average in terms of innovation. Another group of regions, Group D, contains those regions that are rated below the EU average. The only Polish group included in this group is Pomorskie. The

majority of Polish regions, i.e. Dolnośląskie, Śląskie, Małopolskie, Łódzkie, Pomorskie, and Zachodniopomorskie, are classified into Group E. This group also includes Latvia and Lithuania, Moravian Silesia in the Czech Republic, and Eastern Germany (Mecklenburg-Vorpommern and Saxony-Anhalt). The investment attractiveness of this group is reduced by their low innovativeness ratings. The remaining Polish regions, Lubelskie, Podkarpackie, Świętokrzyskie, Podlaskie, Opolskie, and Kujawsko-Pomorskie, were pigeonholed into the last, least attractive group of European regions for investors (Group F). Despite the low overall assessment, these regions too can be attractive to investors thanks to access to the labor force.

In conclusion, Polish regions compete mainly through access to labor, which is the main factor creating a cost advantage. A comparison with other EU regions confirmed the low investment attractiveness of regions in eastern Poland and areas with an incomplete transformation of industry. To improve the competitiveness of the regions, it is necessary to stimulate innovation and make sure that regional development is based on what is known as smart specialization.

Chapter 6

Regional Policy and the Competitiveness of Polish Regions

This chapter focuses on selected aspects of regional policy that may be factors in strengthening the competitive position of regions. The starting point for this discussion of Poland's regional policy is the presentation of its European dimension. This is complemented by a diagnosis of the extent to which the two main objectives of regional policy in Poland have been carried out. These objectives are an increase in the competitiveness of regions and the diffusion of development and reduction of disparities.

6.1. Regional Policy Challenges in Poland in the Context of the European Cohesion Policy for 2014–2020

Jacek Szlachta

An important element of Poland's transition to a market economy in the early 1990 s was a move away from the formula of uniform government authority and state administration in local areas, a formula hailing from the central planning era. This was expressed by the establishment of local governments in cities and districts. However, at the regional level, 49 provincial governors continued to function, representing the central government in local areas, and major changes were only introduced a decade later. The shape of modern regional policy in Poland was influenced by two key factors: an administrative reform launched on Jan. 1, 1999, and Poland's entry to the European Union on May 1, 2004. As a result of the administrative reform, 16 large provinces were established, which are at the same time NUTS 2 territorial units, with their own

budgets and elected representative bodies.[1] This is why it is often said that the possibility of pursuing a comprehensive regional policy did not appear in Poland until after 1998. Poland's EU accession, on the other hand, made it possible to take advantage of the opportunities and funds available under the European cohesion policy.[2]

The key features of the current model of regional policy in Poland are as follows:

1) It has two key dimensions, interregional and intraregional. The interregional dimension involves the government's policy toward regions, and the intraregional aspect involves the policy of regional authorities pursued within individual provinces;
2) There have been politically and substantatively motivated shifts in powers between the central government and regional governments, and over the past several years there have been changes in both directions. The current external conditions for supporting socioeconomic development add to the pressure to centralize development policies;
3) The policy is completely subordinated to the European cohesion policy because the principles, procedures and the bulk of the funds available under this policy come from the European Union;
4) It is less the traditional equalization policy and increasingly a policy focused on building the competitive strength of regions, taking advantage of endogenous development potential and eliminating barriers;
5) Over the past decade, the policy has been completely ineffective in reducing regional disparities, both at the regional and sub-regional levels. This means that while all regions and subregions in Poland are bridging their development gap to Western Europe, this most visibly applies to the most affluent areas of the country;
6) It is a dual policy – a universal policy including urban development and rural development policyies. This poorly integrated arrangement is the consequence of arrangements developed at the European Union level, where these areas of intervention are subject to two different policies: the European cohesion policy and the Common Agricultural Policy. This model is copied in many member countries;
7) It allows the transfer of modern European know-how in areas such as multiannual programming, finance, management, monitoring, evaluation, and selection of projects;

[1] The Nomenclature of Units for Territorial Statistics (NUTS) is a universal regionalization system in the European Union. It comprises three levels: NUTS 1 (macro-regions), NUTS 2 (regions) and NUTS 3 (sub-regions). Poland has six macro-regions, 16 regions in the form of provinces and 66 sub-regions. In addition, there are two local levels called LAU 1 and LAU 2 (Local Administration Units). In Poland, these are counties (LAU 1) and cities and districts (LAU 2). The basic territorial units of European cohesion policy are NUTS 2 areas. Therefore it is a good arrangement that provinces as regional units of the territorial organization of the country are also the key players in the European cohesion policy in Poland.

[2] This area of European Union intervention involves three expressions that are used simultaneously: (1) structural policy, the oldest term, which appeared in 1957 in the Treaty Establishing the European Economic Community providing for support for structural changes, (2) regional policy, the main focus of which is regional development; problem areas are selected on the basis of regional data, and a large part of the funds are managed at the regional level; and (3) cohesion policy, where the main goal of intervention is a reduction in territorial disparities.

8) It is a segment of a national development policy that is primarily guided by domestic priorities. Until recently there was no special government document setting out the framework for regional policy in Poland. The first such document, *Narodowa Strategia Rozwoju Regionalnego* (The National Strategy for Regional Development), was adopted by the government in 2001; it covered the 2001–2006 period. Another such document is *Krajowa Strategia Rozwoju Regionalnego do roku 2020. Regiony, Miasta, Obszary Wiejskie* (The National Strategy for Regional Development until 2020: Regions, Cities, and Rural Areas), adopted by the government on July 13, 2010.

EU foundations for changing regional policy making in Poland

The basic thesis of this section is as follows: Poland's membership in the European Union has made it possible to build the foundations of a modern regional policy at the national and provincial levels since 2004; however, due to a combination of various internal and external factors, this policy needs to be substantially revised in the coming years. A delayed response to the new challenges or a failure to address these effectively could lead to under-utilization of opportunities offered by the new-generation European cohesion policy proposed for 2014–2020.

Solutions and funds available under the European cohesion policy are often seen in Poland as a key benefit of European integration. But a number of factors are far more important for Poland's socioeconomic development. These include access to markets in other EU member states for Polish companies; adaptation of legal and public policy standards to EU standards (*acquis*), and the opening of labor markets in old member states to Polish workerslabor force. Also significant is the image of Poland as an EU member state (Geodecki et al., 2012).

The benefits of European cohesion policy in Poland can be evaluated in the context of the significant transfer of funds that cause a supply-side effect (strengthening endogenous development potential and helping remove various barriers) as well as a demand-side effect (income for institutions and individuals carrying out various contracts under this policy and benefiting from it in other ways). Of course, the stronger the supply-side effect, the more lasting the effects of EU structural intervention are at the level of countries and regions.

Since the 1988 Delors reform, the European Union has programmed its policies and budgets for the long term, and its long-term financial perspectives have covered 1989–1993, 1994–1999, 2000–2006 and 2007–2013. From 2004 to 2006, Poland benefited from allocations available under four structural funds and the Cohesion Fund to the tune of around € 12.8 billion in constant 2004 prices. In 2007–2013, Poland used around € 59.5 billion in constant 2004 prices (around € 67.3 billion in current prices), available under two structural funds (the European Regional Development Fund and the European Social Fund) as well as the Cohesion Fund. If the European Agricultural Fund for Rural

Development and the European Fisheries Fund are taken into account for the 2007–2013 period, this amount will grow by around €6 billion and €700 million respectively.

The fundamental change in the nature and scope of regional policy in Poland that took place in connection with the administrative system reform in 1998 required appropriate legal regulations. These regulations changed due to the need to adapt the Polish system to the changing model of the European Union's cohesion policy. Several rounds of new regulations related to regional policy were introduced in Poland. These were:

- a law regulating support for regional development, dated May 12, 2000;
- a law on the National Development Plan, dated April 20, 2004;
- a law on development policy making, dated Dec. 12, 2006;
- a law dated Nov. 8, 2008 amending selected other laws in connection with the implementation of structural funds and the Cohesion Fund.

Further changes to regulations are due to take place in 2013. They are necessary to adapt the Polish system to modifications in European cohesion policy that will take effect in 2014.

The main tool for assessing the impact of structural funds and the Cohesion Fund on the economies of beneficiary countries is macroeconomic modeling, and the most highly valued tool is the HERMIN model built by the Economic and Social Research Institute in Dublin (Bradley, Zaleski, 2003a). The Wrocław Regional Development Agency (WARR) has adapted this model to Polish conditions at both the national and regional levels. The results of the modeling show that EU structural intervention after accession has added more than one percentage point to the average annual growth of Poland's gross domestic product (Zaleski, Kudełko, Mogiła, 2012). Interestingly, it is estimated that on an *ex ante* basis this impact was slightly higher than on an *ex post* basis (Zaleski, Tomaszewski, 2004).

The launch of EU cohesion policy procedures and instruments in Poland has produced many positive results including the following (Geodecki et al., 2012):

- The introduction of a "first-generation" development policy based on long-term program documents;
- The creation of potential to pursue development policy at the regional level, thus enabling a far-reaching decentralization in regional policy;
- Better use of endogenous development potential in the country as a whole and in individual regions;
- Limiting shortcomings affecting supply-side factors in the manufacturing sector, including those related to infrastructure, the labor force, and the business environment;
- Stimulating the economy on the demand side, a task that was particularly important in the 2009–2011 period and contributed to keeping the Polish economy on a growth path;
- The introduction of multiannual programming, monitoring, evaluation, auditing, and certification as commonly used methods and practices.

The enormous importance of the European cohesion policy in terms of its impact on socioeconomic development is often overlooked. The policy facilitates thinking

and acting in terms of the development of small and medium-sized enterprises, local governments, NGOs, business environment institutions, etc., and the use of community-oriented planning procedures that take into account the interests of different social and business partners. The quality of the public administration involved in implementing EU cohesion policy has generally improved, at both the national and regional levels.

Poland has adopted a relatively decentralized model of management for structural funds. The key components of this model are regional operational programs; cross-border cooperation programs pursued by EU countries along their internal borders; programs undertaken as part of the European Neighborhood and Partnership Instrument (ENPI) at the external borders of the European Union; and since 2007, a macroregional program for five provinces in eastern Poland (Lubelskie, Podkarpackie, Podlaskie, Świętokrzyskie, and Warmińsko-Mazurskie). In 2004–2006, the Integrated Regional Development Operational Program containing 16 provincial segments accounted for around 25% of the total allocation available to Poland under the European cohesion policy. In 2007–2013, regional operational programs and the decentralized segment of the Human Capital operational program account for about 36% of the total pool of structural funds and Cohesion Fundfinancing available as part of the cohesion policy in Poland. This means the possibility as well as the need to develop the potential for managing regional policy at the provincial level. The government intends to further decentralize the management of European cohesion policy in Poland, because the assumption is that 50% of all regional policy funds in Poland should be managed at the regional level in 2014–2020 (Ministry of Regional Development, 2010a). It is therefore possible to say that thanks to European cohesion policy, provincial governments have become important development policy players in Poland after the country's EU entry. The demonstration effect of the undertakings and projects financed under the European cohesion policy was also important, and the scope of funds potentially available catalyzed the development of strategic thinking at the local level and promoted a reduction in the passive local communitiesy syndrome.

European cohesion policy, quite apart from the rave reviews formulated by those benefiting from this policy, is also subject to criticism, especially in the context of the bad practices observed in countries including Greece and southern Italy (Sapir et al., 2003). Regardless of the critical perception of the dysfunctions recorded in various parts of Europe, including Poland, critical views have also been voiced in the debate on the track record of implementing EU cohesion policy (Geodecki et al., 2012). Reservations primarily concern an excessive focus on spending funds as well as the abandonment of sovereign national strategic thinking in development policy. Critics also target the duality of development policy (its national and European segments) and argue that EU funds have a protective rather than a development-oriented effect, accompanied by a heavy scattering of intervention areas. Criticism is also leveled at the imperfections of the process of selecting projects for co-financing and at public procurement procedures where price is the main and often only criterion of choice. Further reservations concern the growing complexity of procedures, which substantially increases the administrative

costs and slows down the implementation process; untimely management of structural funds; poor functionality and effectiveness of various committees; an intricate network of guidelines and recommendations that are often unclear and conflicting; the development of a market for EU fund "fixers"; absurd reporting requirements, repression and continuous supervision instead of auditing; the use of monitoring procedures that are useless in management; the poor quality of evaluation research, and a situation which EU funds have become a practical tool for seizing, keeping and concentrating political power. In general, a special type of dysfunction is the philosophy of *wyciskania brukselki* ("squeezing out the Brussels sprouts"), which implies that EU funds are no one's funds so there is no reason to worry about how they are spent.

The criticism of European cohesion policy has led to attempts to counteract an erosion of this policy. However, these attempts have often been poorly coordinated and generated additional costs against the logic of public intervention. The main thrusts of activities undertaken in recent years have included:

1. Widening the political base of beneficiaries of the European cohesion policy. Back in 2007 an assumption was adopted that all NUTS2 regions across the European Union would benefit from financial transfers. Proposals for 2014–2020 call for the introduction of a new category of transition regions with GDP per capita at purchasing power parity from 75% to 90% of the EU27 average. These countries and regions are also becoming active supporters of this policy. The side effect, however, is a decrease in the size of financial flows to the poorest regions and countries in the European Union.
2. Prompt adaptation of the European cohesion policy to a fundamental change in the context of socioeconomic development in Europe and beyond. This is expressed by an exceptional flexibility and efficiency of this policy in taking over and embracing new ideas such as a knowledge-based economy, information society, information and communication technology, learning regions, and innovation diffusion. This is in line with the Europe 2020 strategy and the range of intervention areas is limited to traditional infrastructure. Moreover, various limitations are set at the European Union level in the structure of expenditure as part of the European cohesion policy in EU countries and regions.
3. Eliminating implementation irregularities. Since various irregularities have been highlighted by the media, the range of measures designed to prevent mismanagement and abuse is steadily expanding. This is reflected by more physical and financial monitoring, the development of the *ex ante*, *on going* and *ex post* evaluation approaches, the upgrading of auditing, and a broadened scope of inspection, including direct supervision of major projects by the European Commission. All these measures, however, result in a substantial slowdown in implementation procedures, higher administrative costs and overregulation instead of simplification.
4. Implementing steps toward territorial cohesion and making it an objective of the European Union under the Lisbon Treaty, which took effect on Dec. 1, 2009. The European cohesion policy calls for a much wider use of instruments related to the

urban dimension, local development, and territorial impact assessment beginning in 2014. Issues related to accessibility, networking and territorial public service standards are becoming crucial. Thanks to this, the European cohesion policy will be increasingly present in the local and regional systems of the European Union, becoming the most important ally of civil society institutions.

This flexible adaptation of European cohesion policy arrangements to the new challenges will probably continue in the 2014–2020 period, though in modified form. This broadens the room for criticism of European cohesion policy in the future, because in 2014–2020 this policy is set to become even more eclectic than before.

Evolution of the theoretical foundations of the European cohesion policy

The latest changes in the European cohesion policy model are tied to the theoretical basis inspired by the new economic geography approach (Krugman, 1995; Fujita, Krugman, Venabes, 2001). Valuable research reports have appeared highlighting the importance of various linkages and of the ability to create different types of networks (Castells, 2008a and 2008b). Several attempts to bring the territorial dimension into mainstream economics have also been discussed in detail in Polish literature on the subject (Churski, 2008; Grosse, 2002).

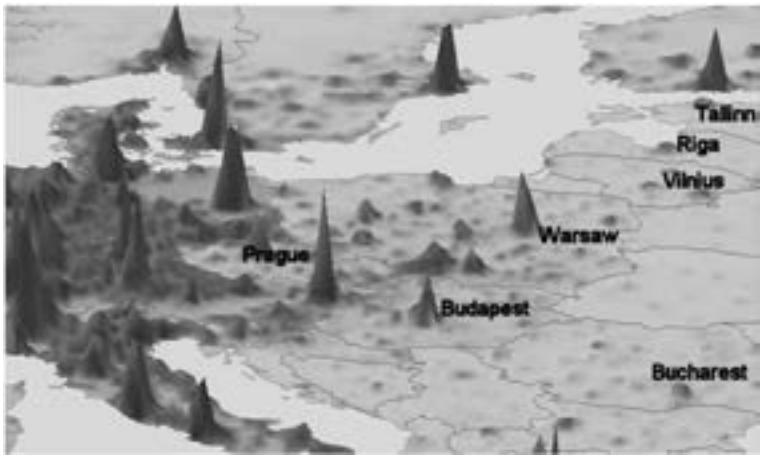
International organizations such as the OECD and the World Bank are trying to translate the theories of economics of location and economics of flow into regional policy solutions (Szlachta, 2009; OECD, 2009; World Bank, 2009). The World Bank has called for a major re-evaluation of development policy fundamentals, pointing to the special importance of the largest metropolitan areas to socioeconomic development at both the regional and national levels (Gill, 2010). The GDP per square kilometer index illustrates the leading role of large cities in generating national income. In Central Europe, the city of Warsaw has a documented strong position, increasingly effectively competing with Berlin, Vienna, Prague and Budapest (Map 1). However, the positions of the largest urban centers in Central Europe are still weak compared with their Western European counterparts.

In Poland, development potential is concentrated in the largest urban centers: Warsaw, Gdańsk, Katowice, Cracow, Łódź, Poznań and Wrocław (Map 2). Particularly underprivileged are regions in eastern Poland, due to weak socioeconomic potential.

The OECD, which brings together the world's highly developed countries, attaches great importance to the development of modern public policies, including regional policy, in member states (OECD, 2009a). Every five years, regional policy ministers from OECD member countries get together at conferences. Materials for the last conference, which was held in 2009 in Paris, contained a proposal for a new paradigm of regional development, taking into account the policy objectivespolicy, the territorial units of intervention, the type of strategy, the tools, and the actors (Table 1) (OECD 2009b

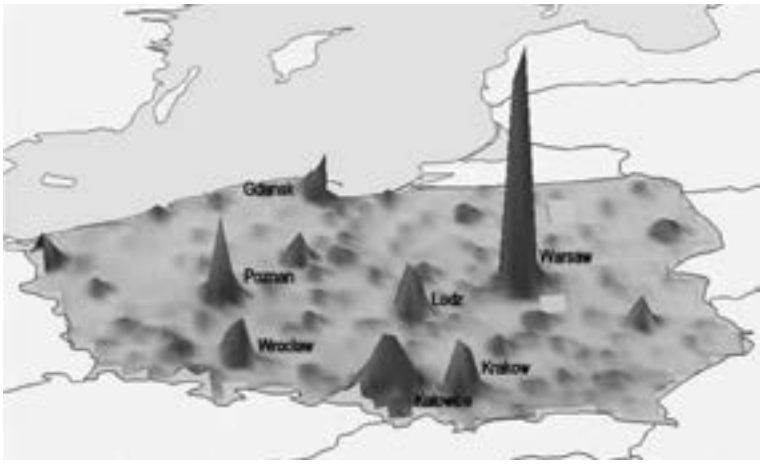
and OECD 2009c). In recent years, terms such as information society, knowledge-based economy, information and communication technology, learning regions, and diffusion of development processes have appeared in the catalog of key public policy concepts. As a result of the adjustment in the theoretical foundations of regional policy, the focus of regional policy has shifted from its traditional equalizing function in favor of taking advantage of the endogenous development potential of different areas.

Map 1
GDP per square kilometer in Central Europe in 2008



Source: Gill, 2010.

Map 2
GDP per square kilometer in Poland in 2008



Source: Gill, 2010.

Table 1
Old and new paradigms of regional policy according to the OECD

Feature	Old	New
Objectives	Compensating temporarily for location disadvantages of lagging regions	Tapping underutilized potential in all regions for enhancing regional competitiveness
Unit of intervention	Administrative units	Functional economic areas
Strategies	Sector approach	Integrated development projects
Tools	Subsidies and state aid	Mix of soft and hard capital
Actors	Central government	Different levels of government

Source: OECD, 2009.

The debate on the shape of the European cohesion policy in 2014–2020

The process of working out a new model and detailed solutions in each successive multiannual programming period in the European Union is long and extremely complex. An additional complication results from the entry into force of the Lisbon Treaty: the decision-making process requires the consensus of three instead of two institutions, as was the case previously – namely the Council, the European Commission and the European Parliament.

The Lisbon Treaty has introduced a third dimension of cohesion: territorial cohesion, in addition to economic and social cohesion, which is an additional complication of this policy – Article 3: "One of the objectives of the European Union is to promote economic, social and territorial cohesion and solidarity among Member States" (Barcz, 2008). Sadly, the debate on the shape of the European cohesion policy in 2014–2020 is taking place in the shadow of a deep global economic crisis that has also hit the European Union as well as the eurozone crisis and a crisis of European integration itself, which complicates matter-of-fact discussion.

There are far-reaching expectations with regard to the European cohesion policy for the 2014–2020 period. In particular, the policy is expected to: (1) help implement the Europe 2020 strategy – While the standard stipulation is that the European cohesion policy should be geared toward helping implement the Europe 2020 strategy, the aim of this policy is far less often defined as transmitting the Europe 2020 strategy to the regional level (European Commission 2010a); (2) help increase the competitiveness of the European Union globally – The latest economic crisis has shown just how strongly different economies are interdependent. As development potential shifts away from Europe, a new generation of public intervention measures is needed in the member states and the European Union as a whole; (3) demonstrate the high quality of public

intervention – This is reflected by strong pressure on effective management of public funds and expressed by the value for money concept (Bachtler, Wren, 2006); (4) help increase the macroeconomic stability of the European Union – The eurozone crisis, triggered by insufficient coordination of monetary and fiscal policies (policy mix), has devastated the position of the euro area and led to a profound crisis in the European Union, and all policies should contribute to remedying the situation; and (5) help effectively embrace the dimension of development oriented toward regional cohesion.

European cohesion policy is the only instance of horizontal intervention undertaken from the European Union level in which the regional dimension plays a leading role. Generally, this means that the European cohesion policy is seen as a universal panacea for all the challenges facing the EU today. The problem is that this policy is not in a position to solve the problems of the member states on its own, which indirectly downgrades the importance of the regional dimension of the European cohesion policy.

A key reference document for the restructuring of European cohesion policy this decade is the Europe 2020 strategy adopted by the Council of the European Union in June 2010 (European Commission, 2010a). The Europe 2020 strategy replaced the Lisbon-Gothenburg strategy of 2000 and 2001, which was subsequently revised in 2005 as a renewed Lisbon Strategy (European Commission, 2005). An oft-repeated declaration is that the Europe 2020 strategy is set to become the foundation of all EU policies, including the European cohesion policy (European Commission, 2010b). The following have been identified as the priorities of the Europe 2020 strategy: (1) developing an economy based on knowledge and innovation, (2) promoting a more resource-efficient, greener, and more competitive economy, and (3) fostering a high-employment economy delivering social and territorial cohesion. The set of targets at the Community level has been defined as follows: (1) 75% of the population aged 20–64 should be employed, (2) 3% of the EU's GDP should be invested in R&D, (3) the 20/20/20 climate and energy targets should be met (reduction of carbon dioxide emissions by 20%, increasing the share of renewable energy to 20%, and improving energy efficiency by 20%), (4) The share of early school leavers should be under 10% and at least 40% of the younger generation in the 30–34 age group should have a tertiary degree, (5) 20 million fewer people should be at risk of poverty (as defined in individual member states). The tasks connected with meeting these targets in each country have been diversified, which in the case of Poland means slightly lower indicators, except for those related to education. The Europe 2020 strategy is expected to be implemented through seven flagship initiatives: (1) Innovation Union, (2) Youth on the Move, (3) A Digital Agenda for Europe, (4) A Resource-Efficient Europe, 5) An Industrial Policy for the Globalization Era, (6) An Agenda for New Skills and Jobs, and (7) European Platform Against Poverty.

The Europe 2020 strategy has, therefore, become the basis for all European Union policies that have stimulated positive changes in member-state economies and societies this decade. The European cohesion policy between 2014 and 2020 will be of critical importance to a successful implementation of the Europe 2020 strategy because the policy has been provided with the necessary means and tools.

Those critical of the Europe 2020 strategy argue that the strategy is based on an internally inconsistent set of goals and that only formal modifications have been made in the assumptions underlying many traditional areas of intervention, for example industrial policy. Critics also say that the recommendations related to the strategy refer to the development level of the more affluent member states and that the call for increased mobility of the EU labor force is in fact an attempt to drain the most valuable manpower resources as well as students from less affluent countries such as Poland. A final argument is that the strategy completely disregards the importance of the quality of infrastructure as a strategic objective.

As a result, there is a dualism of socioeconomic development programming, as member states benefiting from the European cohesion policy must draw up a set of program documents specifying the ways and areas in which they want to spend structural funds and use financing available under the Cohesion Fund in the next programming period. Moreover, each EU country draws up a National Reform Program aimed directly at putting the Europe 2020 strategy into practice. Another consequence of the changes introduced is a gradual shift in the focus of EU structural intervention from the regional level to the member-state level, because an effective implementation of macroeconomic, microeconomic and labor market-related objectives depends mainly on what the member state governments do, while the impact of the regional system on these objectives is limited. This may lead to the sectorization of structural intervention in EU member states.

As a result of public consultations, the adopted version of the Europe 2020 strategy includes direct references to cohesion policy:

1) "It is also essential that the benefits of economic growth spread to all parts of the Union, including its outermost regions, thus strengthening territorial cohesion."
2) "Economic, social and territorial cohesion will remain at the heart of the Europe 2020 strategy to ensure that all energies and capacities are mobilized and focused on the pursuit of the strategy's priorities."

The key documents shaping the public debate on cohesion policy beyond 2013 include the Green Paper on Territorial Cohesion of Oct. 6, 2008 (European Commission, 2008); a report by Fabrizio Barca entitled "An Agenda for a Reformed Cohesion Policy" dated April 2009 (Barca, 2009); the position of the Commissioner for Regional Policy, Danuta Huebner, of April 2009 (Huebner, 2009); the position of Commissioner Paweł Samecki of December 2009 expressed in the "Orientation Paper on Future Cohesion Policy" (Samecki, 2009); an EU budget review of Oct. 19, 2010 (European Commission, 2010c); proposals put forward by the European Commission in its Fifth Cohesion Report of Nov. 9, 2010 (European Commission, 2010b). The Results of the Public Consultation on the Conclusions of the Fifth Report on Economic, Social and Territorial Cohesion of Jan. 31, 2011 (Results of the Public Consultation); the Territorial Agenda of the European Union of May 2011, adopted at Godollo (Informal meeting, 2011b); the European Commission's budget proposals for 2014–2020 published on June 29, 2011 (European Commission, 2011a); and, finally, a draft legislative package

adopted by the European Commission on Oct. 6, 2011 (European Commission, 2011b). In March 2012, a European Commission Staff Working Document called *Elements for a Common Strategic Framework* was released (European Commission, 2012). Each stage of discussion was summed up by the successive presidencies (Informal Meeting of the Ministers, 2010 and 2011a).

Poland was and remains active in this debate, as evidenced by the modified negotiation positions of the government (Ministry of Regional Development, 2009b and 2010a) and the extensive participation of various Polish institutions, including those representing provincial governments, in the process of consultation and public debate. Polish officials have formulated a number of proposals for improving the quality of public intervention (Ministry of Regional Development, 2011).

A brief look at the European Commission's proposals for regional policy between 2014 and 2020 (European Commission, 2011b) yields the following conclusions:

(A) The European Commission proposes a thematic concentration of intervention areas. A total of 11 thematic objectives "to deliver Europe 2020" have been identified: (1) Strengthening research, technological development and innovation, (2) Enhancing access to, and use and quality of, information and communication technologies, (3) Enhancing the competitiveness of small and medium-sized enterprises, the agricultural sector (European Agricultural Fund for Rural Development) and the fisheries and acquaculture sector (European Maritime and Fisheries Fund), (4) Supporting the shift towards a low-carbon economy in all sectors, (5) Promoting climate change adaptation, risk prevention, and management, (6) Protecting the environment and promoting resource efficiency; (7) Promoting sustainable transport and removing bottlenecks in key network infrastructures, (8) Promoting employment and supporting labor mobility, (9) Promoting social inclusion and combating poverty, (10) Investing in education, skills, and lifelong learning, (11) Enhancing institutional capacity and an efficient public administration.

Such a thematic concentration is designed to counteract an excessive scattering of funds available under the European cohesion policy, a situation that in many cases proved to be an obstacle to achieving the necessary scalelevel of intervention. However, the proposed intervention areas will promote the management of funds in individual sectors, while weakening the position of intervention undertaken at the regional level.

(B) Despite the clearly uniform views of member states, a major modification in the programming system is being proposed once again. The Common Strategic Framework (CSF) document specifies the priorities of intervention as part of the European cohesion policy. On the basis of this document, Partnership Contracts between member states and the European Commission would be drawn up and a set of operational programs would be launched. The European Commission is seeking to seriously reduce the status of the CSF document (a so-called delegated act). The European Parliament wants this document to be an "annex to the general regulation." Also important is the question of procedures offor a potential revision of the CSF for the 2014–2020 period. The European Commission is trying to obtain such a mandate without having to consult the

member states and the European Parliament. These changes mean that each country will have to develop new negotiating skills and adopt its own medium-term national development strategy as the basis for EU structural interventiono.

(C) The European Commission plans to introduce two types of conditionality: *ex ante* and macroeconomic conditionality. The former is based on guarantees of an efficient management of EU funds. In fact, this type of conditionality is already in force to a large extent, because the allocation of structural funds and the Cohesion Fund is conditional on meeting a number of preliminary conditions. Macroeconomic conditionality means that allocations for member states that have an excessive budget deficit and fail to pursue a sound fiscal policy would be reduced. This means that local governments would take responsibility for the central government's macroeconomic policy and that, in practice, only countries that are major beneficiaries of the EU's cohesion policy would be punished. Interestingly, there are no plans for macroeconomic conditionality to cover the Common Agricultural Policy.

(D) The European Commission is calling for a more rigid structure of allocation. This involves the introduction of at least four types of top-down-regulated spending ceilings at the level of countries covered by the European cohesion policy. The first limit concerns the mandatory minimum share of the European Social Fund, which indirectly also determines the role of and expenditure from the European Regional Development Fund as well as the Cohesion Fund. The second and third limits apply to the minimum share of spending on the various thematic objectives under the European Regional Development Fund and the European Social Fund. Further restrictions concern expenditure earmarked for Integrated Development Strategies for urban areas as well as expenditure on innovative action taken as an initiative by the European Commission in the area of sustainable urban development. As a result of these limitations, we may be dealing with a trend toward uniformity in EU structural intervention areas in different regions, regardless of the local development context. This arrangement has been criticized as an unacceptable one-solution-fits-all model. Such is also the nature of the European performance reserve, which represents 7% of the allocation to individual beneficiary countries and which may be launched no earlier than 2019, and only if a specific country fulfills the pre-determined conditions.

(E) The European Commission is proposing major modifications in the scope and method of financing the objectives of the European cohesion policy. The change would be based on moves including a reduction in the volume of funds made available as part of the European cohesion policy. The poorest regions and countries' share of structural funds and the Cohesion Fund would represent about 71% of the European cohesion policy's budget, down from around 80% in the 2007–2013 period. Nevertheless, per capita allocation in the poorest regions and cities would increase due to higher GDP per capita at purchasing power parity in many regions above 75% of the EU27 average. Of special importance is an assumption that the level of co-financing from a beneficiary's own funds would still run at 15%, i.e., regions would still have to contribute at least 15% of a project's costs from their own funds in order to be eligible for co-financing

from the EU budget. Considering the limited absorption capacity of beneficiary countries, an average annual ceiling (capping) of 2.35% of a beneficiary country's GDP has been proposed for the transfer of funds for 2014–2020, followed by 3.3%–3.4% of GDP in 2007–2013. The European Commission also assumes that the existing model for calculating allocations – in which they are rendered from fixed prices to current prices using a 2% hypothetical medium-term inflation index – would be maintained. This means that, with the higher inflation forecast for the years ahead this decade, the real value of funds available under the European cohesion policy will shrink in the next few years. These changes mean a general deterioration in the possibilities for financing regional policy objectives in the 2014–2020 period compared with the 2007–2013 period.

(F) The European Commission is urging a bigger role for territorial cooperation, both within the European Union and with neighboring countries. The territorial cooperation objective would still cover three types of programs: (1) cross-border cooperation, with a 73.2% share in the total territorial cooperation budget, (2) transnational cooperation involving 13 macroregions and accounting for 20.8% of the total territorial cooperation budget, and (3) interregional cooperation, claiming the remaining 6% of the funds available. The scope of funds available as part of the European Neighborhood and Partnership Instrument, targeted at countries neighboring the European Union, would increase by around 50%; for Poland, competition between Mediterranean and Eastern European countries is obviously important in this context.

Challenges for regional development policy in Poland

From 2014 to 2020, Poland's regional policy will continue to be shaped predominately by the European cohesion policy. The key strategic decisions that need to be made at the government level in connection with the expected modification of the European cohesion policy model involve the following issues:

1. The structure of allocation of funds available under the European cohesion policy for central and regional programs. The new structure will better correspond with the 11 thematic priorities defined in EU regulations (centrally managed areas of intervention, areas managed at the regional level, and areas combining management at the central and regional levels). As stated earlier, the implementation of the Europe 2020 strategy promotes the centralization of EU structural intervention.
2. The set of operational programs under the European cohesion policy and allocations for these programs. The following types of operational programs can be launched: sector programs; regional programs; programs involving territorial cooperation; macroregional programs; and programs involving technical assistance. In the current 2007–2013 programming period, Poland has the biggest operational programs ever, in terms of both the amount of funds available and the number of priority axes (Ministry of Regional Development, 2007). The implementation system in the case of operational programs is exceptionally complicated. With national operational pro-

grams, one dilemma is who should manage these programs: the Ministry of Regional Development or other ministries responsible for specific sectors of the economy.

3. The algorithm for dividing the allocation among regions as part of the regional segment of structural funds. The current algorithm (under which 80% of the funds are divided among provinces depending on their population, 10% of the funds available go to the five poorest provinces in eastern Poland, and the remaining 10% of the funds are divided in proportion to the number of people living in counties with an unemployment rate exceeding 150% of the national average) produces considerable regional disparities in allocation per capita of as much as two to one.. As a result, the algorithm is often criticized. Even though the position of Poland and its regions in the European Union is steadily improving, simulations by J. Zaleski indicate that a competition-oriented scenario of EU fund allocation adds just 0.2 percentage points to Poland's average annual GDP growth (Zaleski et al., 2012). At the same time, territorial disparities – among regions, subregions, between large cities and the rest of the country, and between urban and rural areas – are growing (Gawlikowska-Hueckel, 2003).
4. The availability of funds for urban policy. In the 2014–2020 period, a significant increase is expected in the amount of funds available under the European cohesion policy for urban policy. Possible availability options include: (1) as part of a central operational program managed by the Ministry of Regional Development, (2) as part of relevant regional operational programs, (3) managed by the authorities of 18 provincial centers.
5. The method of reintegration of development policy. It is assumed that a closer link will be created in the 2014–2020 period between intervention based on structural funds and the Cohesion Fund on the one hand, and the European Agricultural Fund for Rural Development and the European Maritime and Fisheries Fund on the other. There are also plans to simultaneously implement multi-fund operational programs financed by the European Regional Development Fund and the European Social Fund. Multi-funding may also be possible at the level of priority axes or intervention areas. Effective coordination mechanisms are needed for EU funds and other EU policies and instruments such as the Connecting Europe Facility (CEF), Horizon 2020, Erasmus for All, Leonardo da Vinci, and LIFE.
6. The ways of using the European Agricultural Fund for Rural Development. In the 2007–2013 period, rural development along with financing was moved to Common Agricultural Policy. This led to the disintegration of EU structural intervention in 2007–2013. A key priority is to make sure that the European Agricultural Fund for Rural Development is really used to support the development of rural areas.. Intervention undertaken with regard to rural areas should be integrated with European cohesion policy tools. On a slightly smaller scale, this also applies to the European Maritime and Fisheries Fund.
7. Changes in the public finance system enabling the implementation of development projects by local governments. Studies show that the indebtedness and limited

economic capacity of many local governments hinders the use of structural funds. Specifically, this applies to the pre-financing of European projects by local governments, the need to contribute one's own funds in the case of projects co-financed by the EU, and the poor functionality of various public finance solutions involving local governments, including a special tax imposed on the richest territorial communities.

8. A reduction in the negative implications of the financing cycle available under the European cohesion policy. According to a forecast by W. Misiąg, local government expenditure will vary considerably in the coming years: 2012 – ZL59.0 billion; 2013 – ZL55.8 billion; 2014 – ZL61.8 billion; 2015 – ZL72.5 billion; 2016 – ZL33.9 billion; 2017 – ZL36.9 billion; 2018 – ZL48.6 billion; 2019 – ZL54.4 billion; 2020 – ZL53.0 billion (Misiąg, 2012). Such large fluctuations in local government expenditure have a devastating effect on the economy.
9. The time of introduction, scope and detailed provisions of new legislation regulating development policy and regional policy in Poland. As stated earlier, the legal basis for development policy, including regional development policy, changes with each succeeding EU multiannual budget perspective. This results from the fact that the financing of various projects in Poland depends on EU funds. Since the European cohesion policy model will change completely in 2014, Polish regulations will have to be brought in line with the legislative package related to the European cohesion policy.

The future of European cohesion policy beyond 2020 is unclear and Poland should be prepared for a reduction in funding. Even if funds are still strongly concentrated in NUTS2 regions in which GDP per capita at purchasing power parity does not exceed 75% of the EU average, the growing prosperity of Poland's provinces and changes in GDP estimations proposed by Eurostat (with a shift by at least one year of the basis for identifying areas classified into different categories of intervention, accompanied by a reference to the number of residents instead of citizens formally inhabiting a specific area) plus the statistical effect resulting from the expansion of the European Union to include some countries in the Western Balkans, mean that not only Mazowieckie, but also four or five other Polish provinces (Dolnośląskie, Pomorskie, Śląskie, Wielkopolskie and probably also Łódzkie) will no longer be among those benefiting from the most generous support available as part of the European cohesion policy. In all, these six provinces account for far more than half of Poland's total population. Of course, the unfavorable course of socioeconomic processes in the next decade and the critical perception of the achievements of European cohesion policy may contribute to substantial spending cuts from the EU budget on this policy. However, this does not mean that Poland will soon become a net contributor to the EU budget.

The obvious conclusion is that Poland's regional policy model is in need of some major restructuring by the end of this decade, because it will not be possible to continue with the policies developed between 2004 and 2013. Using the achievements of European cohesion policy, it is necessary to build a regional policy financed from domestic funds, with only limited support from EU structural funds and the Cohesion Fund

(Szlachta, Zaleski, 2010). If that does not happen, regional policy making in Poland will likely undergo degradation due to the scope and nature of public intervention at the national and regional levels and the squandering of the achievements of the European cohesion policy.

This also calls for a fundamental change in the ongoing debate on the European cohesion policy. The key question is not how much money will be available under the European cohesion policy in the 2014–2020 period, but how European funds should be spent in order to spur development and shape a new regional policy model in Poland. What is especially important is an increased supply-side scale effect when it comes to the European cohesion policy in the 2014–2020 period.

6.2. Assessment of Poland's Regional Policy in 2012

Ewa Freyberg

Assessing the results of regional policy is not an easy task, for several reasons. Poland's experience in this area is limited. It began in the 1990 s when the country launched its preparations to become a member of the European Union. A new administrative division of the country was introduced and the 16 new regions drew up their development strategies. Both of these steps were taken to comply with EU requirements regarding the use of European funds. The problem was that there was no long-term vision for the development of the country. Also lacking was the political courage to more comprehensively reform the administrative system by reducing the number of counties and clarifying the scope of powers at different levels of government. It seems that reforms could have improved the use of EU funds and provided a stronger basis for regional policy making in Poland.

A characteristic feature of Poland's regional policy is that it is strongly subordinated to EU regional policy[3]. In the first few years of Poland's transformation process, this had a positive impact on the results achieved, but today it is beginning to pose a barrier. On the one hand, all the weaknesses of the EU regional policy (including excessive paperwork and overly detailed regulations) are being transferred, often indiscriminately, to Polish regional policy. On the other hand, motivation is waning for shaping a coherent regional policy tailored to the specific needs of Poland's regions. Instead, the "squeeze out the Brussels sprouts" syndrome is spreading, referring to the broadest and fastest possible absorption of EU funds at any price. Even though EU co-financing requires

[3] The government's *Krajowa Strategia Rozwoju Regionalnego* (National Strategy for Regional Development) of July 2010 says that "Poland's regional policy is dominated by EU cohesion policy," p. 8; see also the previous section of this report.

beneficiaries to contribute their own funds to finance their projects, often the end result is that companies do not look for internal sources of funding. Of course, these negative factors do not overshadow the many positive results of regional policy in Poland. To evaluate these, it is necessary to recap the objectives of regional policy. The key objective within the EU is often defined as cohesion/convergence in the development of individual regions. In recent years, this objective has been expanded to include goals such as competitiveness, innovation, employment, and territorial cooperation[4]. This marks a new approach to the development model resulting from the renewed Lisbon Strategy. A pre-condition for convergence is not so much increased spending on development, but an appropriate role of funds allocated for an increase in competitiveness and innovation. This makes it possible to stimulate internal factors of development.

A similar change in regional policy objectives has taken place in Poland. The Polish government's latest strategic policy documents (KPRM, 2009a, KPRM, 2011, MRR, 2010) refer to the need to combine cohesion and competitiveness policy objectives and principles necessary for the development of appropriate development potential. Moreover, in a document drafted in 2011, the government scrapped its previous "polarization/diffusion" model of development – promoted in 2009 and 2010 – and replaced it with the principle of "intergenerational, territorial, and innovation solidarity." The polarization/diffusion model concept was difficult for the general public to understand and was sometimes interpreted by less wealthy regions as an attempt to make their economic development dependent on the successful diffusion of growth in more affluent regions.

Poland's convergence with the EU in the level of economic development

The extent to which the two main objectives of regional policy – greater competitiveness of regions and diffusion of growth combined with measures to equalize the level of development – have been implemented in Poland is unsatisfactory. Regional policy is inadequate despite the fact that the Polish economy grew at a relatively fast rate in 2000–2013, as a result of which it narrowed its gap with the EU27 in GDP per capita. In 2010, Poland's GDP per capita represented 62% of the EU27 average, compared with 51% in 2004. This external convergence was the result of a significant increase in the number of public investment projects, which were mainly financed with EU funds but stimulated private investment in the process. It is estimated that from 2007 to 2009 European funds were responsible for 20% of all public investment in Poland. For this reason, the GDP share of public investment increased from 3.5% in 2004 to over 6.6% in 2011[5], enabling Poland to maintain a relatively high rate of economic growth during

4 The EU has four objectives for its 2007–2013 programming period: cohesion, competitiveness, employment, and territorial cooperation. See OECD, 2009d.

5 This was the highest level among EU countries, with the EU27 average at 2.5%.

the crisis. Estimates suggest that the GDP growth rate would have been a quarter of a percentage point lower without the increase in public investment (ECFIN, 2009).

Table 2
Annual growth of GDP, private investment and public expenditure (%)

	2000–2007 average	2008	2009	2010	2011	2012[a]	2013[a]
GDP at market prices	4.1	5.0	1.6	3.9	4.3	3.0	2.7
Expenditure on gross fixed capital formation (private sector investment)	4.0	9.7	–1.2	–0.2[b]	7.2	5.0	4.4
Public spending, including public investment	3.6	6.7	2.5	3.8	0.1	0.1	0.0

[a] projection, [b] according to GUS data: – 1.2%

Source: OECD, Economic Outlook database and OECD updates.

Public investment expenditure produces a demand effect after a delay of no more than one or two quarters. The increased GDP share of public investment expenditure adds just over half a percentage point to the GDP growth rate. The supply-side effect in the form of increased private investment stimulated by the expected rise in productivity, is lagged by two to three quarters, reaching its highest level in the sixth quarter. A 1 percentage point increase in the GDP share of public investment leads to an increase in the share of private investment in GDP by more than three-quarters of a percentage point. This means that an increase in public spending does not produce a crowding-out effect with regard to private investment. Experts point out that the positive impact of public investment on economic growth in the studied period was also the result of factors including changes in the quality of institutions. A quantitative assessment of this impact is impossible, yet there is no denying that in the case of Poland, a number of factors are responsible for the results being worse than expected: the weaknesses of development policy, including regional policy – such as delays in projects resulting from their being inconsistent with the adopted development strategy; the sluggish process of buying land for investment projects; insufficient use of external auditing services for completed projects; complicated public procurement procedures; an absence of local development and zoning plans; an inadequate system for rewarding success and tackling failure; and high turnover of staff at all levels of government. Determining the extent of this gap would require an attempt to measure the opportunity cost. Unfortunately, neither Polish government institutions nor international organizations dealing with assessing regional policy conduct such analyses. Polish government officials are not obligated to compare the costs and benefits of EU cohesion policy, and in any case efforts made by some countries to analyze this area are not entirely satisfactory because they tend to be based on the use of imperfect tools.

Convergence of Polish regions with the EU

In principle, little or no progress was made in the convergence of Polish regions and sub-regions in the 2003–2011 period. Official government documents (MRR, 2010, MRR, 2011a) mention a "varied extent of convergence." In reality, in the 2004–2011 period, there were no significant changes toward leveling out differences in the development of Poland's regions. The five richest provinces (Mazowieckie, Dolnośląskie, Wielkopolskie, Śląskie and Pomorskie) grew at a much faster rate than five provinces in eastern Poland. Mazowieckie continued to be the growth leader, producing 22% of Poland's GDP (2010), almost twice as much as the runner-up Śląskie, with 12.9%. Mazowieckie was No. 1 in terms of GDP per capita (161% of the national average), while the indicator for eastern Polish provinces (Podkarpackie and Lubelskie) stood at 66%–67% of the national average (2010). But the biggest problem is that these disparities did not decrease, and in some cases even increased, between 2004 and 2010. The situation in terms of GDP per capita is similar. Mazowieckie's GDP per capita has exceeded 75% of the EU27 average, while in six other provinces (Lubelskie, Podkarpackie, Podlaskie, Opolskie, Warmińsko-Mazurskie, and Świętokrzyskie) the figure was still below 50% of the EU average (MRR, 2011).

R. Kosmalski's studies of regional convergence and disparities based on the distribution of GDP per person employed have yielded similar results. According to Kosmalski, there was no convergence between Poland's regions in 1998–2008. The distribution of GDP per person employed tended to deepen the regional differences. Interregional divergence in terms of GDP per person employed grew mainly due to differences in technology and physical capital resources (Kosmalski, 2011). While public spending increased thanks to European funds and had a positive impact on economic growth in regions, this increase did not promote convergence in terms of the indicator adopted in the analysis. Kosmalski's study also shows that the current extent of divergence is likely to persist in the long term.

The thesis about the lack of interregional convergence is also confirmed by an analysis of the country's territorial differentiation based on the dispersion of GDP per capita at the regional level (NUTS2) and the sub-regional level (NUTS3). The dispersion of GDP per capita in Poland increased at both the provincial level (NUTS 2) and the sub-regional level (NUTS 3) in the 1999–2009 period. This means that EU cohesion policy has failed to contribute to equalizing the development of regions and sub-regions in Poland. It seems that one of the reasons for this was the structure of expenditure on cohesion policy in 2004–2013. The largest portion of the EU funds allocated to Poland (around 50%) was earmarked for basic infrastructure and environmental protection under central and regional operational programs. R&D and entrepreneurship, human resource development, and information society – three goals important for stimulating internal factors of development – claimed only 34% of the funds allocated under regional operational programs for the 2007–2013 period, much less than in the EU as a whole (43.46%). Such a structure of expenditure, dominated by spending on traditional

infrastructure, at a time of rapid progress in modern communication technology, coupled with the growing proportion of funds earmarked for scientific research in affluent regions, is tantamount to perpetuating the traditional development model, which has failed to enable lagging provinces to catch up with leading regions. This approach has many opponents among Polish economists. However, channeling considerable funds on traditional infrastructure is not synonymous with the efficient use of these funds, and the unimpressive results of infrastructure projects in Poland – in the form of delays in road-building projects or modernization of railways, poor quality of new roads, the lack of a well-thought-out strategy for the role of road and rail transport in the supply of transport services – are due to a lack of skills in managing large projects, inadequate legal regulations, and an insufficient use of modern information technology. Consequently, the increased focus on the role of internal factors of development does not mean that the authorities should scrap their plan to quickly improve the state of infrastructure in the country. Just the reverse: an increased role for domestic funds in public investment projects could help reduce the costs of investment in the public sector. One reason that traditional infrastructure still claims a predominant portion of the expenditure is that such projects are often easier to carry out and burdened with a relatively lower risk, and are therefore more attractive to local politicians (Pose, Crescenzi, 2006).

Economists seeking the causes of the growing divergence of development at the regional level point out that: 1) This divergence is symptomatic of the new EU member states struggling to catch up with EU15 countries; 2) A standout feature of regional development today is that it is concentrated in metropolitan regions, a process that is expected to intensify; 3) Funds spent on development are far more productive in core regions than in peripheral regions; 4) The diffusion of regional growth produces results in the long term and requires an efficient and consistent government policy and strong and efficient institutions to support the diffusion process; 5) Unless accompanied by a substantial improvement in the quality of institutions, the transfer of public funds to weaker regions alone cannot reduce the gap between core and peripheral regions; 6) Despite some improvement in this area (MRR, 2010), too little attention is still being paid in Poland to the relationship between the quality of government and the results of the government's economic policy; 7) The relative abundance of EU funds weakens the incentive to look for other effective financing options; and 8) The experience of "old" EU member states confirms that the progress in leveling out disparities in development within individual countries has been slow. For example, in countries such as Britain, France, and Greece, the dispersion of regional GDP per inhabitant at the NUTS2 and NUTS3 levels increased significantly in selected years of the 1999–2009 period. In Britain, the increase was 3.9 percentage points for the NUTS2 level and 3.6 percentage points for the NUTS3 level. In France, the increase was 2.4 and 3.6 points respectively, and Greece recorded a 23-point increase at the NUTS2 level. In the EU27 as a whole, a drop by 1 point was noted in the 2007–2009 period[6].

[6] Eurostat data.

Table 3

Dispersion[7] of regional GDP per inhabitant at the NUTS2 and NUTS3 levels

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
GDP (PPS) per capita NUTS2	17.4	17.4	18.2	17.9	18.3	18.7	19.4	19.7	19.9	19.7	20.7
GDP (PPS) per capita NUTS3	31.8	32.8	31.1	32.7	32.4	32.2	33.2	34.4	34.5	33.6	34.4

Source: Eurostat.

Poland's convergence with the EU in development management

For several years, the relatively low quality of governance has been increasingly mentioned among the main reasons for Poland's slower-than-expected convergence with the EU as a whole. The quality of governance consists of regulatory quality, administrative coordination at various levels, and the ability to think strategically. Tables 4 and 5 indicate that progress in terms of the effectiveness of government, measured by an index developed by the World Bank, was small in the 1998–2010 period, and Poland was far down on the list among EU countries. In 2007, when Poland's government effectiveness was rated lower than in 1998, Poland was only ahead of Bulgaria and Romania (MRR, 2010). A slightly greater improvement occurred in regulatory quality, but the 0.70 score for 2009 was still low compared with other EU member states.

Table 4

The effectiveness of government in Poland and selected EU countries in the 1998–2010 period (ratings on a scale of –2.5 to 2.5)

	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010
Poland	0.60	0.57	0.49	0.53	0.45	0.49	0.46	0.42	0.53	0.59	0.70
Czech Republic	0.64	0.66	0.96	0.90	0.92	0.99	1.05	0.89	0.99	0.98	1.00
Finland	2.06	2.13	2.19	2.23	2.19	2.18	2.24	1.96	2.04	2.22	2.24
Netherlands	2.08	2.08	2.00	2.01	2.09	1.92	1.80	1.76	1.72	1.74	1.73
Hungary	0.96	0.90	1.02	0.99	0.98	0.88	0.93	0.75	0.73	0.69	0.69

Source: Worldwide Governance Indicators, World Bank.

[7] The dispersion of regional GDP per inhabitant is the sum of the absolute differences between national and regional GDP per inhabitant, weighted with the population. A dispersion index of 0 means that the regions are not differentiated in terms of GDP per capita, while an increase in the index denotes growing disparities in the development of individual regions as measured by GDP per capita.

Table 5

Regulatory quality in Poland and selected EU countries in the 1998–2010 period (ratings on a scale of –2.5 to 2.5)

	1998	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010
Poland	0.61	0.63	0.72	0.68	0.61	0.81	0.70	0.75	0.80	0.94	0.97
Czech Republic	0.89	0.76	1.10	1.18	1.07	1.11	1.09	1.03	1.15	1.26	1.23
Finland	1.81	1.89	1.87	1.88	1.81	1.68	1.69	1.54	1.69	1.78	1.83
Netherlands	1.89	2.05	1.86	1.74	1.78	1.66	1.68	1.79	1.76	1.76	1.79
Hungary	0.97	0.98	1.27	1.11	1.18	1.10	1.20	1.20	1.21	1.20	1.05

Source: Worldwide Governance Indicators, World Bank.

In the course of its preparations for EU membership and in the first few years of its participation in the EU's cohesion policy, Poland mainly focused on building the capacity to absorb the allocated funds and on constructing econometric models to forecast the impact of these funds on the country's macroeconomic performance. For the country as a whole, these forecasts, depending on the assumptions adopted and the type of model, showed a varied albeit invariably positive correlation between the amount of planned expenditure and the level of GDP, employment and investment over several years.[8] A large injection of public funds was bound to produce strong effects on demand as well as on supply, although with some delay and less markedly. The results of *ex ante* evaluations of development-oriented programs were sufficient basis and a kind of alibi for their implementation and for seeking funds for them. Less important was the analysis of the costs and benefits of projects financed from European funds and their compliance with the long-term strategy of the country and the region. Especially in 1989–2006, there were 406 different strategies and strategic documents (departmental, regional and sectoral) in Polan[9], many of them mutually exclusive. Fortunately, most of these were never carried out. In the first stage of bringing order to this multitude of regulations, the Ministry of Regional Development came up with an initiative to repeal 286 of them after finding them useless; the remaining ones were updated and consolidated. An especially critical assessment of the ability to formulate a coherent strategy can be found in the government's guidelines for a development management system (KPRM, 2009b). The following basic weaknesses of Polish development policy were identified: lack of a clearly defined role of development policy and its relation to regional policy; lack of a vision for regional policy; lack of efficient cooperation between different central and local government agencies, on the one hand, and the private sector and nongovernmental organizations, on the other; inadequate policy tools, in particular

[8] A positive correlation between the funds spent and the rate of development is ceasing to be the rule in the case of forecasts for the impact of cohesion policy on the development of regions and sub-regions.

[9] Ministry of Regional Development data, www.mrr.gov.pl/rozwój.

financial and legal, not adapted to the goals set; lack of a strong center for coordinating development policy, and insufficient involvement of political leaders in strategic work on regional policy. The government's guidelines also include a number of recommendations for development policy makers, along with a detailed schedule for carrying these out. There is no doubt that this new approach to the country's development strategy stems from EU cohesion policy. The requirements imposed by the European Commission on countries and regions benefiting from European funds have encouraged a series of measures in regional policy management and resulted in the development of best practices that can now be recommended to policy makers in other areas. The following can be mentioned in this context: a system for programming cohesion policy measures together with the public-private partnership idea; policy monitoring and evaluation; public-private partnerships for the joint financing of projects; introduction of multiannual financial planning, and gradual decentralization of procedures.

It is thus possible to argue that cohesion policy helps ensure more efficient functioning of the state in Poland. The convergence between Poland's internal cohesion policy and EU cohesion policy has been relatively fast; its effects are now being diffused in the form of improved regional and development policy management. Therefore it can be expected that the process of institutional diffusion that got under way in 2009 will now trigger the diffusion of growth from core regions to peripheral regions. Examples of diffusion in the field of government include: the formulation of two horizontal development strategies for Poland until 2030; the drafting of a document dealing with changes in the development management system; the drawing up of a regional development strategy for 2010–2020; a strengthening of the role of the Ministry of Regional Development and the Office of the Prime Minister in shaping a consistent vision of Poland's development, and the establishment of a body known as the Coordinating Committee for Development Policy. It can thus be assumed that Polish regional policy is now less dominated by EU cohesion policy.

Other criticism against cohesion policy applies to indicators used in the process of managing this policy (OECD, 2009d). In general, these indicators are divided into input measures and output measures as well as those that make it possible to determine the results of the policy or its impact in a specific area. An appropriate selection of indicators is particularly important but difficult, because cohesion policy is currently concentrated on pursuing two objectives simultaneously: evening out disparities in the development of regions and increasing the level of competitiveness. In Poland, for example, it is necessary to monitor the results of efforts designed to support so-called growth poles (metropolises) and channel funds to peripheral regions (OECD, 2009d). The outcomes of regional policy are difficult to measure in part because this policy has a number of specific features. These include: 1) its multisector approach, resulting in an increased amount of information and requiring those taking the measurements to consider outcomes from several areas[10]; 2) participation of a large number of actors from different

[10] For example, the results of measures designed to improve workers' qualifications in a given region depend not only on regional policy makers, but also on educational policy makers from the central government; see OECD, 2009d, p. 54.

levels of the central and regional government administration, representing different sectors (public and private) and various sectors of the economy, as a result of which it is difficult to assign responsibility to specific individuals or institutions; 3) complexity resulting from the need to implement regional policy in a system in which responsibility is delegated to many policy makers, which increases the cost of the administrative burdens related to policy making; 4) uncertainty about the results, especially in the case of competitiveness or innovation, 5) focus on short-term results stemming from the difficulty of establishing a causal link between a specific type of policy and its results in the long term. Other important factors include access to modern information technology as well as the ability to use and convey information. These technical factors may be a constraint at both the regional and local levels. Yet another barrier to successful measurements of regional policy outcomes is the quality of available data, especially those related to individual programs implemented at the local level[11]. In Poland, but also in other countries benefiting from EU funds, the system of indicators used to assess the results of regional policy is largely shaped by solutions adopted by the European Commission. This particularly applies to the system of incentives for the timely use of the allotted funds. The way in which this system is designed, however, encourages misreporting and misinformation. This also applies to information on the basis of which project selection decisions are made as well as decisions to grant extra funds to those putting allotted funds to the best use. Sometimes misguided quantitative indicators (length of roads, number of companies benefiting from co-financing) are to blame, creating a situation in which fund beneficiaries are tempted to act erratically without bothering about the rationality of their actions. Those carrying out their projects on time are sometimes eligible for incentives such as applying for extra funds from a special reserve[12], but this arrangement has been known to encourage fund beneficiaries to deliberately understate their results in "time period *t1*" in order to easily report a good result in "time period t^2." A similar practice known as "cream skimming" involves giving preference to projects that carry relatively low risk and guarantee success, while crowding out private-sector funds and preventing private companies from investing in such projects. The experience of countries using support available under the EU cohesion policy in their regional policy indicates that there are also other problems when it comes to tools used for assessing the impact of this policy. These include the so-called "N + 2" rule for accelerating the absorption of allotted funds, in an attempt to avoid the risk of losing whatever money was not spent in the first two years of the project. Moreover, an earlier practice has

11 In some countries, for example Britain and Italy, regional policy makers closely work with statistical offices to improve the quality of data (OECD, 2009d, p. 61).

12 Such an arrangement was available in the 2000–2006 programming period; in the 2007–2013 period, as the process of using structural funds is decentralized, member states are free to set up a reserve of 3% of the allocated funds. Italy, for example, has introduced a special performance reserve system intended for programs implemented under regional policy and financed or co-financed from national funds. Poland kept its 3% performance reserve for projects financed under the Cohesion Policy in the current programming period.

intensified whereby beneficiaries understate the quality of their projects or abandon innovative projects because these are more risky to carry out.

Much of the criticism against regional policy in Poland stems from the fact that this policy is largely based on methods and tools used in EU cohesion policy. The same tools are also used in other EU countries and are criticized there as well. An OECD study of regional policy management indicators identifies a number of examples of situations in which upgraded versions of Brussels indicators are used in national development policies, for example in countries such as France and Italy (OECD, 2009d).

Such creativity would be most welcome in Poland. It could be promoted by projects financed from the European Social Fund (ESF) and aiming to strengthen the capacity of public administration to develop and carry out various programs and strategies (KPRM, 2009b). Experts give poor ratings to the results of ESF-funded projects to date.

Some critical remarks are specifically related to the Polish development management system. One report on innovation in Poland lists the following problems: a dysfunctional process of selecting projects; an inefficient, bloated network of committees and commissions; an unstable and excessively developed system of guidelines regulating the process of carrying out and financially settling projects ("gold-plating" of Brussels-issued recommendations); absurd reporting; overly restrictive controls; inefficient monitoring, and poor quality evaluation analysis. As a result, according to the report, there is a growing gap between the efficiency of those government institutions that deal with the management of EU funds and the rest of the public administration (Geodecki et al., 2012). It remains an open question whether measures taken by the government in recent years will prove to be effective enough and make it possible to diffuse best practices to the rest of the public administration.

The results of regional policy and changes in public administration

EU cohesion policy has had an impact on Poland's regional policy and initiated a process of change in Poland's public administration system. The arrangement of core and peripheral regions has changed and regional authorities have secured more autonomy with regard to the central government. There have also been changes in the position of regions in relation to the European Commission. The experience of Spain (Noferini, Beltran, 2010) shows that EU membership has provided Spanish regions with new tools useful in relations with the central government and strengthened their position in relations with the European Commission. In addition, some improvement was observed in horizontal cooperation among different regions and between regions and the central government.

Similar developments have taken place in Poland. They mainly occurred due to deferred demand from local governments for decision-making autonomy. Theoretically, Poland's local governments obtained such autonomy in the wake of the political and

economic reforms in the early 1990 s, but it was not until the administrative reform of 1999 that the powers of regional authorities were modified and their financial independence increased. Poland's participation in EU regional policy has made it possible to expand regional autonomy and accelerated institutional changes, making it easier for Polish regions to strengthen their position with central authorities. Poland's EU entry also marked the beginning of cooperation between individual regions in the form of carrying out large infrastructure and environmental protection projects. A particularly interesting form of such cooperation is the creation by regional authorities of informal ties (frequently taking the form of specific pressure groups) in order to pressure the central authorities into introducing regulations to increase the financial independence of regions. However, it seems that a part of the demand for regional autonomy has not yet been met due to the substantial inconsistency of the Polish government's regional policy reflected by frequent changes in law and the lack of consistency in formulating a long-term vision of the country's territorial arrangement. Regions are therefore working to strengthen their position with the European Commission. These attempts, in the form of setting up offices at the European Commission or increased activity within the Committee of the Regions, have produced limited results so far due to a significant divergence of interests as regions compete with each other for European funds and have been unable to exert joint pressure to bring about the desired changes in regulations or restrict European bureaucracy. Still, as in other EU countries, the importance of European issues for Poland's regional institutions is growing. Most regional governments have opened special departments to secure and handle European funds and to promote their regions in Europe and vice versa. Some of these departments also deal with education and public awareness campaigns focusing on European issues and also establish direct contacts with European Commission officials. These kinds of institutional changes should eventually result in regions having more influence on both the government's regional policy and EU regional policy. This would indirectly help strengthen the government's hand in dealings with the European Commission.

The benefits of public administration reform are hampered by an unclear division of responsibilities between individual policy makers: the central government administration and regional and local authorities. This leads to overlapping responsibilities and prevents proper coordination of activities (MRR, 2011b). Both the new administrative division of the country and most strategic documents and laws regulating regional policy in Poland have been introduced not only because Polish regulations had to be brought in line with EU standards, but also because regional policy was missing in Poland until 1989. This lack of experience in shaping regional policy, particularly in the run-up to EU accession and in the first few years of EU membership, weakened Poland's position with regard to the European Commission. One example is the adoption of a centralized regional operational program despite the position of all the regions, which were interested in having some independence in using EU funds. Another case in point is the relatively low proportion of funds spent as part of regional programs in the total pool of funds allocated to Poland for the 2004–2006 period. Decentralized cohesion policy manage-

ment in the 2007–2013 period increased the autonomy of regions in regional policy, but the linkages between the central and local governments, as well as those between the governments of individual provinces, and those between the public administration and nongovernmental organizations, are still inconsistent. Changes in the public finance system introduced as a result of the reform have proved to be insufficient. The system requires further decentralization. There is no doubt that without progress in reforming all these areas, poorer regions will be unable to take part in the diffusion of growth.[13] The slow progress of the public finance reform is proof of the increasingly wider gap between the priorities of regional development policy and the priorities of a short-term macroeconomic policy.

Transparency of regional policy in Poland

One of the important features of regional policy is that – in line with the principles of EU cohesion policy – it tends to enhance the transparency of government action by: 1) going public with information on decisions, both those already made and those planned, 2) requiring that the results of evaluations of government intervention be disclosed to the public, 3) applying the principle of partnership in the process of making key decisions, and 4) requiring that draft legislation and programs be consulted with social partners. In the pre-transition period, the Polish public administration had almost no experience in this area. The progress made over the last several years is surprising, largely thanks to the spread of modern communication tools.

One of the ways to evaluate this progress would be a review of the websites of the 16 province chairmen's offices responsible for pursuing regional policy in Poland. Information on the participation of regions in this policy can be divided into several groups. The most space is occupied by information about European funds, accompanied by information on cohesion policy rules and regulations, formulated at both the EU and national levels. Most regions also post up-to-date information on their websites about the activities of the European Parliament and the European Commission; this information is produced by the representative offices of regions in Brussels. Another group of information concerns the regions' development strategy.

All the provinces have started work to update strategies they developed in 2005–2006. They have gone public with their draft development strategies until 2020 and also released the results of consulting with social partners on these blueprints. Moreover, they have provided information about each stage of work on drafting the strategies. Notably, all 16 regional websites are comparable in terms of standards, which, in a sense, testifies to a successful process of convergence between regions in this area. However, some

[13] Such a view was expressed by local government officials during a discussion on the draft National Development Strategy 2020.

of the slowest-developing regions (including Warmińsko-Mazurskie) have outstanding websites in terms of the quality of information and clarity of presentation.

One drawback of most of the websites is that it often takes a long time for the user to access information on regional policy, in particular information on the region's development strategy, even though such data is important to citizens. This data is not posted according to any clear pattern and is consequently drowned out in a flood of other information. At the same time, it seems that the next step in enhancing the transparency of regional policy should be to balance the relationship between the diversity and amount of posted information and the implementation of specific policy priorities. In particular, there is no separate section focusing on analysis of the results of regional policy that would contain data based on the evaluation of projects carried out and showing the relationship between the costs incurred and the benefits derived[14].

A good model in this area could be the British government's Department for Business Innovation and Skills (BIS), which runs an integrated interactive website that offers detailed quarterly information on how each office carries out its responsibilities, how public money is spent, and what results this produces. It seems that as the Polish development management system continues to be reformed, decision makers should make greater use of best practices developed in other countries as far as policy transparency is concerned. Increased transparency of government action counteracts corruption while speeding up the development of a civil society. In both of these areas, Poland improved its position in the 2007–2009 period. In terms of corruption control, Poland was ranked 16th in the EU27 and fourth among new member states (after Estonia, Malta, and Cyprus). In terms of perception of corruption, Poland's performance has improved at a fast rate (the fastest among EU countries) since 2006 (MRR, 2011a). The increased transparency of central and local government policy is an important factor contributing to a reduction in corruption. Poland's EU entry had a positive impact on the development of civil society institutions. The number of nongovernmental organizations has increased and the quality of their operations has improved, primarily thanks to EU structural funds. A major obstacle to a faster development of voluntary organizations – which make up what is known as the third sector – is a lack of access to data needed to make institutions and public administration accountable for their work. Shortcomings in this area make it impossible for citizens to effectively pressure the authorities at all levels to improve the efficiency of government. It appears that pressure applied at the regional and sub-regional level is especially important in this context, because mechanisms are urgently needed at these levels to facilitate the diffusion of growth.

14 Such regular analysis is also missing in the case of regional policy making at the national level.

Summary and conclusions

- As a result of regional policy, Poland has made some progress in moving closer to the EU average in terms of GDP per capita, despite the fact that in the first few years of the country's EU membership this policy was largely limited to EU cohesion policy.
- On the minus side, differences have increased in the development of individual regions and sub-regions.
- Convergence in socioeconomic development at the national level combined with divergence at the regional level is a trend typical of most EU countries.
- The paradigm of regional development has changed in recent years: the objective of equalizing the development level has been supplemented by the goal of enhancing regional competitiveness.
- One result of this change is that the authorities in 2009 began making efforts to improve Poland's development policy management system.
- Institutional convergence in the 2009–2011 period was faster than socioeconomic convergence.
- This is the right way to go because poor governance, including development policy management, is a major reason that regional policy has not lived up to its potential.
- Under the new paradigm of regional policy, it is expected that a process will be launched for diffusing growth from regional powerhouses to regions that are developing more slowly.
- Forecasts for GDP per capita in Poland's regions until 2020 are pessimistic. GDP per capita in regions such as Opolskie, Podkarpackie and Podlaskie is projected to be roughly half that of Mazowieckie.
- While drafting their development strategies until 2020, individual regions must make sure these strategies are in line with the government's regional development strategy and that they take into account the diffusion of growth. But the bad news is that, during a debate on national strategy, local government officials called on the central government to propose concrete tools to ensure the diffusion.
- On the other hand, local governments and central government experts are rightly calling for an accelerated decentralization of public finances. Reforms in this area could provide a strong incentive to change the regions' approach from "waiting for proposals" to "intensively seeking new solutions."

Summary and Conclusions: Poland's Competitive Position in 2012

Marzenna Anna Weresa

The analysis conducted in this book provides the basis for a concise assessment of the competitive position of the Polish economy in 2012. This assessment assumes that competitiveness is reflected by the prosperity of the population and its changes over time. The level of prosperity is mainly determined by:

- The current condition of the economy measured by the so-called "magic pentagon" indices: GDP growth, inflation, unemployment, the public finance balance, and the current-account balance;
- Changes in the standard of living, as measured by national income per capita at purchasing power parity terms (PPP) and broader indicators of socioeconomic development such as the Human Development Index (HDI), income inequality and the poverty level;
- A country's position in the international division of labor, in particular its ability to export goods and services as well as its attractiveness for foreign direct investment inflows.

The indicators of Poland's competitiveness are evaluated in terms of their changes in 2012 as seen in a comparative perspective. The competitive position of the Polish economy has been compared with that of other countries in the European Union, in particular those in Central and Eastern Europe (EU10). The latter group of countries has been chosen as a reference point because these countries are similar to Poland in terms of economic and institutional development and have transformed their economies from central planning to a market system in a similar way. Moreover, these countries compete with Poland for external resources such as foreign direct investment and technology, which they need to speed up their development.

In assessing Poland's competitive position within the "magic pentagon" framework, it should be noted that the Polish economy performed relatively well in 2012, especially in the context of the current economic conditions in Europe and worldwide. Still,

in comparison with the previous year, Poland's overall economic situation, measured by the five basic macroeconomic performance indicators, deteriorated slightly. The year 2012 brought a slowdown in Poland's economic growth to 2.0%, compared with 4.3% in 2011. This was a result of the economic downturn in Europe, coupled with a variety of internal problems such as adverse demographic changes, employment running below the EU27 average, and slower investment growth.

However, there were also some positive trends in Poland's development in 2012 compared with the preceding year. First, the ratio of the budget deficit to GDP was reduced to 3.4% (from 5.1% of GDP in 2011). Second, inflation fell to 3.7% (from 4.3% in 2011). Third, there was a slight decline in the current-account deficit in relation to GDP, from –4.9% in 2011 to –3.5% in 2012.

One of the main problems that the Polish economy faces is a steady rise in unemployment since 2009. In 2012, the jobless rate stood at 10.1% and was slightly lower than the EU27 average (10.5%), but higher than in the Czech Republic (7.0%), Romania (7.0%), and Germany (5.5%).

Despite slower economic growth, Poland's real convergence toward more developed countries in the European Union continued in 2012. Between 2009 and 2012, Poland was among the fastest-growing economies in the EU. The country's competitive position, as measured by the relative level of GDP per capita, has improved over the past few years. According to preliminary data, Poland's 2012 GDP per capita in purchasing power parity terms (PPP) constituted about 61% of the EU15 average. This means that the development gap separating Poland from the EU15 average decreased by 3 percentage points in 2012. Moreover, since the beginning of the global financial and economic crisis, Poland has managed to narrow the gap to the EU15 average in terms of GDP per capita by 11 percentage points.

When assessing prosperity apart from income levels, income disparities should be taken into account. These can be measured by household income inequalities and the poverty level. According to Eurostat, the EU statistics office, income disparities in Poland have decreased since 2005, as reflected by a decline in the Gini coefficient from 35.6 in 2005 to 31.1 in 2011. However, the pace of these changes has decelerated. A similar downward trend has been noted in the poverty level in Poland, but, after a brief slowdown, these two indicators remained relatively stable in 2011 and 2012.

The Human Development Index (HDI) socioeconomic indicator provides further evidence that the level of prosperity in Poland has increased. In recent years, Poland's HDI score has stayed close to the average for the new EU member states, which stands at 0.813. In 2011, Poland moved up by two notches on the ranking list to 39th place worldwide, surpassing some other EU countries, such as Portugal. In fact, Poland's competitive position in the EU27, as measured by the HDI, was somewhat better than that expressed in GDP per capita terms alone.

A crucial determinant of a country's international competitiveness is its ability to compete in an international environment, in particular its ability to export goods and services and to attract foreign factors of production, including foreign direct investment.

While assessing the international dimension of the competitive position of the Polish economy, it should be noted that Poland's exports grew at a slower rate in 2012, while imports declined in absolute terms. According to the Central Statistical Office (GUS), exports increased by only 2.5% (in constant prices), compared with 8.1% in 2011 and 13.2% in 2010. Imports declined by 3% (in constant prices) from 2011. The good news is that Poland's foreign trade deficit was reduced as a result of these developments. In 2012, the EU as a whole remained Poland's most important trading partner, accounting for about two-thirds of the country's overall trade turnover, but the geographical structure of Poland's foreign trade is changing. The role of EU markets in Poland's foreign trade is steadily decreasing, especially in the case of imports.

Poland's international competitiveness is reflected in the pattern of revealed comparative advantages in foreign trade (the so-called RCA index). When it comes to exports to other EU countries, Poland enjoyed comparative advantages in goods such as food, transport equipment and consumer durables in 2012. In Poland's exports to non-EU markets in 2012, comparative advantages were revealed in the case of transport equipment for industrial purposes, consumer goods and processed foods. Furthermore, 2012 marked increases in the RCA index for unprocessed foods as well as for lubricants and fuels. Poland's comparative advantage declined in the case of transportation equipment exports, including passenger cars.

Apart from trade, another aspect of Poland's international competitiveness evaluated in this book is the country's attractiveness for foreign direct investment (FDI). In 2012, the inflow of FDI into Poland stood at its lowest level in more than a decade. Although in absolute terms the country's FDI stock continued to grow, in relative terms its share of the FDI stock invested in the EU10 countries showed no progress. Poland's share remained at the 2010 level, accounting for around 40% of the total FDI stock invested in the EU10 region. With the increased competition for foreign capital among EU10 countries in recent years, Poland appears to have become less attractive to foreign investors.

Summarizing this assessment of Poland's overall competitiveness, it can be concluded that in 2012 Poland's competitive position was relatively stable; it remained at the same level as in 2011. Poland's standing in international competitiveness league tables published by the World Economic Forum and the Institute for Management Development remained unchanged last year. However, developments such as an excessive public deficit, growing unemployment and relatively lower investment attractiveness adversely affected Poland's competitive position and will continue to challenge it in 2013.

On the plus side, the business environment in Poland is improving, which offers a positive prospect for the future. This determinant of the country's competitiveness is assessed by the World Bank in its *Doing Business* report. In the latest rankings, unveiled in December 2012, Poland advanced by seven spots to 55th place.

The picture is less optimistic when it comes to the competitiveness of Poland's regions. Although Poland has reduced its gap to the EU in average regional GDP per capita since its EU entry in 2004, there are increasing disparities between Polish provinces

in GDP per capita. Moreover, the Polish regions are generally less innovative than most other EU regions. Internationally, all of Poland's regions are classified as regional innovation systems not driven by science and technology. Four Polish provinces have experienced structural inertia or deindustrialization, while the development of others is based on what are known as primary sectors. Consequently, there is no sound basis for improvement in either the innovative position or the competitiveness of Polish regions.

The regions' trade and investment linkages with foreign countries confirm that regional disparities in Poland are growing. Foreign trade adds to the imbalance in development between Poland's regions. Less developed regions specialize in exporting low value-added products from low- and medium- low-tech industries, while well-developed provinces such as Śląskie (Silesia), Wielkopolskie (Greater Poland), Dolnośląskie (Lower Silesia) and Mazowieckie (Mazovia) export high-tech and high-value-added products.

The attractiveness of Polish regions for FDI is lower than that of leading European regions. Furthermore, Polish regions hold less appeal than most of their counterparts in other EU10 countries. None of the Polish provinces was among European regions with the highest level of investment attractiveness in 2012, while two regions from other EU10 countries – the Czech region of Prague (Praha) and the Slovak region of Bratislava (Bratislavský Kraj) – joined this elite group.

Among Polish regions, Mazowieckie appears to be the most attractive for FDI, but even this province is less appealing than most other EU regions.

On the basis of this evaluation of regional competitiveness, some tentative conclusions for economic policy can be drawn. First, the European cohesion policy is likely to play a significant role in strengthening the competitiveness of Poland's regions between 2014 and 2020. While the foundations for a modern regional policy at the national and regional levels have already been laid in Poland, it is still necessary to increase funding from domestic sources in order to implement this policy. This requires further decentralization of public finances, accompanied by further institutional changes. European funds should be used to supplement domestic resources for policy implementation.

A pro-competitive regional policy should focus on reducing the divergence among regions. This goal can be achieved through further institutional changes to ensure the diffusion of growth from core regions and drive the country's development to peripheral regions whose growth is lagging.

An increase in domestic funding, in particular funds spent on innovation, supported by further institutional changes, should be among the key priorities for public policy in the next several years.

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This book presents the results of systematic comparative research conducted for more than 20 years at the World Economy Institute of the Warsaw School of Economics. This year's edition seeks to evaluate changes in the competitiveness of the Polish economy in 2012, at both the macroeconomic and regional levels. This assessment is the basis for a further in-depth analysis of factors influencing the competitive position of Poland and its regions between 2005 and 2012.

The Polish economy is compared with other European Union economies, in particular with those in Central and Eastern Europe (EU10). A wide range of quantitative and qualitative indicators was used in this comparative study. They include gross domestic product (GDP) growth, GDP per capita, income inequality and the poverty level as well as the growth and structure of foreign trade, revealed comparative advantages in trade and their changes over time, the size and growth of foreign direct investment, and the balance of payments.

On the basis of these analyses, forecasts have been presented for changes in the competitiveness of the Polish economy in the coming years. Moreover, priorities have been indicated for pro-competitive economic policies.

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ISSN 2083-229X

ISBN 978-83-7378-820-6