

POLAND

COMPETITIVENESS REPORT 2018

THE ROLE OF CITIES IN CREATING
COMPETITIVE ADVANTAGES

Edited by
Marzenna Anna Weresa
Arkadiusz Michał Kowalski



SGH

WORLD ECONOMY RESEARCH INSTITUTE
SGH WARSAW SCHOOL OF ECONOMICS



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Contents

Preface	7
PART I. THE COMPETITIVENESS OF THE POLISH ECONOMY IN 2010–2017	
Chapter 1. A Comparative Assessment of Development Trends in the Polish Economy in 2010–2017: Poland and the EU	13
<i>Ryszard Rapacki, Mariusz Próchniak</i>	
Chapter 2. Convergence of Income Levels Between East-Central and Western Europe ..	29
<i>Mariusz Próchniak</i>	
Chapter 3. Income Inequality and Poverty in Poland in 2010–2016 with Particular Focus on Aspects of Urbanization	43
<i>Patrycja Graca-Gelert</i>	
Chapter 4. The Foreign Trade of Poland and Voivodship Cities: The Competitive Advantages and Balance of Payments in 2010–2017	63
<i>Mariusz-Jan Radło</i>	
Chapter 5. Impact of Foreign Direct Investment on the Urbanization Process in Poland. Heterogeneity of Regions	81
<i>Tomasz Marcin Napiórkowski</i>	
PART II. MAIN COMPETITIVE FACTORS OF POLISH ECONOMY IN THE YEARS 2010–2017	
Chapter 6. Directions of Economic Policy and the Most Significant Challenges in 2010–2017	105
<i>Adam Czerniak, Ryszard Rapacki</i>	
Chapter 7. Investments and Domestic Savings in Poland in 2010–2017	121
<i>Piotr Maszczyk</i>	
Chapter 8. R&D, Innovation and the Competitiveness of the Polish Economy	137
<i>Marzenna Anna Weresa</i>	
Chapter 9. Changes in Total Factor Productivity	157
<i>Mariusz Próchniak</i>	

PART III. THE COMPETITIVENESS OF POLISH CITIES

Chapter 10. The Competitiveness of Cities: Components, Meaning and Determinants . . .	173
<i>Magdalena Kachniewska, Arkadiusz Michał Kowalski, Ewelina Szczech-Pietkiewicz</i>	
Chapter 11. Competitiveness and Dynamics of Urban Development in Poland	193
<i>Arkadiusz Michał Kowalski</i>	
Chapter 12. Financing Urban Development Projects for the Purpose of Increasing Competitiveness	207
<i>Katarzyna Sum</i>	
Chapter 13. Smart City as a Form of Increasing Competitiveness of Cities	219
<i>Ewelina Szczech-Pietkiewicz</i>	
Chapter 14. The Role of Urban Spaces in Creating Innovations	229
<i>Marta Mackiewicz</i>	
Chapter 15. Financing Smart Cities Projects from the European Union Framework Programs FP7 and H2020	241
<i>Małgorzata Stefania Lewandowska, Tomasz Gołębiowski</i>	
Chapter 16. Impact of Tourism on Competitiveness and Internationalization of Cities . .	255
<i>Magdalena Kachniewska</i>	
Chapter 17. Cultural Diversity of the City: Costs and Benefits. Research Overview	279
<i>Lidia Danik</i>	
FINAL CONCLUSIONS	
The Competitive Position of the Polish Economy in 2010–2017 with Focus on City Competitiveness	291
<i>Marzenna Anna Weresa, Arkadiusz Michał Kowalski</i>	

Preface

Poland: Report on Competitiveness 2018. The Role of Cities in Creating Competitive Advantages is the latest edition of a long-standing series of comparative research on the main trends in the development of Polish economy, which has been conducted in the World Economy Research Institute of Warsaw School of Economics (SGH) since the mid-1980s. The main objective of this book is to identify changes of Poland's competitive position in 2010–2017, taking into account the competitiveness of cities and specifying factors affecting their competitive position in 2017.

The competitiveness of economies is defined in the book, by pointing to its manifestations, which primarily include an increase in the level of well-being of society while ensuring the sustainable use of natural resources and a proportional division of benefits and costs of economic growth. The definition also includes the international dimension of competitiveness, which is reflected in strengthening the position of domestic goods and services on foreign markets and in improving the attractiveness of a given territory for foreign production factors (especially the attractiveness for foreign direct investment).

The research presented in this monograph concentrates on the competitive position of Poland in comparison with other analyzed countries, which after the systemic transformation in the 1990s became part of the European Union following its enlargement in 2004, 2007 and 2013¹.

The methodology of the comparative studies of Poland's competitiveness has been developed by a team coordinated by the World Economy Research Institute of the Warsaw School of Economics. It goes beyond the simple outcome approach and highlights structural factors affecting Poland's competitiveness. Its competitive position has been determined by a comparative analysis and benchmarking, taking as a reference point the economic results of individual member states and average indicators for the entire EU. Other aspects of the competitiveness of Polish economy, particularly its determinants, have been analyzed using a variety of methods best suited to the considered issue (such as statistical and descriptive analysis, econometric modeling, economic growth accounting, comparative analysis, deduction and induction methods) and economic indicators (e.g., indicators of revealed comparative

¹ It is about the countries of Central and Eastern Europe, which, similarly to Poland, entered the European Union at the beginning of the 21st century. These include: the Czech Republic, Estonia, Lithuania, Latvia, Slovakia, Slovenia, Hungary, Bulgaria, Romania and Croatia.

advantages in foreign trade – RCA, income inequality measures, including the Gini coefficient, the summary innovation index, etc.).

Overall, the book consists of three parts divided into chapters.

Part I (Chapters 1–5) shows competitive position of Poland's economy compared to other European Union countries on the basis of outcome measures, such as: the rate of economic growth, the volume of gross domestic product analyzed in absolute and per capita terms, income inequalities in society and poverty scale. The picture of Polish economy development is summarized by a synthetic glance at five basic economic indicators (GDP per capita growth rate, inflation, unemployment, as well as public finance deficit and current deficit both in relation to GDP), which illustrate the condition of the Polish economy at the end of 2017. It is supplemented by the analysis of income convergence carried out for Poland and the other Central and Eastern European countries that joined the European Union in 2004, 2007 and 2013. The assessment of the macroeconomic situation has been enriched with international aspects of competitiveness. The focal point has been Poland's trade links with foreign countries, especially with the other EU countries – Poland's main economic partners (trade in goods and services, balance of payments) and foreign direct investment in Poland and their impact on regions.

Part II of the book (Chapters 6–9) seeks to identify factors determining the competitiveness of the Polish economy. Both theory and empirical research accentuate the importance of economic policy in shaping the competitiveness of economies. Therefore, the book presents the economic policy directions in 2010–2017 and on this basis, the most important challenges that will determine Poland's economic development and competitive position in the 2020 perspective are indicated.

Human, financial and intangible resources (knowledge, technology) are another group of factors determining the competitiveness of economies. Among those that were analyzed in detail in the monograph, and are considered to be key factors for improving Poland's competitiveness, were: domestic capital resources (investment and savings) as well as innovation and technology, including financial and human resources necessary for innovative activity, as well as innovation output in the form of patents, export of high-tech goods and knowledge-intensive services, and the revenues from sales of innovative products.

Part III (Chapters 10–17) focuses on the competitiveness of cities, which has become an important research topic in the context of location decisions, in particular nowadays when economies operate in rapidly changing environment (e.g., urban sprawl or the emergence of megacities, as well as the development of a global network of cities and clusters). Firstly, the theoretical foundations of the analyzed issue are presented. An attempt was made to define the term of a city's competitiveness and to describe its specific features, as well as indicate the factors affecting urban competitiveness.

The empirical research starts with the introduction of the competitiveness and dynamics of urban development in Poland in the context of urbanization processes that took place in previous decades, including demographic and income criteria. For this purpose, indicators defining the development of human capital, the level of entrepreneurship and the way of city management have been analyzed. It should also be mentioned that there are significant limitations for empirical research at the urban level, which are related to the lack of statistical data for many indicators usually used in competitiveness studies carried out at the level of countries and regions.

Subsequent chapters of the third part of the monograph discuss the possibilities of financing cities' development and their projects regarding, for example, investment in transport infrastructure, actions related to noise reduction or improving access to social and municipal services. The importance of the smart city concept for improving cities' competitiveness was also discussed, indicating that the smart city model is not limited to the technological dimension, but also takes into account the quality of life, social capital, social innovations, culture and education. While the use of technology is not of sole importance, it does contribute to raising the living standard of residents, increasing prosperity and balancing expansion. This subject is analyzed in Chapter 14, which underlines the role of urban spaces in creating innovation. Additionally, cities are a special environment conducive to the emergence of new solutions because human, financial and organizational resources are concentrated there. The examples of revitalization activities that have influenced the development of innovativeness in cities have been provided, along with a data analysis of the number of projects in the area of innovativeness and entrepreneurship co-financed from the EU funds implemented in the largest cities in Poland during 2007–2013. The research on issues connected with the smart city concept has been conducted in Chapter 15, which presents the financing of smart city projects from the European Union framework programs, including the main areas of financing and beneficiaries. The following issue analyzed in this book was specifically designed to portray the impact of the tourism function, which is the most exogenous of all urban functions, on the competitiveness and internationalization of cities. The analysis of cities' competitiveness also includes the benefits and threats related to the city's cultural diversity.

The final conclusions based on the conducted analyzes are presented in the final part of the book. We hope that research findings presented in this monograph are a contribution to the theory of competitiveness of national economies and allow for a better understanding of the factors determining both a short and long term competitive position, with an emphasis on the competitiveness of cities.

Part I

**The Competitiveness
of the Polish Economy
in 2010–2017**

A Comparative Assessment of Development Trends in the Polish Economy in 2010–2017: Poland and the EU

Ryszard Rapacki, Mariusz Próchniak

International Background – Development Trends in the Global Economy

Before proceeding to the comparative assessment of Poland's economic performance in 2010–2017, the most important development trends in the global economy in this period will first be presented (Table 1.1).

Table 1.1. Global economic growth in 2010–2017 (growth rate in %)

Years	2010–2013 (annual averages)	2014	2015	2016	2017 ^a
World	2.8	2.6	2.7	2.4	3.0
Developed countries	1.6	1.9	2.2	1.6	2.2
Eurozone	0.6	1.3	2.0	1.8	2.1
USA	2.0	2.6	2.9	1.5	2.2
Japan	1.9	0.3	1.1	1.0	1.7
Transition countries	3.8	0.9	-2.2	0.4	2.2
Russia	3.6	0.7	-2.8	-0.2	1.8
Developing countries, of which:	6.0	4.4	3.9	3.8	4.3
least developed countries	5.7	5.1	4.2	4.3	4.8
Africa ^b	4.4	4.3	3.3	1.7	2.6
South East Asia	7.1	6.1	5.8	6.0	6.0
China	9.0	7.3	6.9	6.7	6.8
India	7.3	7.2	7.6	7.1	6.7
Latin America	4.1	0.9	-0.6	-1.3	1.0

^a Preliminary data.

^b Excluding Libya.

The economic growth rates of groups of countries were calculated as a weighted average of GDP growth rates in individual countries. The averages were based on 2010 prices and exchange rates.

Source: United Nations [2018].

As can be noted on the basis of the preliminary, partly estimated data in Table 1.1, global gross domestic product (GDP) increased in 2017 by 3.0% i.e., at a slightly faster rate than in the three previous years, and more rapidly than the medium-term trend recorded in 2010–2013.

Similarly to the entirety of the analyzed period, the acceleration of the global economic development dynamics in 2017 was mainly the result of rapid economic growth in developing countries which noted a GDP increase of 4.3%. In comparison, economic growth rates in South-East Asian countries were particularly favorable (6.0%), especially in China (6.8%) and India (6.7%). The general improvement of the global economic performance was also influenced by better growth rates in developed countries than in previous years (a 2.2% improvement of GDP). A significant acceleration of economic growth (albeit from a low base) also took place in transition countries (excluding the new EU Member States in Central and Eastern Europe), including Russia. However, despite the end of the economic recession in Latin America, growth rates achieved on this continent made – in relative terms – a negative contribution to global development dynamics in the past year.

The Size of the Polish Economy

We begin our analysis of Poland's economic performance in 2017 and its international competitive position with a brief assessment of Poland's economic potential collated with the global economy, as well as Poland's position in respect to the European Union¹.

The basic measure of an economy's size is the value of GDP generated in a particular country in a given year. This is still the most prevalent method of economic activity assessment, commonly used in macroeconomic analyzes, despite its many shortcomings and limitations. For international comparisons GDP values in individual countries expressed in national currencies are converted into a single international currency (e.g., USD or EUR) using current market exchange rates (CER) or purchasing power parity (PPP) as conversion factors. GDP value calculated at PPP is believed to reflect better the real value of output produced in a given country, because it takes into account the differences in prices of goods and services in local markets. It is also less susceptible to the influence of exchange rate fluctuations, which is why this method of assessment is more often used in broad international comparisons. However, currency

¹ The content of this and subsequent subsections of this chapter refers to earlier editions of the *Report on Competitiveness* [Matkowski, Rapacki, Próchniak, 2016; Matkowski, Próchniak, Rapacki, 2016; Rapacki, Próchniak, 2017].

converters used in calculating GDP at PPP are inaccurate and often overestimate the value of GDP for less developed countries in relation to the GDP of more developed countries (the same applies to GDP per capita). In our assessments, the values of total GDP and GDP per capita will be provided in both of these approaches: converted into international currency according to CER and according to PPP, so as to allow for more comprehensive comparisons.

Poland's GDP value in 2017, calculated at CER, amounted to 510.0 billion USD, but the GDP value calculated at PPP was more than twice as high (1,110.7 billion USD), according to preliminary estimates of the IMF [IMF, 2018]. In terms of GDP at CER, Poland was ranked 24th on the list of the largest economies in the world (between Sweden and Belgium), and also 24th in terms of GDP at PPP (between Nigeria and Pakistan)². Poland's position in the global ranking of economies based on PPP has not changed since the previous year but has improved by one position in the CER ranking due to the relatively fast growth of the Polish economy compared to other developing countries. However, Poland's contribution to the global value of output has not changed, as it is still 0.6% according to CER, and 0.9% according to PPP. This indicator, reflecting Poland's position in the global economy, has remained relatively stable for many years. However, the exact position of Poland in the world ranking of economies by size of GDP changes every year due to cyclical fluctuations in output, changes in inflation rates and exchange rates, as well as some revisions in GDP data and conversion factors.

Let us now look at the data indicating Poland's position in the European Union's economy (EU-28). Table 1.3 presents data on the GDP value of the individual EU member states in 2017, in EUR according to current market exchange rates and the purchasing power parity. All of the data on GDP in 2017 are based on preliminary estimates published by the European Commission in October 2017 [EC, 2017], which may be subject to further revisions. The ranking of the EU members included in the table has been drawn up in accordance with the value of GDP at CER. The positions of individual countries in the alternative ranking based on the GDP value at PPP have been provided in brackets.

² The ranking based on CER includes 190 countries. The top three spots are taken by the USA, China and Japan, while the bottom three (in descending order) are held by Kiribati, Nauru and Tuvalu. The PPP ranking covers 192 countries. The top three positions are taken by China, the USA and India, while the bottom three places are the Marshall Islands, Nauru and Tuvalu.

Table 1.2. EU-28 countries according to GDP value in 2017 (in billion EUR)

Rank	Country	GDP at CER		GDP at PPP	
		billion EUR	%	billion EUR	%
1 (1)	Germany	3,259.0	21.3	3,027.0	19.8
2 (2)	United Kingdom	2,318.0	15.1	2,104.0	13.8
3 (3)	France	2,286.0	14.9	2,067.0	13.5
4 (4)	Italy	1,715.0	11.2	1,729.0	11.3
5 (5)	Spain	1,164.0	7.6	1,280.0	8.4
6 (7)	Netherlands	733.1	4.8	661.0	4.3
7 (9)	Sweden	485.2	3.2	371.0	2.4
8 (6)	Poland	463.4	3.0	809.6	5.3
9 (8)	Belgium	438.2	2.9	394.0	2.6
10 (11)	Austria	368.9	2.4	333.2	2.2
11 (13)	Ireland	290.2	1.9	262.0	1.7
12 (15)	Denmark	288.6	1.9	214.1	1.4
13 (18)	Finland	223.9	1.5	180.5	1.2
14 (14)	Portugal	192.6	1.3	238.3	1.6
15 (12)	Czech Republic	191.5	1.3	283.9	1.9
16 (10)	Romania	180.0	1.2	359.4	2.3
17 (16)	Greece	178.6	1.2	212.4	1.4
18 (17)	Hungary	122.3	0.8	201.6	1.3
19 (19)	Slovakia	85.5	0.6	126.2	0.8
20 (24)	Luxembourg	56.1	0.4	45.8	0.3
21 (20)	Bulgaria	50.3	0.3	105.5	0.7
22 (21)	Croatia	48.3	0.3	74.6	0.5
23 (23)	Slovenia	43.1	0.3	53.0	0.3
24 (22)	Lithuania	41.6	0.3	65.4	0.4
25 (25)	Latvia	26.5	0.2	38.7	0.3
26 (26)	Estonia	23.0	0.2	29.9	0.2
27 (27)	Cyprus	19.0	0.1	21.2	0.1
28 (28)	Malta	10.7	0.1	12.8	0.1
	EU-28	15,302.0	100.0	15,302.0	100.0

Note: The 2017 GDP data are the European Commission's preliminary estimates. The country's position provided in the first column corresponds to the value of GDP at CER; the positions of individual countries in an alternative ranking based on GDP at PPP are given in brackets.

Total contributions to the EU-28 GDP have been calculated by the authors.

Source: European Commission [EC, 2017].

The European Union currently consists of 28 countries with diverse sizes and economic potential. It is important to point out that Germany, UK, France, Italy and Spain are the five largest countries in terms of population and production volume. They represent 63% of the total population of EU-28 countries and produce 70% of the total GDP at CER and 67% of GDP at PPP. The 15 countries that made up the EU before its enlargement (EU-15) represent 80% of the total population and produce 92% of the total GDP at CER and 86% of GDP at PPP. In contrast, the 13 new member states that have joined the EU in 2004 and 2007 or later, i.e. 11 Central and Eastern European countries, along with Cyprus and Malta, represent 20% of the total population, but produce only 8% or 14% of the total GDP. When considering Poland's position in the European Union, the significant asymmetry between the old EU and the new member states (more broadly, between Western, Central and Eastern Europe) should be taken into consideration.

Poland is the largest new member state of the European Union, in terms of its territory and population as well as its GDP size. In the enlarged European Union (EU-28), Poland ranks sixth in terms of territory and population (respectively 7.1% and 7.4%). Poland also holds the sixth position in terms of GDP at PPP (5.3%), while in terms of GDP at CER, it ranks eighth (3%). Poland's position in the European Union rankings has not changed compared to 2016. As can be observed, Poland's contribution to the EU-28's economic potential is much lower than indicated by the size of its territory and population. However, in light of historical experience, this should not come as a surprise (a similar disparity can be noted in all Central and Eastern European countries).

Since joining the EU, it is worth noting that Poland's position in the European economy has improved significantly. Its contribution to the total GDP of all the current EU member countries (EU-28) increased from 1.9% in 2004 to 2.8% in 2010 and to 3.0% in 2017, according to CER. Similarly, Poland's contribution to the EU-28 GDP at PPP increased from 3.6% in 2004 to 4.7% in 2010 and 5.3% in 2017.

Economic Growth and Real Convergence

A significant increase in economic activity dynamics in Poland was noted during the previous year. The GDP growth rate was almost 2 p.p. higher than a year earlier and higher than the average throughout the duration of systemic transformation, but still lower than in several other countries of Central and Eastern Europe. This has not, however, fundamentally changed the overall development trends in Poland in a comparative international perspective. In 1990–2017, the average annual GDP

growth rate of our country was the highest among the new EU Member States (EU-11) from Central and Eastern Europe (CEE) and twice as high as a similar average rate in the "old" EU-15 countries. Similar trends were observed in the development trajectories of Poland and the two reference groups in 2004–2017 i.e., after Poland's accession to the EU. The situation has slightly changed in this respect in 2010–2017 that is the period covered by this year's *Report*. A significant decrease of the variations in development dynamics took place during this period, both within the CEE group and between CEE countries and the EU-15 average. The data is provided in Table 1.3.

Table 1.3. GDP growth in 1990–2017

Country	Real GDP growth rate (constant prices)				Real GDP index in 2017		
	Average annual growth rate in %	Annual growth rate in %			1989 = 100	2004 = 100	2010 = 100
	1990–2017	2010	2016	2017 ^a			
Poland	3.1	3.7	2.9	4.2	234	163	125
Bulgaria	1.0	1.3	3.9	3.9	131	145	123
Croatia	0.3	-1.1	3.0	3.2	107	110	103
Czech Republic	1.6	-0.5	2.6	4.3	154	137	112
Estonia	1.7	1.6	2.1	4.4	161	137	122
Lithuania	0.9	3.5	2.3	3.8	130	144	131
Latvia	0.7	3.0	2.1	4.2	122	137	125
Romania	1.2	3.0	4.6	5.7	140	150	120
Slovakia	2.4	1.4	3.3	3.3	196	160	122
Slovenia	1.6	-1.1	3.1	4.7	157	125	107
Hungary	1.4	1.9	2.2	3.7	148	118	115
EU-15 ^b	1.5	0.1	1.8	2.1	153	114	116

^a Estimates.

^b Weighted average.

The historical EBRD data, referring to 1989, was also used to calculate the growth rates with the basis of 1989 = 100.

Source: Eurostat; European Commission [EC, 2017]; own calculations.

Poland was the only country in Central and Eastern Europe that had more than doubled its GDP (index equal to 234) in 1990–2017. This indicated an average annual growth rate (taking into account the transformation recession in 1990–1991) of 3.1%. The only transition country with comparable growth dynamics was Slovakia (2.4% annually).

After joining the EU, GDP in Poland increased by 56% (i.e., at a rate of around 4.2% on average per year). Just as throughout the duration of systemic transformation, our country held the leading position in the group of the new EU member states in this

respect (a similar result was achieved by Slovakia at this time – 55%). At the same time, Poland significantly outpaced the EU-15 countries in terms of economic growth.

Poland lost the position of a leader in economic growth in the group of Central and Eastern European countries during the period analyzed in this study (2010–2017). Its growth rate also significantly decreased relative to the EU-15 countries (the real GDP growth indices in this period were 125 and 116, see Table 1.3). This was mainly a consequence of a significant slowdown in Poland's growth – the average annual GDP growth rate in these years was 3.1% that is over 1 p.p. less than in 2004–2016 i.e., after our accession to the EU (4.2%). It cannot be ruled out that the occurrence indicated here may be the first, early symptom of secular changes of hitherto growth trajectories, as mentioned in the previous edition of the *Report on Competitiveness* in the EU member states and may mean the deceleration or even reversal of the real convergence of the Polish economy with the EU-15 countries [Weresa, 2016].

As a result of the combined impact of the tendencies presented above, Poland managed to significantly narrow its gap in economic development in relation to all current EU Member States (except for Ireland), as well as all CEE countries in 1990–2017. In this instance, the changes in the relative developmental position of the Polish economy were not only a derivative of a faster rate of economic growth, but also a function of diverging demographic trends and diverse appreciation paths of real exchange rates in individual countries³.

The fastest real convergence process in Poland took place in relation to the United Kingdom, Italy and Greece. Poland created a historical precedent by completely closing its gap in economic development and overtaking Greece at the end of 2015, as the first old EU member country.

As a part of the CEE group of new member states, Poland has been the most successful in closing the distance between its level of economic development and that of the richest countries i.e., Slovenia and the Czech Republic. This is the first noted instance since pre-war times, in which we have also managed to overtake Hungary in terms of GDP per capita (see Table 1.4).

As seen in Table 1.4, in 2017 Poland's GDP per capita in PPP terms stood at 66% of the EU-15 average⁴. This implies that between 1989 and 2017 our country has gained 28 p.p. in the relative development level vis-à-vis the "old" Union, of which 23 points

³ While a slight decrease has been noted in the population in Poland in 1989–2017 (38.446 million compared to 37.973 million i.e., 1.2%), there has been a significant demographic increase of approximately 10.6% in the EU-15 (from 369 million to 408 million people). Such demographic tendencies indicate greater differences between GDP growth rates per capita: in Poland, this rate was 3.2% per year, while in EU-15 – on average 1.1% annually.

⁴ It should however be noted that in 2017, in terms of the market (current) exchange rate, Poland's GDP accounted for only 35% of the average level in the EU-15 (own calculations based on Eurostat data).

were gained after its EU entry (i.e., in 2004–2017). What is more, the rate of real convergence clearly accelerated in Poland after joining the EU. While it was equal to an average of 0.5 p.p. annually in 1990–2003, it increased fourfold in 2004–2017 to almost 2 p.p. annually.

Table 1.4. The development gap in new EU member states in relation to the EU-15 in 1989–2017 (GDP per capita in PPP, EU-15 = 100)

Country	1989	2004	2010	2016	2017 ^a
Poland	38	43	57	64	66
Bulgaria	47	30	42	45	46
Croatia	51	50	54	55	56
Czech Republic	75	69	76	82	84
Estonia	54	48	69	69	70
Lithuania	55	44	67	69	72
Latvia	52	41	57	60	62
Romania	34	30	49	55	57
Slovakia	59	50	69	71	72
Slovenia	74	75	74	78	80
Hungary	56	55	61	63	64

^a Own estimates.

Source: IMF for 1989 [IMF, 2005]; Eurostat in 2004 and 2010; European Commission in 2016–2017 [EC, 2017]; own calculations.

When compared to the other new EU member states from Central and Eastern Europe, Poland's results are quite favorable, especially in view of the entire course of the system transformation to date. Poland was a definite leader in the process of real convergence with the EU-15 countries among the new EU Member States in 1990–2017. However, our country lost its position after 2004. During the period succeeding the enlargement of the Union, the real convergence process took place the most rapidly in Lithuania (28 p.p.) and in Romania (27 p.p.). At the same time there was also a divergence process in Poland in relation to some CEE countries, as our development gap increased after 2004 relative to Lithuania. At the same time Romania edged closer to Poland's economic development level.

What is more, Poland's pace of catching up with more developed EU-15 countries clearly slowed down in 2011–2017. While we have narrowed by 14 p.p. the development gap with the EU-15 during the first six years of our membership in the Union (2004–2010), our development gap decreased by only 9 p.p. during the following seven years.

Socio-Economic Development and the Standard of Living

The basic indicator of the level of socio-economic development and standard of living is national income or product per inhabitant. Figure 1.1 shows the ranking of EU-28 countries in terms of GDP per capita at PPP in 2004 and 2017. This allows for a comparison of the current level of real income in individual countries, as well as their growth since the EU enlargement. The data on GDP per capita in 2017 are preliminary estimates. For Central and Eastern European countries, the values of GDP per capita (as well as the values of total GDP) at PPP are much higher than analogue values calculated at CER.

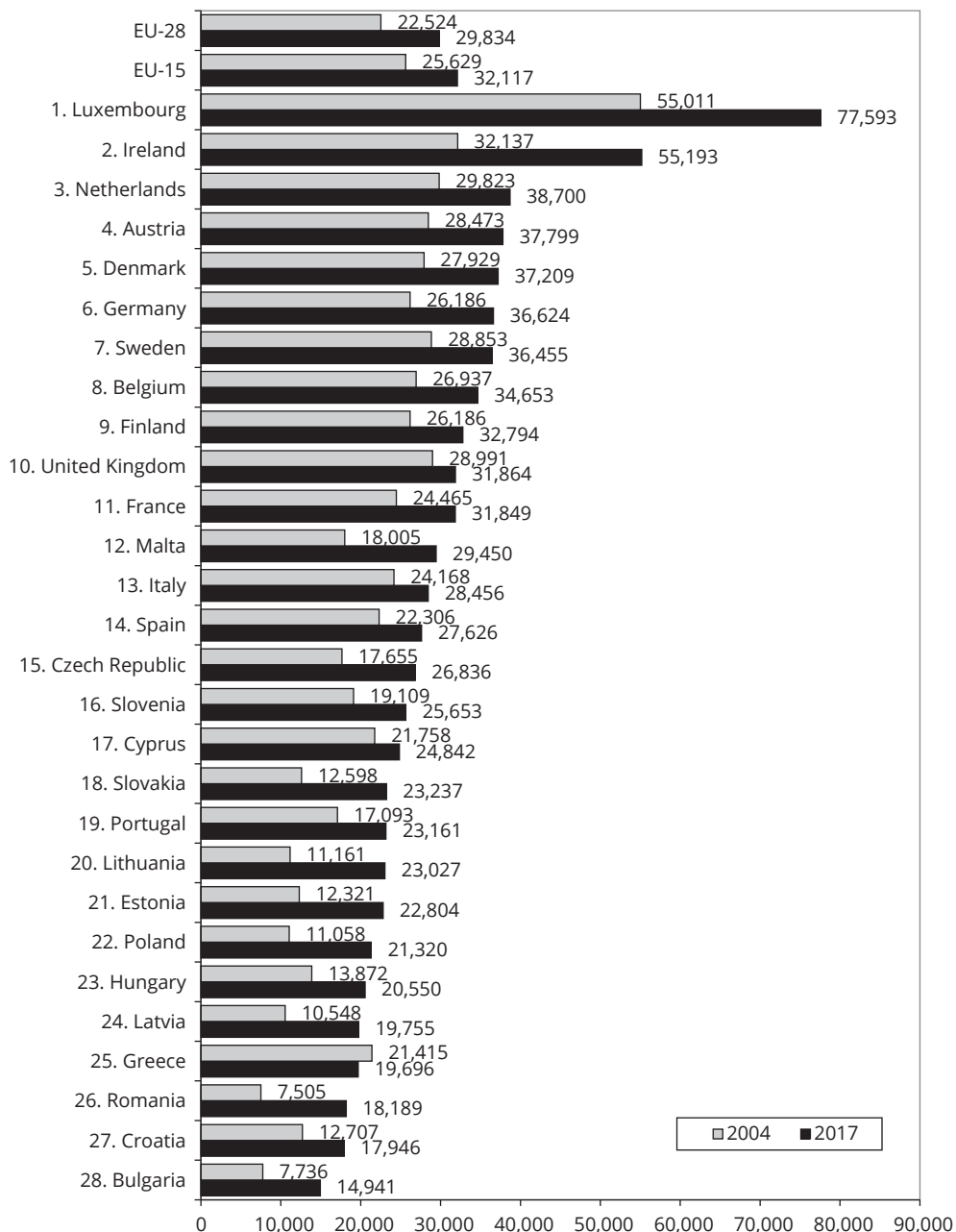
According to our calculations, based on preliminary data published by the European Commission [EC, 2017], the average GDP per capita in 2017 in the countries of the enlarged EU amounted to 29,834 EUR in PPP terms. In the euro area (EA19) it has amounted to 31,606 EUR, and 32,117 EUR in the countries forming the European Union before its enlargement.

The levels of income in the EU countries are very differentiated. The leader in terms of GDP per capita is Luxembourg (77,593 EUR)⁵. The following countries also have high income per capita (from 31,000 to 56,000 EUR): Ireland, the Netherlands, Austria, Denmark, Germany, Sweden, Belgium, Finland, the United Kingdom and France. Malta, Italy and Spain have slightly lower income per capita (between 27,000 and 30,000 EUR). Less developed countries of Western Europe, such as Cyprus, Portugal and Greece, have much lower incomes (19,000–25,000 EUR). In Central and Eastern Europe, GDP per capita ranges from 14,941 in Bulgaria to 26,836 EUR in the Czech Republic.

Against this background, Poland's position is not impressive. With the value of GDP per capita at PPP equal to 21,320 EUR in 2017, Poland is in the lower part of the ranking of the enlarged EU countries, ahead of Hungary, Latvia, Greece, Romania, Croatia and Bulgaria.

⁵ The exceptionally high value of GDP per capita in Luxembourg does not accurately reflect the difference in the standard of living in this country in relation to other Western European countries; results recorded by Luxembourg are mainly owed to the high income earned by international corporations, banks and financial institutions located in this country.

Figure 1.1. The ranking of the EU-28 countries according to GDP per capita at PPP (in EUR)



Note: The ranking has been created in accordance with preliminary data of GDP at PPP for 2017. The data for 2004 illustrate the change noted in the period succeeding the enlargement of the EU. The data on GDP per capita were calculated by dividing the value of total GDP (from the European Commission) by the total population (from IMF data for individual countries and the European Commission for groups of countries).

Source: Own calculations based on data from the European Commission [EC, 2017] and the International Monetary Fund [IMF, 2018].

The GDP per capita is only an approximate indicator of the standard of living in a given country, as the standard of living of residents is also dependent on the distribution of income and wealth possessed. International statistics unfortunately contain a minuscule amount of data on household financial and tangible assets, and data concerning inequalities in the distribution of income, especially the incidence of poverty, are incomplete and often outdated. Poverty rate estimates provided by the World Bank [World Bank, 2017], based on a percentage of the population below the absolute poverty line of 1.90 USD or 3.10 USD per day, indicate that the incidence of absolute poverty is low in all the EU countries. However, a significant part of the population in most CEE countries maintains a level of income and consumption that is recognized as poverty in a given country. According to the report of the Organization for Economic Co-operation and Development (OECD) based on 2010 data concerning income distribution and poverty, the relative poverty rate in Poland (the percentage of population with income lower than half of the median income in the country) was around 11%. This ratio was close to the OECD average, but almost twice as high as in the Czech Republic and Denmark [OECD, 2013].

A common view in Poland is that a relatively high rate of economic growth, measured by changes in the level of real GDP, does not fully translate into increasing the well-being of an average citizen. If this view is correct, one of the reasons that may justify this perception is a high dispersion in the distribution of income and wealth.

The Gini coefficient is a conventional measure of inequality in the distribution of income, which expresses the general level of concentration of household incomes. Poland is a country with relatively large differences in income levels. The Gini coefficient in Poland was equal to 32.1 in 2014 [World Bank, 2017]⁶.

A concise indicator of social development and the standard of living is the Human Development Index (HDI), published by the United Nations Development Program (UNDP). It is the geometric mean of three indices expressing: Gross National Income (GNI) per capita, the life expectancy, and education level. It reflects the three main dimensions of social development: a healthy and long life, fundamental knowledge and a decent standard of living. The indicator ranges from 0 to 1 (higher values indicating a higher level of development).

Based on the latest UNDP report and data for 2015, the leaders of the world ranking in terms of HDI are: Norway, Australia, Switzerland, Germany, Denmark, Singapore, the Netherlands, Ireland, Iceland, Canada and the USA [UNDP, 2016]. The highest position by the CEE countries in this ranking is held by Slovenia (25th), followed by:

⁶ Detailed data on income and poverty differentiation can be found in Chapter 3 of the *Report on Competitiveness*.

the Czech Republic, Estonia, Poland, Lithuania, Slovakia, Hungary, Latvia, Croatia, Romania and Bulgaria (56th). Poland is slightly above the average for Central and Eastern Europe in terms of the value of this indicator (HDI for Poland is equal to 0.855 compared to the average for 11 CEE countries – 0.843), but in this respect it is only 36th in the world, among 188 classified nations. Poland ranks 20th among the EU countries in terms of the level of this indicator, ahead of Lithuania, Slovakia, Portugal, Hungary, Latvia, Croatia, Romania and Bulgaria.

The value of the HDI for Poland has consistently increased, indicating a continuity of socio-economic development. Poland, as compared to 2008, has advanced in this ranking by four positions, overtaking, among others, Portugal (these changes have taken place within the last four years). However, our country's position in the HDI world ranking still remains quite far down the list. Its spot in this ranking is also low in terms of individual components of the HDI indicator, i.e. income level, health status, and the duration of education.

A Comparative Assessment of Macroeconomic Performance

A general assessment of the current condition of the Polish economy will be based on a comparative analysis of five commonly used macroeconomic indicators: a) economic growth rate, b) unemployment rate, c) inflation rate, d) general government balance, e) current account balance. The tool that is used in this analysis is the pentagon of macroeconomic performance. It illustrates the degree of meeting five basic macroeconomic objectives, which are: a) economic growth, b) full employment, c) internal equilibrium (no inflation), d) public finance equilibrium, e) external equilibrium. The degree of achieving the above objectives is expressed by the five variables on the axes of the pentagons.

The tips of pentagons expressing the maximum or minimum values of each variable are treated as desirable targets, although they may sometimes be debatable. For example, a large current account surplus or a budget surplus may not be the optimal outcomes, as well as zero inflation or zero unemployment. Another problem is interdependence, especially conflicts between various macroeconomic targets, e.g. the fact that low unemployment (according to the Phillips curve) is often accompanied by high inflation and vice versa. The relative importance of individual criteria (e.g., whether low inflation is as important as low unemployment) is a separate issue. All these reservations must be taken into account when interpreting the charts.

When comparing the pentagons illustrating the economic performance of various countries in a given year, we take into account the marked surface of a pentagon, as well as its shape. A larger surface of the pentagon indicates a better general performance of the economy, and a more symmetric shape indicates a more balanced growth. Of course, such an assessment is based solely on the five aforementioned macroeconomic criteria describing the current condition of the economy. It does not include information on the size of a given economy, its economic potential and development prospects. It does not indicate the directions of changes in a country's economic situation in the subsequent year either, although a good current condition of the economy increases the chances of sustaining it in the near future as well. Nevertheless, the analyzes based on this method should be interpreted with caution.

These categories will now be used to compare the general performance of the Polish economy with the situation of three other CEE countries: Hungary, the Czech Republic and Slovakia and five Western European countries: Germany, France, Italy, Spain and Sweden. The data concerning five indicators describing the overall macroeconomic performance of Poland and the reference countries in 2017 are provided in Table 1.5. Most of the data are preliminary estimates that may be subject to further corrections and revisions. Figure 1.2 shows the data in the form of pentagons in order to facilitate comparative analysis.

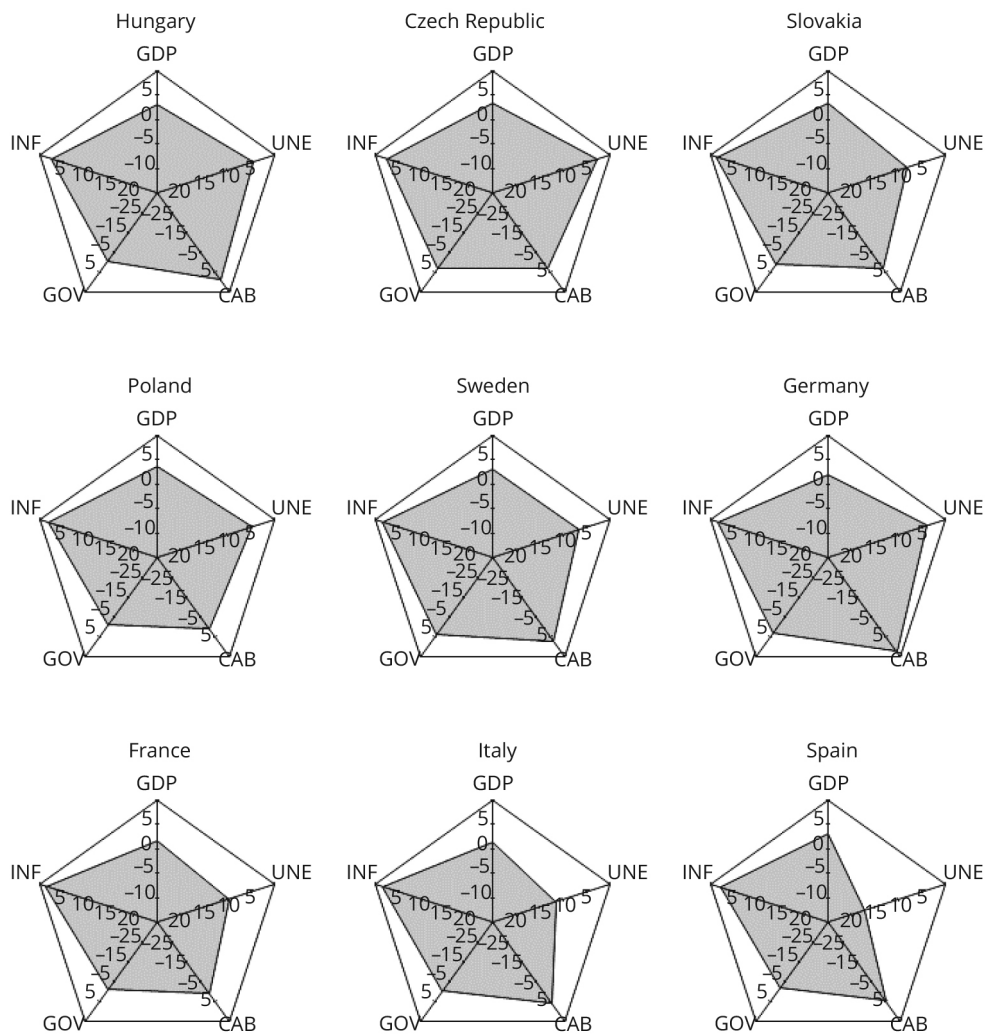
Table 1.5. Main macroeconomic indicators in Poland and the selected EU countries in 2017

Country	GDP growth	Inflation	Unemployment	General government balance	Current account balance
	%	%	%	% of GDP	% of GDP
Czech Republic	3.5	2.3	2.8	0.5	0.6
France	1.6	1.2	9.5	-3.0	-1.1
Spain	3.1	2.0	17.1	-3.2	1.9
Germany	2.1	1.6	3.8	0.7	8.1
Poland	3.8	1.9	4.8	-2.7	-1.0
Slovakia	3.3	1.2	8.1	-1.2	0.3
Sweden	3.1	1.6	6.6	1.0	3.9
Hungary	3.2	2.5	4.4	-2.6	4.8
Italy	1.5	1.4	11.4	-2.2	2.8

Note: All the data are preliminary estimates. Inflation rate is the growth rate of the prices of consumer goods and services (annual average). In addition, the data on economic growth for Poland and other CEE countries are slightly different from those in Table 1.3, due to different data sources. According to Table 1.3, the GDP growth rate in Poland was equal to 4.2% in 2017.

Source: IMF [2018].

Figure 1.2. The macroeconomic performance of Poland and selected other EU countries in 2017



GDP – GDP growth rate (%)

UNE – unemployment rate (%)

INF – inflation rate (%)

GOV – general government balance (% of GDP)

CAB – current account balance (% of GDP)

Source: Own elaboration based on data from Table 1.5.

The pentagon representing the general condition of the Polish economy in 2017 is, in terms of its area and shape, relatively similar to pentagons illustrating the economic performance in other analyzed CEE countries, i.e. Hungary, the Czech Republic and Slovakia. This means that in terms of the analyzed five indicators, the overall performance of these economies was more or less similar. All four countries recorded last year an increase in output at the level of at least 3%, along with a decline in unemployment, although its level (especially in Slovakia) is still quite high (over 8%). Inflation has been almost completely suppressed in all four countries. The budget deficit in Poland last year was higher than in Hungary and Slovakia (exception being the Czech Republic, which showed a small budget surplus), but did not exceed 3% of GDP. Poland has recorded a small deficit in the current account, while the Czech Republic, Slovakia and Hungary managed to work out a surplus, which, in Hungary's case, amounted to nearly 5% of GDP.

The shape of the pentagon indicating the overall condition of the Polish economy is also similar to the pentagons for Sweden and Germany, but its area is smaller (especially compared to Germany, which had very good record of current account balance). This means that, as far as the five macroeconomic criteria are concerned, the results achieved by the Polish economy in 2017 were generally worse. The GDP growth rate in Poland was much higher than in Germany, but the latter outperformed Poland in terms of all other indicators. Compared to Sweden, the Polish economy grew at a pace that was faster by 0.7 p.p. and had a lower unemployment rate, but Sweden recorded a budget surplus and a significant current account surplus.

The shape of the pentagon for Poland is also somewhat similar to that for France, but its area is much larger. This implies that in terms of the five basic macroeconomic indicators, the current performance of the Polish economy in 2017 was much better compared to France. Along with high unemployment, the main weakness of the French economy is a very slow increase in output. As for the other three macroeconomic indicators, the results achieved by both countries last year were roughly comparable.

Poland continued to perform much better economically than Spain, which still records very high unemployment, large budget deficit and huge public debt, amid coming out of a long-term recession. Much the same can be said about the general comparative macroeconomic performance of Poland and Italy, where the economy is still stagnant, with low output growth, high unemployment and huge public debt.

The overall performance of the Polish economy in 2017 was, on average, better in comparison to the previous year, given the five core macroeconomic indicators presented here [IMF, 2018]. The GDP growth was over 1 p.p. higher than in 2016, and the unemployment rate continued to decrease (from 6.2% in 2016 to 4.8% in 2017). The budget deficit was below 3% of GDP, current account showed a small deficit

in both years, while inflation increased (from deflation of 0.6% in 2016 to a positive price increase of 1.9% in 2017).

Summing up, Poland's results in 2017, much as in the previous year, were relatively good in the context of the overall economic situation in Europe, in terms of the five main macroeconomic indicators characterizing the general performance of the economy.

Nevertheless, Poland's unquestionable achievements recorded throughout the entire period of systemic transformation and its pretty good macroeconomic performance in recent years should not overshadow numerous unsolved economic and social problems, as well as serious threats to the future development faced by the Polish economy⁷.

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⁷ More information on these threats can be found in Chapter 6 of this *Report on Competitiveness*.

Convergence of Income Levels Between East-Central and Western Europe

Mariusz Próchniak

Introduction

The purpose of this chapter is to analyze the income convergence of eleven Central and Eastern European countries that joined the European Union in 2004, 2007 and 2013 i.e., Poland, Bulgaria, Croatia, the Czech Republic, Estonia, Lithuania, Latvia, Romania, Slovakia, Slovenia and Hungary (EU-11). The development trajectories of these countries are analyzed in relation to the former fifteen EU member states (EU-15). The study is a continuation of research on this subject, presented in previous versions of the *Competitiveness Report* [see e.g., Matkowski et al., 2016a; Próchniak, 2017]. The 2013 edition of the report also includes an analysis of regional convergence covering the regions of all the EU countries [Matkowski, Próchniak, 2013].

Theory

It is important to point out that models of economic growth constitute the theoretical framework for the analysis of convergence in the level of income. Neoclassical models of economic growth [e.g., Solow, 1956; Mankiw et al., 1992] confirm the existence of conditional convergence of the β type. It occurs when less developed countries (with lower GDP per capita) show a faster rate of economic growth than more developed ones. Convergence is conditional because it only occurs when all countries tend to the same long-term equilibrium (steady state). The β convergence hypothesis can be explained using the Solow's model [see e.g., Rapacki, Próchniak, 2012; Próchniak, Witkowski, 2012].

In the Solow's model, the basic equation describing the dynamics of the economy tending to a steady state takes the following form:

$$\dot{k} = sf(k) - (n+a+\delta)k, \quad (2.1)$$

where: k – capital per unit of effective labor in year t , \dot{k} – change of k in a time unit (from a mathematical point of view it is a derivative of k with respect to time), s – savings rate, $f(k)$ – production function (expressed per unit of effective labor), n – population growth rate, a – rate of exogenous technical progress, δ – capital depreciation rate. In the analysis of the Solow's model with technical progress, the symbols k and $f(k)$ mean, respectively, capital and output per unit of effective labor, where effective labor is a product of the level of technology and labor input.

If we assume that the production function is Cobb-Douglas' one with the form $f(k) = k^\alpha$ ($0 < \alpha < 1$), equation (2.1) is transformed to:

$$\dot{k} = sk^{\alpha-1} - (n+a+\delta)k. \quad (2.2)$$

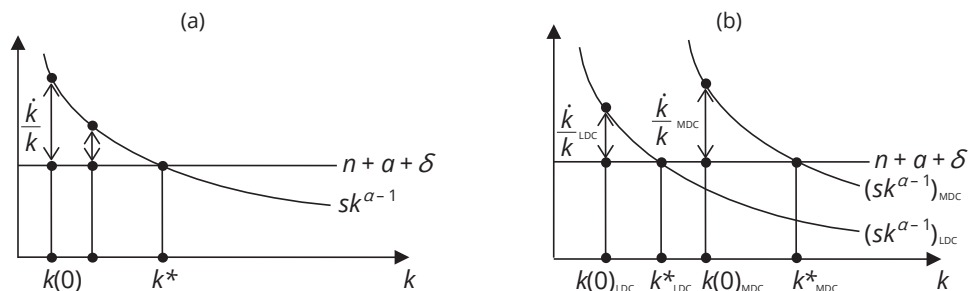
After dividing the equation (2.2) by k , we obtain a formula for the growth rate of capital per unit of effective labor during the transition period towards the steady state:

$$\frac{\dot{k}}{k} = sk^{\alpha-1} - (n+a+\delta). \quad (2.3)$$

Because output is directly proportional to capital, the analogous equation characterizes the dynamics of GDP per unit of effective labor.

The best way to illustrate the convergence hypothesis is to graphically analyze the equation (2.3). This is shown in Figure 2.1.

Figure 2.1. Economic Growth in Solow's Model



LDC – less developed country; MDC – more developed country.

Source: Own study.

The rate of growth is equal to the vertical distance between the $sk^{\alpha-1}$ curve and $n + a + \delta$ straight line. As one can see, the economy, which starts with the initial capital level $k(0)$ and reaches the capital level in the long-term equilibrium k^* , shows a decreasing rate of economic growth. Convergence is conditional because it occurs only when both economies tend to the same steady-state.

In order to illustrate the conditional character of the convergence phenomenon, let us consider two countries: more developed country (MDC) and less developed country (LDC), in which the savings rates are different. Because the savings rate in a more developed country is higher, the capital level in a steady-state is also greater. This is illustrated in part (b) of Figure 2.1. Although a more developed country is starting from a higher capital level, it shows faster economic growth because it is moving toward a different steady-state. In this situation, convergence will not occur.

An important goal of empirical research is to estimate the value of parameter β , which measures the speed of the convergence process to a steady state, according to the following equation:

$$\frac{\dot{y}}{y} = \beta(\ln y^* - \ln y), \quad (2.4)$$

where: y – output per unit of effective labor in year t , \dot{y} – change of y in time unit (derivative with respect to time), y^* – output per unit of effective labor in steady state.

The parameter β informs about the distance which is covered by the economy tending towards the steady state during one period (year). For example, when $\beta = 0.02$, the economy covers 2% of the distance each year.

Another type of catching-up is σ convergence. It occurs when the income differentiation between countries decreases over time. The income differentiation can be measured by the standard deviation, variance or coefficient of variation of GDP per capita levels between countries or regions.

From a theoretical perspective, the σ convergence is a necessary but insufficient condition of β convergence. Therefore, it is possible (though unlikely) that the differences in the level of income between economies will grow over time and at the same time the less developed country will show a faster rate of economic growth. It happens when a less developed country reaches such a fast rate of economic growth that it outstrips the more developed country in terms of income level and the differences in the development level in the final period will be higher than in the initial one.

Method

To verify the occurrence of absolute β convergence, we estimate the following regression equation:

$$\frac{1}{T} \ln \frac{y_T}{y_0} = \alpha_0 + \alpha_1 \ln y_0 + \varepsilon_t, \quad (2.5)$$

where y_T and y_0 are income per capita in the final and initial year, while ε_t is a random factor. Thus, the average annual growth rate of real GDP per capita according to the purchasing power parity (PPP) between the period T and 0 is the explained variable, while natural logarithm of GDP per capita in the initial period is the explanatory variable. If the α_1 parameter is negative and statistically significant (in the empirical analysis we assumed a significance level of 10%), the β convergence exists. In this situation, we can calculate the value of the coefficient β , measuring the speed of convergence¹:

$$\beta = -\frac{1}{T} \ln(1 + \alpha_1 T). \quad (2.6)$$

In order to verify the occurrence of σ convergence, we estimate the trend line for differentiation of income levels between countries:

$$sd(\ln y_t) = \alpha_0 + \alpha_1 t + \varepsilon_t, \quad (2.7)$$

where sd is the standard deviation, while t – time ($t = 1, \dots, 25$ for the period 1993–2017). Thus, the explained variable is the standard deviation of natural logarithms of GDP per capita levels between countries, while time is the explanatory variable. If the α_1 parameter is negative and statistically significant, σ convergence exists.

¹ Barro and Sala-i-Martin [2003, p. 467], when analyzing β convergence based on the neoclassical model, derive an equation showing the relationship between the average rate of economic growth and the initial level of income:

$$\left(\frac{1}{T}\right) \ln(y_{iT} / y_{i0}) = a - \left[\frac{1 - e^{-\beta T}}{T}\right] \ln(y_{i0}) + w_{i0,T},$$

where y_{iT} and y_{i0} – GDP per capita in the i country in the final and initial year, T – time period, β – convergence rate, a – constant, $w_{i0,T}$ – random factor. The coefficient at the initial income level i.e., $-\left[\frac{1 - e^{-\beta T}}{T}\right]$ equals the α_1 parameter in the formula (2.5). Thus, from the equation $\alpha_1 = -\left[\frac{1 - e^{-\beta T}}{T}\right]$ we obtain the formula (2.6). For a small T , the parameter's estimate in the regression equation α_1 will be very close to the coefficient β , because when T tends to zero the expression $(1 - e^{-\beta T})/T$ tends to β .

Empirical Evidence

The study covers the period 1993–2017. All calculations were also made for three sub-periods: 1993–2000, 2000–2008 and 2008–2017, which allows analyzing the stability in time of the catching-up process. The calculations use time series of real GDP per capita according to the purchasing power parity (in USD) obtained from the International Monetary Fund data [IMF, 2018]. When converting nominal GDP per capita according to purchasing power parities (PPP), in current prices, to real GDP per capita according to PPP (constant prices), we used a GDP deflator for the USA.

The results of the β convergence analysis of the EU-11 to the EU-15 countries are presented in Table 2.1 and Figure 2.2. Convergence is analyzed both between the twenty-six EU countries and between two regions covering the EU-11 and EU-15 area. Aggregated data for two areas: EU-11 and EU-15 are weighted averages with variable weights reflecting the population number of a given country included in a specific group in a given year.

Table 2.1. Results of estimation of regression equations describing convergence β

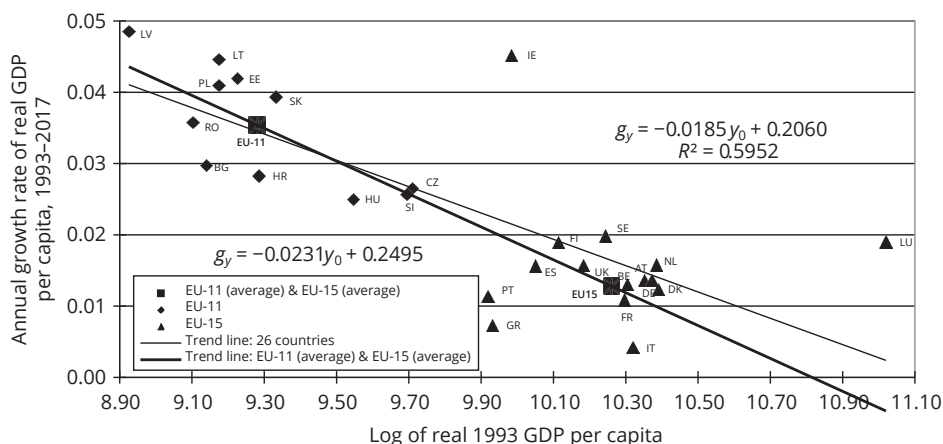
Time period	α_0	α_1	<i>t</i> -stat. (α_0)	<i>t</i> -stat. (α_1)	<i>p</i> -value (α_0)	<i>p</i> -value (α_1)	R^2	β convergence	β
26 countries of enlarged EU									
1993–2017	0.2060	-0.0185	6.71	-5.94	0.000	0.000	0.5952	yes	0.0186
1993–2000	0.0719	-0.0039	1.23	-0.65	0.230	0.520	0.0175	no	-
2000–2008	0.4214	-0.0385	9.27	-8.55	0.000	0.000	0.7529	yes	0.0392
2008–2017	0.1351	-0.0123	1.93	-1.82	0.065	0.081	0.1212	yes	0.0124
2 regions (EU-11 and EU-15)									
1993–2017	0.2495	-0.0231	.	.	.	.	1.0000	yes	0.0233
1993–2000	0.1431	-0.0115	.	.	.	.	1.0000	yes	0.0115
2000–2008	0.4469	-0.0416	.	.	.	.	1.0000	yes	0.0424
2008–2017	0.3224	-0.0303	.	.	.	.	1.0000	yes	0.0308

Source: Own calculations.

Obtained results confirm the existence of clear income convergence of the EU-11 to the EU-15 countries through the whole 1993–2017 period. Convergence occurred both among twenty-six countries of the studied group and between two areas of the EU-11 and the EU-15. Countries characterized by lower income levels in 1993 showed – on average – a faster rate of economic growth in 1993–2017 than countries initially better developed. As the less developed countries' group in 1993 consisted of the

Central and Eastern Europe countries, these results confirm the clear convergence of the EU-11 countries to the average level of income in Western Europe.

Figure 2.2. Relationship between the GDP per capita growth rate in 1993–2017 and the level of GDP per capita at the beginning of the period



Source: Own calculations.

The analysis of Figure 2.2 shows that the distribution of points representing individual countries fits quite well the negatively sloped trend line. This results in a relatively high value of the determination coefficient at the level close to 60%. Thus, differences in the initial income level allow one to explain almost $\frac{2}{3}$ of the economic growth rate differentiation in 1993–2017.

When analyzing the points representing individual countries, one can compare the situation of individual countries and, in respect to this perspective, assess the changes in their competitive position through the whole period. The fastest rate of economic growth among the countries of the studied group from Central and Eastern Europe was recorded in the Baltic states and Poland. Latvia, Lithuania, Estonia and Poland showed economic growth in the years 1993–2017 exceeding 4% annually starting with a relatively low-income level. Slovakia also noticed a rate of economic growth of around 4%, but its initial level of income was slightly higher. Results obtained by these countries strengthened the convergence tendency in the whole group. As it can be seen, the situation of Poland compared to other countries is favorable. Poland ranked fourth among the eleven countries of Central and Eastern Europe in terms of the average rate of economic growth in 1993–2017, which was one of the factors behind strengthening the competitive position of the Polish economy.

Aggregated data for two areas: EU-11 and EU-15 also confirm convergence in 1993–2017. In Figure 2.2, the points representing these two areas are marked with squares. The EU-11 group as a whole showed faster economic growth than the EU-15 with a much lower initial level of income.

Coefficients β , which measure the speed of the convergence process, amount to 1.86% for twenty-six countries and 2.33% for two areas. They allow one to estimate the time needed to reduce the development gap between the studied countries. Namely, with the average economic growth rate observed during 1993–2017, the countries of the extended EU will need about 30–35 years to halve the distance separating them from the common hypothetical steady-state (this result was calculated as follows: $-\ln(0.5)/0.0186 = 37.3$ years and $-\ln(0.5)/0.0233 = 29.7$ years). The above results show a slow convergence of the EU-11 countries to Western Europe. Based on these estimates, it is difficult to expect a quick equalization of the income levels between Poland and other countries of Central and Eastern Europe as well as Western Europe in the medium term.

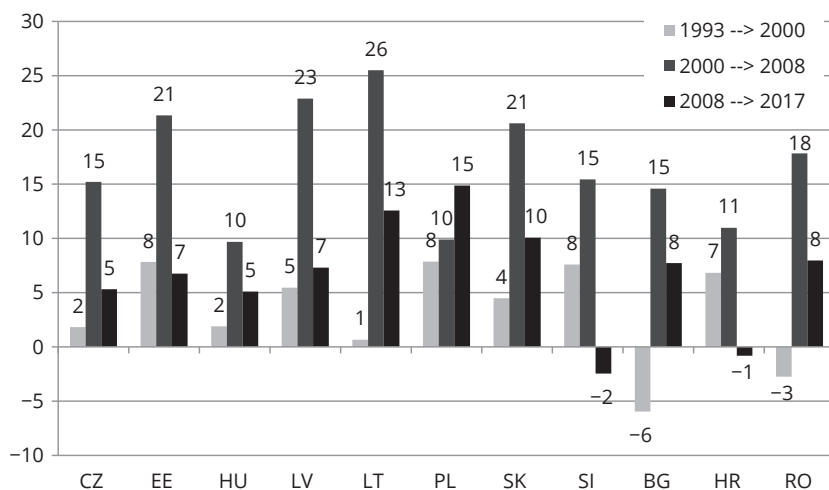
It is worth looking at the stability of the convergence processes over time. It turns out that in the separate sub-periods the speed of convergence was very diversified. High instability of the convergence pace in the researched countries was caused, among others, by global crisis. For the twenty-six EU countries, in the years 1993–2000, there was no statistically significant reduction in the income gap between the EU-11 countries and the EU-15 (in the average terms for the whole group). For years 1993–2000, the slope of the trend line is negative but not statistically significant. Such model's estimation results show de facto lack of convergence, despite the negative slope of the trend line. A very strong acceleration of the convergence rate occurred in 2000–2008, which had undoubtedly its source in the EU enlargement. A clear tendency towards convergence during the early years of the first decade of the 21st century was weakened significantly after 2008. This was largely due to the global crisis in this period.

The presented β convergence results are averaged outcomes for the entire region. As it can be seen in Figure 2.2, individual countries of Central and Eastern Europe showed different dynamics of economic growth and a different degree of convergence to Western Europe. It is worth analyzing what the convergence of the particular EU-11 countries with respect to the EU-15 in separated sub-periods was.

Figure 2.3 shows a decrease in income gap (in percentage points) of a given EU-11 country in relation to the EU-15 in the years 1993–2000, 2000–2008 and 2008–2017. The data presented in the figure confirm the β convergence analysis conclusions. Namely, for all the EU-11 countries, except Poland, the fastest closing of the income gap in relation to Western Europe occurred in 2000–2008. For the three Baltic states and Slovakia, the income gap in this period decreased by over 20 p.p., and for the

Czech Republic, Slovenia, Bulgaria and Romania – by 15–18 p.p. Poland was the only country that improved the most its relative level of development only in recent years. While in the period 1993–2000 and 2000–2008 our country reduced the income gap in relation to Western Europe by 8 and 10 p.p. respectively, in the years 2008–2017 this process accelerated and Poland managed to reduce the income gap by 15 p.p. It can be expected that in the case of Poland, an important role in accelerating the pace of convergence after the EU enlargement was played by the European funds that increased the competitiveness of Poland’s economy. Poland was the largest beneficiary of the EU funds under the 2007–2013 budget. The stream of money transferred by the Union under various support programs positively influenced the growth of the Polish economy from the demand and supply side, thanks to which Poland achieved relatively good results in terms of economic growth in recent years (e.g., it was the only EU country that avoided the recession during the last global crisis). The EU budget for 2014–2020, which foresees the continuation of a large inflow of structural funds to the new member states, should be one of the factors conducive to the maintained pace of Poland’s convergence to the Western Europe in the coming years.

Figure 2.3. Extent of closing the income gap by the EU-11 countries compared to the EU-15 in three consecutive subperiods^a



^a Changes are expressed in percentage points; in each year 100 represents the level of GDP per capita according to PPP in the EU-15.

Source: Own calculations based on IMF [2018].

Convergence σ of the Central and Eastern European countries to Western Europe is measured by changes in the standard deviation of GDP per capita natural logarithms between the twenty-six EU countries, as well as between two areas of the EU-11 and the

EU-15. The results of the trend line estimation for standard deviations are presented in Table 2.2, and Figure 2.4 contains a graphical presentation of the results.

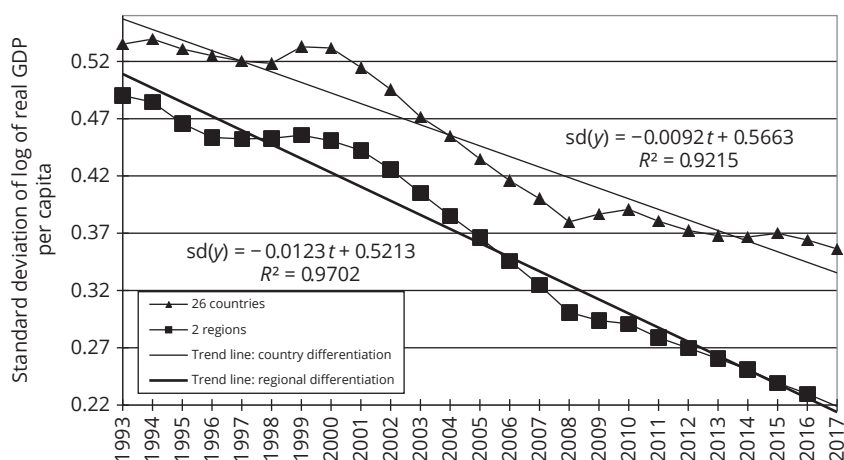
The data contained in Table 2.2 show that in the scale of the entire period there was a convergence of σ type both among the twenty-six EU countries and between the EU-11 and the EU-15. The slopes of both estimated trend lines are negative and statistically significant at very high significance levels (as reported by p -values equal to 0.000). High values of determination coefficients (over 90%) show a very good fit of empirical points to the trend line.

Table 2.2. Regression equations estimation results describing σ -convergence

Period	α_0	α_1	t -stat. (α_0)	t -stat. (α_1)	p -value (α_0)	p -value (α_1)	R^2	σ -convergence
26 countries of the enlarged European Union								
1993–2017	0.5663	-0.0092	67.75	-16.43	0.000	0.000	0.9215	yes
1993–2000	0.5345	-0.0012	93.74	-1.04	0.000	0.337	0.1538	no
2000–2008	0.5511	-0.0191	389.92	-76.15	0.000	0.000	0.9988	yes
2008–2017	0.3909	-0.0032	109.49	-5.48	0.000	0.001	0.7896	yes
2 regions (EU-11 and EU-15)								
1993–2017	0.5213	-0.0123	78.03	-27.37	0.000	0.000	0.9702	yes
1993–2000	0.4879	-0.0055	71.96	-4.09	0.000	0.006	0.7356	yes
2000–2008	0.4789	-0.0192	140.71	-31.73	0.000	0.000	0.9931	yes
2008–2017	0.3146	-0.0093	165.44	-30.41	0.000	0.000	0.9914	yes

Source: Own calculations.

Figure 2.4. Standard deviation of GDP per capita in 1993–2017



Source: Own calculations.

Figure 2.4 shows the tendency of standard deviation of log GDP per capita levels. As it can be seen, the differentiation of incomes between new and old EU countries showed, in general, a downward trend. The most visible and systematic decrease in income differences occurred in the second part of the analyzed period i.e., from 2000. In 2009 and 2010 – as a result of the economic crisis and dropping GDP growth rate in many hitherto fast developing countries – income differences among twenty-six countries of the studied group increased, although the data averaged for two areas do not confirm this.

Scientific Discussion

There is a lot of empirical research on the phenomenon of convergence and it is impossible to list all of it here. A detailed review of the latest empirical research includes the article by Matkowski, Próchniak and Rapacki [2016b], while the books by Malaga [2004], Michałek, Siwiński and Socha [2007], Liberda [2009], Batóg [2010] and Józwik [2017] are entirely or largely devoted to the phenomenon of convergence in the countries of the European Union or the Organization for Economic Co-operation and Development (OECD).

Comparing the obtained results with the literature, it should be emphasized that in recent years studies suggesting the possibility of divergence in Europe (both at the national and regional level) are increasingly frequent. For example, Mucha [2012] suggests that for some euro area countries, having a single currency may be a source of many problems and the emergence of economic divergence in relation to other members of the Economic and Monetary Union. Monfort, Cuestas and Ordóñez [2013] analyze the real convergence of GDP per worker in twenty-three EU countries in 1980–2009 (Western European countries) and 1990–2009 (Central and Eastern European countries), showing that – using the club convergence research techniques – there are strong reasons for existence of per capita income divergence in the EU as a whole, however, for example, the countries of Central and Eastern Europe (except for the Czech Republic but with Greece) form a group showing convergence. Borsi and Metiu [2013] analyze the real convergence of the twenty-seven EU countries in the years 1970–2010, reaching the conclusion that there is no convergence of per capita income levels in the whole group and that there is convergence in the subgroups of countries that tend to different steady-states. Stañisić [2012] analyzes β convergence in the EU-25 and within two groups of countries: EU-15 and EU-10, confirming the existence of β convergence in the EU-25 (which means the convergence of the new EU member states to Western Europe) and denying the convergence within the EU-15 and the

EU-10. The author of the quoted study also claims that during the recent crisis income differences between the EU-25 countries increased, but the scale and time range of this increase were limited and did not affect the long-term convergence path, which is a conclusion very similar to the results of our study.

It is clear therefore that the convergence process is not an automatic phenomenon. Despite the strong tendency of decreasing income differences between Central and Eastern Europe and Western Europe in recent years, there is no guarantee that this situation will persist in the future (as evidenced by the time instability of our results and more frequent references in the literature about the possibility of divergence tendencies in Europe). An extremely important task for policy makers is therefore to carry out activities to maintain the current long-term trends of economic growth in Europe, characterized by reducing the income differences between the eastern and western areas of our continent.

Conclusions

In the group of twenty-six countries of the enlarged European Union, income convergence occurs both in terms of β and σ convergence. The rate of economic growth in 1993–2017 was negatively dependent on the initial level of GDP per capita. New EU member states from Central and Eastern Europe achieved a faster rate of economic growth than Western European countries, although the initial level of GDP per capita in Central and Eastern European countries was much lower. Differences in the level of income decreased, especially in the years 2000–2008, although they are still very large.

The global economic and financial crisis has weakened the convergence process in the group of the EU countries, causing even temporary divergence tendencies. Therefore, one cannot expect unconditionally the reduction in the differences in the competitiveness measured by the standard of living of the societies of the old and the new EU countries in the short-term perspective. Acceleration of the convergence process will depend, among others, on properly conducted economic policy aimed at reducing differences in the level of development between Central and Eastern Europe and Western Europe.

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Income Inequality and Poverty in Poland in 2010–2016¹ with Particular Focus on Aspects of Urbanization

Patrycja Graca-Gelert

Income inequality and poverty are two issues that are increasingly examined in social sciences. They are closely related to the concept of competitiveness. Particularly relevant for this “relationship” are those parts of the definition of competitiveness, which refer to the improvement in sustainable economic growth and the ability to improve the quality of life for society [Weresa, 2015, p. 7]. Literature provides many studies indicating a negative relationship between the level of income inequality and poverty and economic growth; low income disparities and the risk of poverty are usually associated with a high living standard.

The aim of this chapter is to show the main trends in income inequality and the risk of poverty in Poland compared with other EU countries in the years 2010–2016, including aspects of urbanization. Additionally, the study of income inequality in Poland was deepened by estimating the impact of the benefits from the “Family 500+” program on income inequality in 2016. In addition, a Gini coefficient decomposition analysis was carried out according to the place of residence in Poland in 2016.

Income Inequality and Poverty in Poland from 2010 to 2016

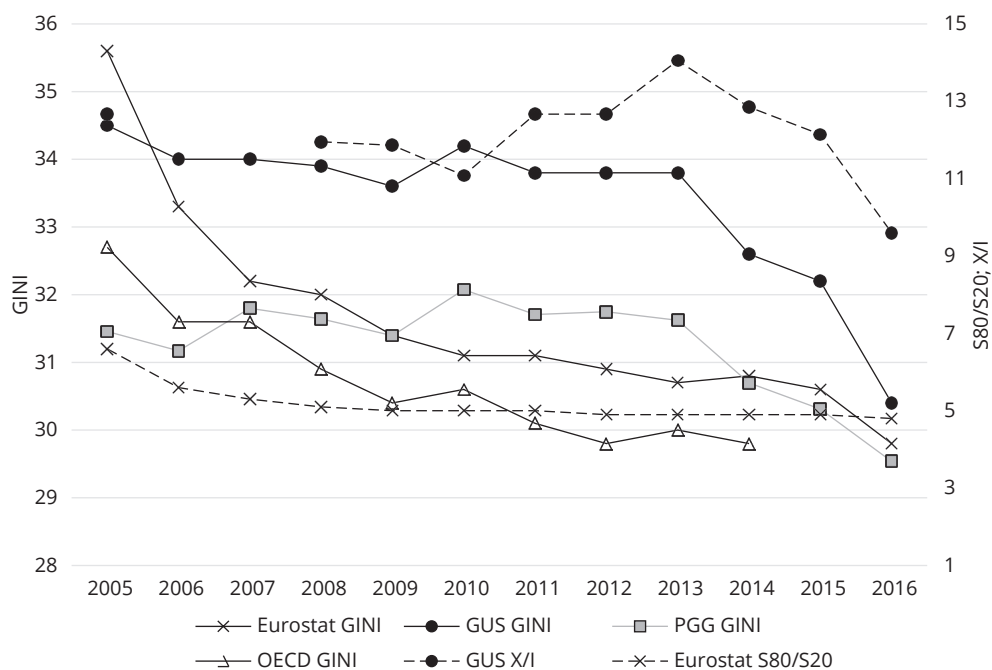
It is important to point out that the analysis of income inequality and poverty is a complex problem, and their interpretation depends to a large extent on the adopted assumptions e.g., regarding the definition of income, poverty line, equivalence scale or reference unit. The proper selection of data sources, or more precisely the methodology, which is the basis for their collection and development, is also important. These problems have been discussed many times in previous editions of the *Report on*

¹ It was not possible to take into account 2017 due to the lack of data availability.

Competitiveness, so this time I will limit myself only to signaling that the complexity of the analysis of this matter is significant and one should interpret the results with a high degree of caution.

Analyzing the time series from Figure 3.1, it can be stated that in the current decade income inequality in Poland generally showed a declining trend. Nearly all inequality measures confirm this. Only the relation of the tenth and first decile of household's disposable income distribution shows an increase by 2013 and a decrease after this period. After a more accurate interpretation of source data [GUS, 2017a, Table 6, p. 299], it turns out that this change does not result from the growing share of the richest people's income but from the declining share of the lowest decile's income. The downward trend of the Gini coefficient (GUS GINI) shows that changes occurred throughout the entire distribution resulting in a decrease in its value. Measure X/I GUS only takes into account the change at the ends of the income distribution.

Figure 3.1. Income^a inequality in Poland, 2010–2016



^a Eurostat – equalized disposable household income (modified OECD equivalence scale, with the person as the unit of reference); GUS – available per capita household income (with the household as the unit of reference), PGG GINI – equalized disposable household income (modified OECD equivalence scale; with the household as the unit of reference), OECD GINI – equalized disposable household income (square root equivalence scale; with the household as the unit of reference).

Source: Eurostat; GUS [2017a, Table 5, p. 299]; OECD; own calculations based on GUS's HBS.

Based on data from Table 3.1, it can be concluded that since 2013, the income for all socio-economic groups has shown a somewhat declining tendency. The highest level of income inequality was observed among households of farmers, while the smallest disparities characterized the group of old-age pensioners' households. Income differences among employees were closest to overall income inequality – which is explained by the fact that it is the most numerous group, with income inequality having the greatest impact on overall income disparities.

Table 3.1. Income differential^a in the socio-economic groups and according to place of residence in Poland in 2010–2016

Households	2010	2011	2012	2013	2014	2015	2016
Total	34.2	33.8	33.8	33.8	32.6	32.2	30.4
Of the employees	34.7	34.6	34.3	34.1	33.4	32.7	30.7
Of the farmers	53.3	53.9	55.9	59.9	54.4	55.3	54.1
Of the self-employed	37.5	37.3	38.2	37.4	37.8	37.3	34.6
Old-age pensioners	24.9	24.4	24.2	23.9	23.6	23.3	22.4
Disability pensioners	29.1	29.2	27.9	28.0	27.6	27.7	26.3
In cities	32.3	31.7	31.7	31.2	30.6	30.3	28.8
In rural areas	33.9	33.7	34.3	35.2	32.9	32.3	30.5

^a Household's disposable per capita income. Income inequality measured by the Gini coefficient.

Source: GUS [2017a, Table 5, p. 299].

The last two rows of Table 3.1 show data on income inequality trends in urban and rural areas. In each of the analyzed years, income disparities in rural areas exceeded income inequalities in the city, with the difference between Gini coefficients for these two categories increasing monotonically until 2013, and then decreasing. However, the available data does not allow for a deeper analysis of the inequality structure due to the place of residence. A slightly wider insight into this issue can be provided by the decomposition of the Gini coefficient. For this purpose, we will use the general method of decomposition by groups commonly used in literature [e.g., Deutsch, Silber, 1999; Bellú, Liberati, 2006; Lambert, Aronson, 1993], which can be presented as follows:

$$I_0 = I_W + I_B + I_R, \quad (1)$$

where I_0 is overall income inequality, I_W means the contribution of within-group inequalities to overall income inequality, I_B determines the contribution of between-group inequalities to overall income inequality, while I_R is the residual term, otherwise known as the interaction term or the re-ranking effect. This component shows the

extent to which overall income inequality can be explained by the overlapping of income distributions of individual groups.

The component of intra-group inequality can be presented as follows:

$$I_W = \sum_{k=1}^K P_k S_k G_k, \quad (2)$$

where K is the number of analyzed groups ($k = 1, \dots, K$), P_k is the population share of group k , S_k is the income share of group k , and G_k is income inequality in group k measured by the Gini coefficient.

The component of intergroup income inequality is calculated as the Gini coefficient of a hypothetical/fictitious income distribution, in which individual income (of persons) was replaced with the average income from the group to which they belong. To better demonstrate the interpretation of the intergroup income inequality component, the following formula of the Gini coefficient can be used:

$$G_0 = \frac{2\text{cov}[y_0, F(y_0)]}{\mu_0}, \quad (3)$$

where y_0 is income, μ_0 is the average income, and $F(y_0)$ is the cumulative distribution of total income. If in the formula (3) we replace y_0 with the appropriate average for each group (μ_k) – as explained above – then we will get the component of intergroup income inequality:

$$I_B = \frac{2\text{cov}[\mu_k, F(\mu_k)]}{\mu_0}, \quad (4)$$

The remaining part of the decomposition (1) constitutes the residual term:

$$I_R = \left(G_0 - [I_W + I_B] \right) \quad (5)$$

In some studies, on the Gini decomposition, I_B is treated as an element of net intergroup income inequality, while the sum ($I_B + I_R$) as an element of gross intergroup income inequality.

Interpretation of the residual term requires a somewhat deeper analysis. As the I_R shows the extent to which overall income inequality stems from the overlap of the distributions of income, I_R will be equal to 0 if the income distributions of individual groups do not overlap. I_R will take a positive value if income distributions overlap i.e., "if the ranking of income of particular subgroups overlaps with the ranking of income

in the total income distribution"² [Bellú, Liberati, 2006, p. 16]. When calculating the intra-group inequalities, we take into account the ranking of the income of people in individual groups, which differs from the ranking of people's income in the overall income distribution if the group distributions overlap. In this sense, the re-ranking effect occurs, moving from intra-group inequalities to overall income inequality.

Table 3.2 presents the results of the Gini coefficient decomposition due to the place of residence of households in Poland in 2016. The calculations were made using individual non-identifiable data from household budget surveys (HBS) for two different income definitions (the upper part of the table refers to disposable income according to the definition of income used by GUS to calculate the Gini coefficient on the basis of HBS) and equivalence scales (the upper part of the table refers to household incomes per capita – such income definition is used by GUS to calculate the Gini coefficient on the basis of HBS). The decomposition was performed for two different classifications of the place of residence – the class of place of residence (due to the size of the city's population, the village) and the population density of the place of residence. The DAD 4.6. software was used in this empirical study (Jean-Yves Duclos, Abdelkrim Araar and Carl Fortin, "DAD: A Software for Distributive Analysis/Analyze Distributive", MIMAP program, International Development Research Centre, Government of Canada, and CIRPÉE, Université Laval).

Regardless of the applied definition of income or the equivalence scale, the calculation results lead to very similar conclusions. First of all, the highest income inequality in 2016 occurred in cities and was the lower, the smaller the number of city residents was, while it was higher for the smallest cities and villages. As far as within-groups inequalities are concerned, the largest absolute and relative contribution in explaining overall income inequality belonged to inequalities in the countryside, due to both a large share of population and of income. Nevertheless, it turns out that within-groups inequalities explained overall income inequality to the smallest extent (around 18.5%), and the largest role – almost 48% – was played by the residual term, that is, overlapping of income distributions of households living in cities with a different number of inhabitants or in the countryside. About one third of overall income disparities in Poland in 2016 was explained by between-groups inequalities, i.e., household's income disparities regarding different places of residence.

² "The rank by subgroup incomes overlap with the rank of the total income distribution".

Table 3.2. Decomposition of the Gini coefficient due to the place of residence of households in Poland in 2016

Category		Gini coefficient	Population share	Income share	Absolute contribution	Relative contribution
disposable per capita income	500 thousand residents and more	0.314	0.149	0.207	0.010	0.032
	200–499 thousand residents	0.272	0.100	0.113	0.003	0.010
	100–199 thousand residents	0.268	0.094	0.099	0.002	0.008
	20–99 thousand residents	0.266	0.200	0.197	0.011	0.035
	Less than 20 thousand residents	0.269	0.131	0.122	0.004	0.014
	Countryside	0.302	0.326	0.263	0.026	0.085
	Within-groups inequalities	-	-	-	0.056	0.184
	Between-groups inequalities	-	-	-	0.104	0.341
	Residual term	-	-	-	0.144	0.475
	A densely populated area	0.293	0.411	0.486	0.059	0.193
	Medium-populated area	0.281	0.238	0.228	0.015	0.050
	A sparsely populated area	0.295	0.351	0.286	0.030	0.098
	Within-groups inequalities	-	-	-	0.104	0.341
	Between-groups inequalities	-	-	-	0.087	0.288
	Residual term	-	-	-	0.113	0.372
disposable income per equivalent unit	500 thousand residents and more	0.311	0.149	0.206	0.010	0.032
	200–499 thousand residents	0.264	0.100	0.111	0.003	0.010
	100–199 thousand residents	0.258	0.094	0.098	0.002	0.008
	20–99 thousand residents	0.252	0.200	0.197	0.010	0.034
	Less than 20 thousand residents	0.259	0.131	0.122	0.004	0.014
	Countryside	0.297	0.326	0.267	0.026	0.087
	Within-groups inequalities	-	-	-	0.055	0.185
	Between-groups inequalities	-	-	-	0.099	0.335
	Residual term	-	-	-	0.142	0.479
	A densely populated area	0.287	0.411	0.483	0.057	0.193
	Medium-populated area	0.270	0.238	0.228	0.015	0.050
	A sparsely populated area	0.288	0.351	0.289	0.029	0.099
	Within-groups inequalities	-	-	-	0.101	0.341
	Between-groups inequalities	-	-	-	0.084	0.283
	Residual term	-	-	-	0.111	0.376

Source: Own study based on GUS's HBS.

In the case of population density, there are no apparent differences in income inequality. Income disparities in low, medium and densely populated areas are at a similar level. Income inequality of households inhabiting low and densely populated areas was almost identical in 2016. It was slightly lower in areas with average population density. The residual term in this case also explained the largest part of overall inequality, although the significance of both between-groups and within-groups inequalities, and the re-ranking effect was much more similar to each other than in the case of the decomposition due to the residence place class.

This study also attempts to estimate the impact of the “Family 500+” program on income inequality in Poland in 2016. Estimates were made for the scenario in which the impact was demonstrated by showing the difference between actual income and income without taking into account the child support benefit. No attempt was made to estimate the impact of 500+ on income inequalities through analyzing the counterfactual income distribution, i.e. existing, if in addition to deducting the benefit, we would take into account the change in economic incentives (i.e., what income, from what sources and in what amount would be received by households if they would not receive child support benefits; we do not examine, for example, the impact of changing the professional activity of women as a result of the 500+ program introduction).

To examine the impact of the “Family 500+” program on income differential in Poland, a method by Lerman and Yitzhaki [1985] was used. The following form of the Gini coefficient is the starting point for analysis:

$$G_0 = \frac{2\text{cov}[y_0, F(y_0)]}{\mu_0}, \quad (6)$$

where G_0 is the Gini coefficient for household income, and y_0 , μ_0 and $F(y_0)$ mean respectively: household income, average household income and the cumulative distribution of overall household income. If we assume that household income can be divided into K sources of household income $y_0 = \sum_{k=1}^K y_k$, where y_1, \dots, y_k are sources of income, then formula (6) can be expressed as follows:

$$\begin{aligned} G_0 &= \frac{2\sum_{k=1}^K \text{cov}[y_k, F(y_0)]}{\mu_0} = \\ &= \sum_{k=1}^K \left(\frac{\text{cov}[y_k, F(y_0)]}{\text{cov}[y_k, F(y_k)]} \right) \left(\frac{2\text{cov}[y_k, F(y_k)]}{\mu_k} \right) \left(\frac{\mu_k}{\mu_0} \right) = \\ &= \sum_{k=1}^K R_k G_k S_k, \end{aligned} \quad (7)$$

where S_k is the share of the k -th component of total household income, G_k is the Gini coefficient for the k -th component of household income, and R_k is the Gini correlation of the k -th component and overall income. The Gini correlation takes values in the $[-1,1]$. If R_k is equal to -1 , then y_k is a decreasing function of total household income. If R_k is equal to 0 , then y_k and y_0 are independent, and when R_k is equal to 1 , then y_k is an increasing function of total household income.

It is possible to specify other components of the decomposition of the Gini coefficient [Fei et al., 1978]:

$$\sum_{k=1}^K S_k \overline{G}_k, \quad (8)$$

where \overline{G}_k is the so-called pseudo-Gini (or coefficient of concentration for the k -th component of income) and is simply the product of the Gini correlation for the k -th component of total income and the Gini coefficient for this source of income. The difference between the pseudo-Gini and the Gini coefficient for the k -th component of income is that the Gini coefficient is calculated for the k -th source of income ranked from the lowest to the highest value, while the pseudo-Gini orders the k -th component of income by ascending overall income. Both measures are therefore the same only if the ranks of the k -th component of income and total income are the same.

A comparison of the pseudo-Gini for each source of income and the Gini coefficient for total income makes it possible to directly evaluate the impact of individual income components on total income inequality. If $\overline{G}_k < G_0$, then the k -th component of income contributes necessarily to a reduction in total income inequality. If $\overline{G}_k > G_0$, then the k -th component of income leads to an increase in income inequality. If $0 < \overline{G}_k < G_0$, then the k -th component of income positively contributes to explaining income disparities, although to an extent it leads to a reduction in income inequality.

It is also important to analyze the effects of marginal changes in individual income components on total income³. If we consider an exogenous change in each household income coming from the k -th component of income equal to $e_k y_k$, where e_k is close to 1 , then we can present this marginal effect, respectively – absolute and relative – as:

$$\frac{\partial G_0}{\partial e_k} = S_k (R_k G_k - G_0), \quad (9)$$

$$\frac{\partial G_0 / \partial e_k}{G_0} = \frac{S_k R_k G_k}{G_0} - S_k. \quad (10)$$

³ A detailed derivation of the equations can be found in e.g. Stark, Taylor, Yitzhaki [1986].

The last formula (10) determines the effect of a percentage change in income from the k -th source on overall income inequality, i.e. the percentage change in total income inequality under the influence of a 1-percent change in income from the k -th source.

The decomposition of the Gini coefficient due to the benefit from the “Family 500+” program was performed using individual non-identifiable data from HBS for two income definitions used by GUS. The DAD 4.6 program was used for the calculations (Jean-Yves Duclos, Abdelkrim Araar and Carl Fortin, "DAD: A Software for Distributive Analysis/Analyze Distributive", MIMAP program, International Development Research Center, Government of Canada, and CIRPÉE, Université Laval).

Table 3.3. Decomposition of the Gini coefficient due to the “Family 500+” program and other income in Poland in 2016

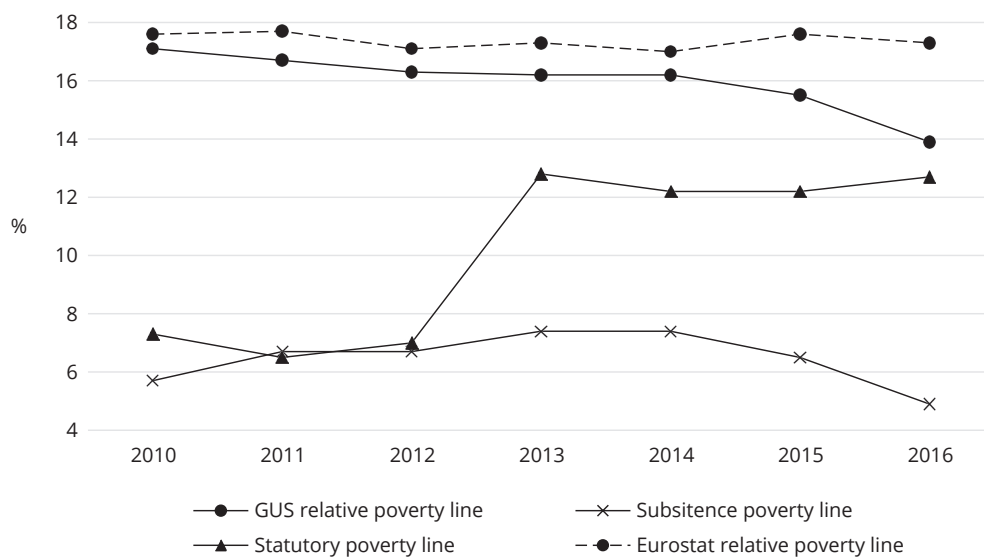
Source of income	Share in total income (S_k)	Gini coefficient for a given source of income (G_k)	Gini correlation of a given source of income with the cumulative distribution of total income (R_k)	Concentration coefficient for a given source of income ($G_k * R_k$)	Contribution of a given source of income to Gini coefficient for total income in absolute terms ($S_k * G_k * R_k$)	Contribution of a given source of income to Gini coefficient for total income in relative terms ($S_k * G_k / G_0$)	The effect of a marginal percentage change in income from the k -th source on overall income inequality
Disposable income per capita	1	0.304	1	0.304	1	1	0
Disposable income – 500+ benefit (per capita)	0.985	0.315	0.996	0.314	0.309	1.019	0.033
500+ benefit per capita	0.015	0.903	-0.420	-0.379	-0.006	-0.019	-0.034
Available income per equivalent unit ^a	1	0.295	1	0.295	1	1	0
Available income – 500+ benefit (for an equivalent unit)	0.982	0.307	0.993	0.304	0.299	1.013	0.030
500+ benefit for an equivalent unit	0.018	0.906	-0.233	-0.211	-0.004	-0.013	-0.031

^a The modified OECD equivalence scale was used.

Source: Own calculations based on GUS's HBS.

The decomposition results presented in Table 3.3 clearly show that irrespective of the income definition and the scale of equivalence, the 500+ benefit affected negatively income inequality in Poland in 2016. It should be noted that it was only paid from April 2016, i.e. *ceteris paribus* this effect would have been greater if the program had been in force since the beginning of the year. Both the negative and relatively high value of Gini's correlation as well as the concentration coefficient show that the 500+ benefit was significantly negatively correlated with overall income, i.e. to a large extent, it supported households with lower income. The marginal effect of the 500+ benefit is negative, which means that increasing this benefit by an additional unit contributed to a decrease in overall income inequality measured by the Gini coefficient. This contribution, however, is small and amounts to 1.3–1.9% (or 4–6 p.p. in absolute terms), depending on the definition of income and the equivalence scale.

Figure 3.2. Poverty and the risk of poverty for different poverty lines⁴ in Poland in 2010–2016



Source: Eurostat; GUS [2017b, Figure 1, pp. 2, 9].

⁴ In the case of extreme poverty rate, the poverty threshold is calculated on the basis of the subsistence minimum (estimated by the Institute of Labor and Social Affairs), which only takes into account those needs that cannot be deferred, and consumption below this level leads to biological deprivation. As far as the statutory poverty line is concerned, it is defined as the amount which, in accordance with applicable Act on Social Assistance, entitles one to apply for a social assistance cash benefit. The GUS relative poverty line is equivalent to 50% of the mean monthly household expenditure calculated on the basis of the HBS [GUS, 2017b, p. 9]. The Eurostat relative poverty line is set at 60% of median equivalized income (EU-SILC data).

From Figure 3.2, which shows trends in poverty and the risk of poverty according to different measures, it appears that this phenomenon generally decreased in 2016 compared to the previous year. Only the poverty rate calculated on the basis of the statutory poverty line has increased (from 12.2 to 12.7%). According to GUS [GUS, 2017b, p. 2], the increase was mainly due – as in 2013 – to the change in the statutory poverty threshold (in 2012 and 2015). It is also important that a significant poverty reduction occurred in the case of large families and in households with disabled people. Poverty among children has also decreased considerably [GUS, 2017b, p. 3]. It can be assumed that this tendency was largely caused by the introduction of the “Family 500+” program. The GUS also provides other reasons for the decline in poverty, namely an increase in wages and a drop in unemployment [2017b, p. 3].

As far as the extent of poverty in Poland according to the place of residence is concerned, it is clearly visible that the changes in poverty for individual residence place classes were not monotonic in the period 2010–2016. However, if we compare the years 2016 and 2010, we can conclude that in the case of relative and extreme poverty, according to GUS, poverty decreased for most classes of residence, except for the largest cities (over 500 thousand inhabitants) and for cities with a population between 20–99 thousand. The range of statutory poverty increased in the analyzed period for all residence place classes, however only in the case of the smallest cities (up to 20 thousand inhabitants) the poverty risk rate decreased from 2014. Irrespective of the adopted measure of poverty, the lowest scale of poverty characterized the biggest cities, and the highest risk of poverty occurred in rural areas (Table 3.4). Both place of residence classes clearly differed by their level of poverty compared to other classes.

Table 3.4. Poverty according to different measures of poverty and class of residence place in Poland in 2010–2016

Category		2010	2011	2012	2013	2014	2015	2016
Cities together	relative poverty	11.9	11.5	11.1	11.2	11.0	10.0	9.5
Cities > 500 thousand residents and more		3.7	3.4	3.4	3.8	3.4	3.3	4.5
Cities 200–499 thousand residents		10.4	9.7	9.2	9.5	9.6	7.4	7.2
Cities 100–199 thousand residents		12.6	11.8	10.9	10.5	9.4	9.5	9.2
Cities 20–99 thousand residents		12.2	13.0	13.8	12.6	11.6	12.7	12.7
Cities < 20 thousand residents		19.0	17.5	15.7	17.4	18.8	14.5	11.3
Countryside		25.4	25.0	23.9	24.0	24.4	24.0	20.8

Category		2010	2011	2012	2013	2014	2015	2016
Cities together	extreme poverty	3.4	4.2	4.3	4.6	4.6	3.5	2.9
Cities > 500 thousand residents and more		0.9	1.1	1.1	1.0	1.0	1.1	1.1
Cities 200–499 thousand residents		3.5	3.2	3.0	4.6	3.2	2.2	1.9
Cities 100–199 thousand residents		4.4	3.8	4.5	3.5	3.7	3.1	2.8
Cities 20–99 thousand residents		3.1	4.4	5.3	4.9	5.1	4.6	3.9
Cities < 20 thousand residents		5.4	7.4	6.7	8.2	8.5	5.4	4.0
Countryside		9.4	10.9	10.4	11.6	11.8	11.3	8.0
Cities together	statutory poverty	4.4	4.1	4.7	8.4	8.0	7.4	8.2
Cities > 500 thousand residents and more		1.1	0.9	1.1	2.6	2.3	2.2	3.6
Cities 200–499 thousand residents		4.2	3.2	2.8	6.7	6.5	4.8	6.2
Cities 100–199 thousand residents		5.2	4.3	4.4	7.5	6.8	6.6	8.9
Cities 20–99 thousand residents		4.2	4.6	5.9	9.8	8.9	10.1	11.2
Cities < 20 thousand residents		7.1	6.7	7.5	13.2	13.4	10.6	9.3
Countryside		11.9	10.4	10.9	19.6	18.7	19.8	19.7

Source: GUS [2017b, Table 7, p. 15]; GUS [2013, Table 3, p. 17]; GUS [2011, Table 5, p. 7].

Income Inequality and the Risk of Poverty in Poland Compared with Other EU Countries in 2010–2016

At the time of finalizing the work on this study (31/10/2017) there were no data available on income inequality in as many as three of the EU-28 countries (Ireland, Italy and Luxembourg) and for the entire EU-28. Therefore, it is not possible to assess the most recent trends of changes in income inequalities in these cases. Regarding the other countries, roughly the same number noted the decrease and increase in income inequality, with the highest increase in absolute income inequality observed in Bulgaria (1.3 p.p.), Sweden (0.9 p.p.) and Slovakia (0.6 p.p.), and the largest decrease – in Romania (2.7 p.p.), Estonia (2.1 p.p.) and Cyprus (1.5 p.p.). Poland recorded a considerable, though not the highest, drop in income inequality – by 0.8 p.p. in 2016 compared to 2015.

The group of countries with the highest income disparities included some countries described as post-socialist (Bulgaria, Lithuania, Romania and Latvia), and

the countries with the lowest income inequalities (Slovakia, Slovenia and the Czech Republic) belonged to this group of countries as well. Income inequality in Poland was close to the EU-28 average. Inequalities, most closely related to the level of income disparities in Poland, occurred in Croatia, Germany, France and Malta.

Individual EU-28 countries were characterized by a different effectiveness in reducing income inequality through the system of social transfers. The smallest absolute effect of reducing inequality through social transfers was found in Latvia, Bulgaria, Estonia and Lithuania, and the highest in Sweden, Portugal, Greece and Germany. Excluding pensions from the analysis of the impact of social transfers on income inequality, the most significant reduction of inequality occurred in Finland, Denmark, Sweden and the United Kingdom, and the smallest – in Bulgaria, Italy, Greece, Latvia and Poland. The pensions themselves had the greatest effect of decreasing inequalities in Greece, Portugal, Sweden and Germany, and the smallest – in Latvia, Estonia, Lithuania and Spain. In general, Poland was characterized by a rather small impact of social transfers on income inequality compared to other EU-28 countries (Table 3.5).

Table 3.5. Income inequality^a in Poland compared with other EU countries in 2010–2016^{b, c}

Country/ Region	2010	2011	2012	2013	2014	2015	2016	2016		
	Gini coefficient (%) after social transfers							Gini coefficient (%) before social transfers (excluding pensions)	Gini coefficient (%) before social transfers (including pensions)	S80/S20
Slovakia	25.9	25.7	25.3	24.2	26.1	23.7	24.3	27.7	41.2	3.6
Slovenia	23.8	23.8	23.7	24.4	25.0	24.5	24.4	30.1	43.6	3.6
Czech Republic	24.9	25.2	24.9	24.6	25.1	25.0	25.1	29.2	44.9	3.5
Finland	25.4	25.8	25.9	25.4	25.6	25.2	25.4	34.6	48.4	3.6
Belgium	26.6	26.3	26.5	25.9	25.9	26.2	26.3	34.2	48.8	3.8
Netherlands	25.5	25.8	25.4	25.1	26.2	26.7	26.9	32.7	46.5	3.9
Austria	28.3	27.4	27.6	27.0	27.6	27.2	27.2	33.6	47.3	4.1
Sweden	24.1	24.4	24.8	24.9	25.4	26.7	27.6	36.4	57.7	4.3
Denmark	26.9	26.6	26.5	26.8	27.7	27.4	27.7	36.9	50.7	4.1
Hungary	24.1	26.9	27.2	28.3	28.6	28.2	28.2	34.2	51.3	4.3
Luxembourg	27.9	27.2	28.0	30.4	28.7	28.5	28.5	34.7	48.1	4.3
Malta	28.6	27.2	27.1	27.9	27.7	28.1	28.5	32.7	44.7	4.2

Country/ Region	2010	2011	2012	2013	2014	2015	2016	2016		
	Gini coefficient (%) after social transfers							Gini coefficient (%) before social transfers (excluding pensions)	Gini coefficient (%) before social transfers (including pensions)	S80/S20
France	29.8	30.8	30.5	30.1	29.2	29.2	29.3	35.3	50.8	4.3
Germany	29.3	29.0	28.3	29.7	30.7	30.1	29.5	35.9	55.5	4.6
Ireland	30.7	29.8	30.5	30.7	31.1	29.8	29.8	42.8	51.1	4.5
Croatia	31.6	31.2	30.9	30.9	30.2	30.4	29.8	34.3	48.5	5.0
Poland	31.1	31.1	30.9	30.7	30.8	30.6	29.8	32.9	46.7	4.8
EU-28	.	30.8	30.5	30.5	30.9	31.0	31.0	36.5	51.8	5.2
United Kingdom	32.9	33.0	31.3	30.2	31.6	32.4	31.5	39.7	54.0	5.1
Cyprus	30.1	29.2	31.0	32.4	34.8	33.6	32.1	36.5	50.2	4.9
Italy	31.7	32.5	32.4	32.8	32.4	32.4	32.4	34.8	48.6	5.8
Estonia	31.3	31.9	32.5	32.9	35.6	34.8	32.7	36.2	46.9	5.6
Portugal	33.7	34.2	34.5	34.2	34.5	34.0	33.9	37.5	60.5	5.9
Greece	32.9	33.5	34.3	34.4	34.5	34.2	34.3	36.8	60.7	6.6
Spain	33.5	34.0	34.2	33.7	34.7	34.6	34.5	39.1	50.7	6.6
Latvia	35.9	35.1	35.7	35.2	35.5	35.4	34.5	37.0	47.6	6.2
Romania	33.5	33.5	34.0	34.6	35.0	37.4	34.7	38.1	53.3	7.2
Lithuania	37.0	33.0	32.0	34.6	35.0	37.9	37.0	41.0	52.3	7.1
Bulgaria	33.2	35.0	33.6	35.4	35.4	37.0	38.3	40.3	52.8	7.9

^a Disposable income per equivalent unit. ^b In the case of Luxembourg, Ireland, EU-28 and Italy values for all dispersion measures for 2016 come from 2015 (access: 31/10/2017). ^c Countries in the table are sorted by ascending income inequality measured by the Gini coefficient after social transfers in 2016.

Source: Eurostat.

Similar deficiencies in the most up-to-date data for the EU-28 countries concerned also the risk of poverty. In this case, the poverty risk for the EU-28 in 2016 was, however, known and amounted to 17.2%, which meant a slight decrease of 0.1 p.p. compared to 2015. The lowest risk of poverty characterized countries such as the Czech Republic, Finland, Denmark and the Netherlands, and the largest – Romania, Bulgaria, Lithuania and Spain. The most significant absolute increase in the risk of poverty in 2016 compared to 2015 occurred in the Netherlands, Bulgaria and Belgium, while the decrease – in Finland, the United Kingdom and Latvia. Poland – similarly as in the case of income differential – had a poverty risk similar to the EU-28 average.

The situation in the case of poverty risk was similar (though with some differences) compared with the efficiency of reducing inequalities through social transfers. The highest efficiency of total transfers in this area was recorded in Hungary, Finland and Greece, and the smallest – in Estonia, Latvia and Lithuania. The effect of social transfers without pensions and with pensions alone was the highest in Finland, Sweden and Denmark, as well as in Greece, Hungary and France. The least effective in limiting the poverty risk through social transfers without pensions and pensions alone, were: Greece, Romania and Bulgaria as well as Estonia, Latvia and Cyprus. In Poland, the impact of social transfers on the risk of poverty was rather average compared to the EU-28, while it was small in the case of social transfers excluding pensions and relatively large – for pensions alone. It is also worth noting the negative correlation (around –0.6) between the at-risk-of-poverty rate and the poverty threshold (see the penultimate column of Table 3.6).

3.6. The risk of poverty^a in Poland compared with the other EU-countries in 2010–2016^{b, d}

Country/ Region	2010	2011	2012	2013	2014	2015	2016	2016			
	Risk of poverty after social transfers							Risk of poverty rate before social transfers (excluding pensions)	Risk of poverty rate before social transfers (including pensions)	Poverty threshold ^c PPP (in EUR)	Depth of poverty ^e
Czech Republic	9.0	9.8	9.6	8.6	9.7	9.7	9.7	16.3	36.5	15,767	19.5
Finland	13.1	13.7	13.2	11.8	12.8	12.4	11.6	27.0	43.7	24,905	13.9
Denmark	13.3	12.1	12.0	11.9	12.1	12.2	11.9	24.9	40.2	26,611	20.8
Netherlands	10.3	11.0	10.1	10.4	11.6	11.6	12.7	22.1	38.4	26,452	17.3
Slovakia	12.0	13.0	13.2	12.8	12.6	12.3	12.7	18.4	37.9	13,239	26.1
France	13.3	14.0	14.1	13.7	13.3	13.6	13.6	23.6	45.0	26,145	16.6
Slovenia	12.7	13.6	13.5	14.5	14.5	14.3	13.9	24.3	41.2	19,530	20.2
Austria	14.7	14.5	14.4	14.4	14.1	13.9	14.1	26.3	44.8	28,380	19.8
Hungary	12.3	14.1	14.3	15.0	15.0	14.9	14.5	25.8	47.6	10,568	18.8
Luxembourg	14.5	13.6	15.1	15.9	16.4	15.3	15.3	27.2	44.7	36,900	17.4
Belgium	14.6	15.3	15.3	15.1	15.5	14.9	15.5	26.3	44.2	26,233	19.4
United Kingdom	17.1	16.2	16.0	15.9	16.8	16.6	15.9	28.1	42.7	22,076	22.4
Cyprus	15.6	14.8	14.7	15.3	14.4	16.2	16.1	25.0	38.3	20,141	17.3
Sweden	12.9	14.0	14.1	14.8	15.1	16.3	16.2	29.9	45.0	26,090	21.1
Ireland	15.2	15.2	16.6	15.7	16.4	16.3	16.3	36.2	46.3	22,307	18.5
Germany	15.6	15.8	16.1	16.1	16.7	16.7	16.5	25.3	43.4	26,725	20.7

Country/ Region	2010	2011	2012	2013	2014	2015	2016	2016			
	Risk of poverty after social transfers							Risk of poverty rate before social transfers (excluding pensions)	Risk of poverty rate before social transfers (including pensions)	Poverty threshold ^c PPP (in EUR)	Depth of poverty ^e
Malta	15.5	15.6	15.1	15.7	15.9	16.3	16.5	23.8	37.9	21,325	15.9
EU-28	16.5	16.8	16.8	16.7	17.2	17.3	17.2	26.1	44.7	.	24.8
Poland	17.6	17.7	17.1	17.3	17.0	17.6	17.3	22.9	43.1	13,671	24.4
Portugal	17.9	18.0	17.9	18.7	19.5	19.5	19.0	25.0	46.1	13,500	26.7
Croatia	20.6	20.9	20.4	19.5	19.4	20.0	19.5	27.3	44.8	11,125	28.2
Italy	18.7	19.8	19.5	19.3	19.4	19.9	19.9	25.4	46.0	19,397	29.3
Greece	20.1	21.4	23.1	23.1	22.1	21.4	21.2	25.2	52.9	11,123	31.9
Estonia	15.8	17.5	17.5	18.6	21.8	21.6	21.7	28.9	39.7	14,944	20.5
Latvia	20.9	19.0	19.2	19.4	21.2	22.5	21.8	27.8	40.2	11,589	24.0
Lithuania	20.5	19.2	18.6	20.6	19.1	22.2	21.9	27.9	42.0	11,691	28.0
Spain	20.7	20.6	20.8	20.4	22.2	22.1	22.3	29.5	46.8	19,120	31.4
Bulgaria	20.7	22.2	21.2	21.0	21.8	22.0	22.9	27.9	45.5	8,497	30.4
Romania	21.6	22.3	22.9	23.0	25.1	25.4	25.3	29.5	49.5	5,948	36.2

^a Relative poverty rates at 60% of median equivalized income. ^b The 2016 data for Luxembourg, Ireland, EU-28 and Italy refer to 2015. ^c The poverty threshold has been set for a family of 2 adults and 2 children below 14 years old. ^d Countries in the table have been ranked according to increasing rate of poverty risk after social transfers in 2016. ^e The depth of poverty is measured here by how much the median income of people considered poor is less than 60% of the equivalent median income i.e., the value assumed for the poverty line in the case of at-risk-of-poverty rates analyzed in the table.

Source: Eurostat.

Romania, Greece and Spain were characterized by the greatest depth of poverty, which meant, for these countries, that half of their population had a lower income than respectively: 63.8, 68.1 and 68.6% of the income determined by the poverty line i.e., income less than respectively: 38.3, 40.9 and 41.1% of equivalized median income. Finland, Malta and France were characterized by the lowest poverty depth in 2016. In the ranking of the EU-28 countries, according to the growing poverty depth, Poland took its place in the second half.

In countries with the highest risk of total poverty, there was usually a negative relationship between the poverty rate and the city's size i.e., the largest cities were characterized by the smallest scale of poverty, smaller cities reported a slightly higher rate of poverty risk, while in rural areas the extent of poverty was the highest. In countries with the highest risk of poverty, the difference in the size of the poverty risk between large cities and rural areas was usually very large. In the case of Poland,

Eurostat data coincide with data from BBGD, i.e. the at-risk-of-poverty rate increased with decreasing town's size, and it was the highest in the case of rural areas.

As for the ratio of the median income from a given area of residence to the median of total income, it was large cities that usually had a higher rate (above 1) than rural areas (less than 1). Countries such as Austria, Belgium, the United Kingdom and Germany were the exceptions, and in addition the differences in ratios were relatively small here. It is also important to note that the differences in the indicators were generally the greater, the more diverse the income in a given country was. The last four columns in Table 3.7 also show that a larger percentage of rich people lived in cities compared to rural areas. The only exceptions were the United Kingdom and Belgium. The difference in the percentage of relatively richer people living in cities compared to rural areas usually increased with the income differential for individual EU-28 countries. In the case of Poland compared to other EU-28 countries, the difference between cities and the countryside was relatively high in 2016 (20.1 p.p.).

Table 3.7. The risk of poverty^a and income inequality in Poland in 2016^{b, c} compared with other European Union countries due to the degree of urbanization

Country/ region	The risk of poverty rate				The ratio of the median income to the median total income			Share of people with income greater than 150% of the median income			
	total	cities	towns and suburbs	rural areas	cities	towns and suburbs	rural areas	total	cities	towns and suburbs	rural areas
Czech Republic	9.7	10.1	10.7	8.5	1.04	0.98	0.99	16.5	23.5	13.4	13.6
Finland	11.6	11.0	11.3	12.8	1.06	0.99	0.95	16.5	22.8	13.5	11.7
Denmark	11.9	17.5	9.5	9.1	1.01	1.03	0.98	15.3	17.6	16.5	11.8
Netherlands	12.7	14.9	9.9	10.1	0.99	1.01	1.01	17.4	18.1	17.5	12.7
Slovakia	12.7	7.0	11.1	17.3	1.14	0.99	0.94	13.1	21.7	10.8	10.5
France	13.6	14.2	15.9	12.1	1.04	0.99	0.96	17.8	21.9	16.0	13.3
Slovenia	13.9	14.6	12.1	14.7	1.04	1.01	0.98	13.9	21.4	13.8	11.0
Austria	14.1	19.2	12.1	11,6	0.94	1.01	1.01	16.2	18.5	16.6	14.2
Hungary	14.5	7.4	14.8	18.9	1.24	1.00	0.89	19.4	32.1	17.6	11.9
Luxembourg	15.3	14.1	19.8	12.1	1.06	0.89	1.06	18.9	26.6	15.0	19.8
Belgium	15.5	23.5	11.6	14.4	0.87	1.05	1.01	17.3	16.3	17.9	17.3
United Kingdom	15.9	17.2	14.1	12.6	0.97	1.01	1.08	22.0	21.2	21.3	26.8
Cyprus	16.1	13.2	19.9	18.3	1.13	0.87	0.92	22.8	29.6	16.7	15.6
Sweden	16.2	17.3	14.2	16.5	1.02	1.01	0.97	16.3	20.1	15.8	12.5

Country/ region	The risk of poverty rate				The ratio of the median income to the median total income			Share of people with income greater than 150% of the median income			
	total	cities	towns and suburbs	rural areas	cities	towns and suburbs	rural areas	total	cities	towns and suburbs	rural areas
Ireland	16.3	14.1	17.1	18.3	1.08	0.91	0.96	21.7	27.4	16.0	18.8
Germany	16.5	19.4	14.8	15.0	0.98	1.01	1.00	19.7	20.4	20.3	17.6
Malta	16.5	16.8	14.0	2.0	1.00	1.02	0.67	19.5	19.8	17.7	0.0
EU-28	17.2	16.7	16.0	19.8	1.01	1.01	0.87	20.8	25.1	20.3	15.1
Poland	17.3	10.9	14.4	23.9	1.17	1.05	0.87	21.0	32.0	22.2	11.9
Portugal	19.0	17.3	16.9	24.0	1.10	1.00	0.87	23.8	31.4	21.3	13.9
Croatia	19.5	11.9	16.2	26.6	1.19	1.01	0.89	20.6	31.0	20.4	14.3
Italy	19.9	19.3	20.3	20.2	1.05	0.99	0.95	21.1	25.2	20.1	16.4
Greece	21.2	18.3	19.5	26.1	1.09	1.05	0.87	23.7	28.7	26.3	15.5
Estonia	21.7	19.4	23.6	23.6	1.10	0.96	0.93	25.8	32.2	20.0	20.9
Latvia	21.8	16.3	22.6	27.7	1.12	0.98	0.86	25.0	30.5	24.0	19.2
Lithuania	21.9	11.5	21.8	30.1	1.28	1.07	0.84	26.3	37.5	25.8	17.5
Spain	22.3	20.1	20.8	28.1	1.09	1.00	0.86	24.8	30.1	24.4	14.4
Bulgaria	22.9	14.0	20.4	36.6	1.26	0.97	0.76	25.4	37.6	21.0	12.0
Romania	25.3	10.3	16.7	40.1	1.39	1.06	0.72	24.8	43.3	25.7	11.7

^a Relative poverty rates for the poverty line at 60% of the equivalent median income. ^b Data for Luxembourg, Ireland, EU-28 and Italy in 2016 refer to 2015. ^c Countries in the table have been ranked according to the rising poverty risk rate in 2016. ^d City was defined as the densely populated area or as an administrative unit with an urban center over 50 thousand residents. Towns and suburbs are defined as average populated areas or as an area where less than 50% of the population live in urban center, along with more than 50% inhabitants in *urban cluster*. Rural areas are, according to Eurostat, sparsely populated areas or those with more than 50% inhabitants in rural grid cells.

Source: Eurostat and own calculations based on Eurostat data.

Conclusions

In summary, general indicators of income inequality, poverty or poverty risk in Poland showed a somewhat declining tendency, which should be assessed as a positive phenomenon in the context of competitiveness. As the competitiveness of the economy is based, inter alia, on the ability to improve the living standard of the society, the reduction of poverty and income inequality in Poland – especially to such a large extent, as Eurostat data show since around 2005 – provides clear evidence of a high level of competitiveness in this plane.

More detailed analyzes of the inequality and poverty risk structure both in Poland and in comparison of Poland with other EU-28 countries do not provide such

a satisfactory picture. Poland still has to deal with a fairly large depth of poverty and with a large diversity of the poverty structure and income inequality. We still have a lot of space to reduce both income inequality and poverty. The “Family 500+” program should be regarded as a positive factor reducing income inequality in Poland.

Poland has a similar level, to the average for the EU-28, of income disparities and poverty risk. Regarding the inequality structure and poverty in EU-28 countries due to the place of residence, it can be generally assessed that countries with higher rates of at risk of poverty and income inequality are also more internally diversified in terms of both indicators.

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The Foreign Trade of Poland and Voivodship Cities: The Competitive Advantages and Balance of Payments in 2010–2017

Mariusz-Jan Radło

Introduction

This chapter aims to present the position of the Polish economy as well as individual voivodship cities in foreign trade, including its directions, balance in trade and its subject structure. It also provides analyzed data on the development and components of payment balance.

The chapter consists of several parts. The main tendencies in Polish foreign trade in 2010–2017 are presented after the introduction. The next part shows an analysis of the geographical structure of the trade in goods, Polish exports, as well as trade in services. The third part presents the development of Polish voivodship cities export, indicating its value, main geographical directions and commodity specializations. An analysis of payment balance has been also conducted. The chapter ends with a conclusion of the research results.

Data from the National Bank of Poland in relation to trade in services and the balance of payments was used in the research. Trade in goods was analyzed on the basis of the data from the Tax Administration Chamber.

The Main Tendencies of Polish Foreign Trade in 2010–2017

The analysis of the data presented in Table 4.1 indicates a surplus in trade in services in Poland during 2010–2017. The year 2017 has been also the fifth consecutive year since 2013 in which a surplus in trade in goods and services in general was recorded in Poland. It was also the third consecutive year in which Poland recorded a surplus in trade in goods. The tendencies listed above resulted in the highest noted

surplus in Polish foreign trade in 2017, which amounted to 18.4 billion EUR. Of this, 17.9 billion was constituted by trade in services and 0.5 billion by trade in goods.

It should also be noted that export of goods reached 197.8 billion EUR in 2017 and was nominally higher than in 2016 by 11.5%. During the same period, the import of goods nominally increased by 13.5%, to 197.3 billion EUR. A more rapid growth of imports than exports caused the surplus in trade in goods in 2016–2017 to drop from 2.9 billion to 0.5 billion EUR. The export of services raised nominally by 15.6%, from 45 to 52 billion EUR in the same period, and service imports grew by 10.4%. This led to an increased surplus in trade in services from 14.1 to 17.9 billion EUR in 2016–2017.

Table 4.1. Polish foreign trade in goods and services (2010–2017, in billion EUR)

	2010	2011	2012	2013	2014	2015	2016	2017
Balance of trade in goods	-10.9	-13.3	-8.1	-0.3	-3.3	2.2	2.9	0.5
Export	118.1	132.5	141.0	149.1	158.6	172.1	177.4	197.8
Import	129.0	145.8	149.2	149.4	161.9	169.9	174.5	197.3
Balance of services	3.3	5.2	6.0	7.6	9.1	10.9	14.1	17.9
Export	26.8	29.4	31.9	33.6	36.7	40.7	45.0	52.0
Import	23.5	24.2	25.9	25.9	27.7	29.7	30.9	34.1
Total trade balance	-7.6	-8.1	-2.1	7.3	5.8	13.1	14.9	18.4
Export	144.8	161.8	173.0	182.7	195.4	212.8	220.4	249.8
Import	152.5	170.0	175.1	175.4	189.5	199.7	205.5	231.4
Previous year = 100								
	2010	2011	2012	2013	2014	2015	2016	2017
Export of goods	123.7	112.2	106.4	105.7	106.4	108.5	103.1	111.5
Import of goods	125.0	113.0	102.3	100.1	108.4	104.9	102.7	113.1
Export of services	119.1	109.7	108.5	105.3	109.2	110.9	110.6	115.6
Import of services	134.3	103.0	107.0	100.0	106.9	107.2	104.0	110.4
Total exports	122.7	111.7	106.9	105.6	107.0	108.9	103.6	113.3
Total imports	126.3	111.5	103.0	100.2	108.0	105.4	102.9	112.6

Notes: The year 2017 includes preliminary data based on monthly estimates.

Source: Own study based on NBP data [2018a].

The Structure of Polish Foreign Trade

According to the preliminary data of the Tax Administration Chamber (IAS), the value of Polish exports in 2017 reached 197.64 billion EUR (NBP data show 197.8 billion EUR). Upon the analysis of the main directions of Polish exports of goods based on

the data presented in Table 4.2, it can be concluded that 85.14% of the value of Polish export of goods was directed to 20 countries to which goods worth 168.21 billion EUR were sold in 2017. The main trade partner of Poland was Germany, which had imported goods worth 53.77 billion EUR, accounting for 27.2% of the value of Polish exports of goods. A similar value (of 27.54%) was achieved along with five other countries (see Table 4.2), to which goods worth 54.43 billion EUR were exported. These included: the United Kingdom (12.57 billion EUR), the Czech Republic (12.55 billion EUR), France (11.03 billion EUR), Italy (9.71 billion EUR) and the Netherlands (8.57 billion EUR). Goods worth 60.01 billion EUR were exported to the remaining 14 countries listed in the provided table, accounting for 30.39% of the value of Polish exports of goods. Among them, the five markets on which the highest-value commodities were exported were: Russia (6.18 billion EUR), US (5.48 billion EUR), Spain (5.43 billion EUR), Sweden (5.39 billion EUR), Hungary (5.18 billion EUR).

Table 4.2. The directions of the Polish export of goods in 2017

Country	bln EUR	% of export	Country	bln EUR	% of export
Germany	53.77	27.2	Hungary	5.18	2.6
United Kingdom	12.57	6.4	Slovakia	4.88	2.5
Czech Republic	12.55	6.3	Belgium	4.28	2.2
France	11.03	5.6	Ukraine	4.26	2.2
Italy	9.71	4.9	Austria	3.77	1.9
Netherlands	8.57	4.3	Romania	3.64	1.8
Russia	6.18	3.1	Denmark	3.53	1.8
USA	5.48	2.8	Turkey	2.92	1.5
Spain	5.43	2.7	Lithuania	2.71	1.4
Sweden	5.39	2.7	Norway	2.36	1.2

Source: Own study based on preliminary data of the Tax Administration Chamber [2018].

According to the data from the Tax Administration Chamber, the value of Polish import of goods was equal to 194,57 billion EUR and was clearly lower than the value recorded by the National Bank of Poland (197.3 billion EUR). Both the data of the Tax Administration Chamber and the NBP is preliminary. It should, however be noted that while a surplus in Polish trade in goods reached EUR 0.5 billion in the case of NBP estimates, the surplus could reach even 3.06 billion EUR in terms of IAS data. When analyzing the main directions of Polish imports based on the data presented in Table 4.3, it should be pointed out that while they are similar to the directions of Polish exports, there are several important differences. Similarly to the list of export directions, the main market from which Poland imported goods was Germany, with

goods valued at 44.15 billion EUR imported in 2017, constituting 22.69% of the value of Polish imports. China and Russia were in the second and third positions, with imports of goods worth 23.61 EUR and 13.17 billion EUR respectively, while the contribution of these two countries to Polish imports was 18.90%. The next five economies which exported to Poland were: Italy (9.77 billion EUR), France (7.50 billion), the Netherlands (EUR 7.2 billion), the Czech Republic (EUR 6.84 billion) and the US (5.76 billion). Their contribution to Polish imports accounted for 19.05%. The other twelve countries (see Table 4.3) were responsible for 21.17% of imports.

Table 4.3. Directions of importing goods to Poland in 2017 by country of origin

Country	bln EUR	% of export	Country	bln EUR	% of export
Germany	44.15	22.69	Spain	4.33	2.23
China	23.61	12.13	Sweden	3.50	1.80
Russia	13.17	6.77	Slovakia	3.43	1.76
Italy	9.77	5.02	Hungary	3.35	1.72
France	7.50	3.85	Japan	3.22	1.65
Netherlands	7.20	3.70	Republic of Korea	3.20	1.64
Czech Republic	6.84	3.52	Austria	3.17	1.63
USA	5.76	2.96	Turkey	3.12	1.60
Belgium	4.90	2.52	Denmark	2.30	1.18
United Kingdom	4.55	2.34	Norway	2.14	1.10

Source: Own study based on preliminary data of the Tax Administration Chamber [2018].

When analyzing the balance of Polish trade in goods (see Table 4.4), it should be noted that Poland recorded surpluses in trade with European countries in 2017, mainly with the EU countries: Germany (EUR 9.62 billion), the United Kingdom (8.03 billion EUR), the Czech Republic (5.71 billion EUR), France (3.54 billion EUR), Ukraine (2.13 billion EUR), Sweden (1.90 billion EUR), Romania (1.89 billion EUR), Hungary (1.83 billion EUR), Slovakia (1.46 billion EUR) and the Netherlands (1.37 billion EUR). However, Asian countries dominated the group of countries with which Poland had the largest deficits in trade in goods. This group included: China (-21.555 billion EUR), Russia (-6.98 billion EUR), Japan (-2.72 billion EUR), the Republic of Korea (-2.71 billion EUR), India (-1.48 billion EUR), Vietnam (1.46 billion EUR), Bangladesh (-1.13 billion EUR), Taiwan (-1.07 billion EUR), Brazil (EUR -0.69 billion EUR) and Ireland (-0.65 billion EUR).

Table 4.4. The balance of Polish trade in goods with selected countries – directions of import by country of origin

Country	bln EUR	Country	bln EUR
Germany	9.62	China	-21.55
United Kingdom	8.03	Russia	-6.98
Czech Republic	5.71	Japan	-2.72
France	3.54	Republic of Korea	-2.71
Ukraine	2.13	India	-1.48
Sweden	1.90	Vietnam	-1.46
Romania	1.89	Bangladesh	-1.13
Hungary	1.83	Taiwan	-1.07
Slovakia	1.46	Brazil	-0.69
Netherlands	1.37	Ireland	-0.65

Source: Own study based on preliminary data of the Tax Administration Chamber [2018].

Trade in Goods

Table 4.5 presents data on Polish exports of commodities according to the main commodity groups in the Combined Nomenclature. The 20 groups of goods presented in it from the level of the two-digit Combined Nomenclature are responsible for exports worth EUR 147 billion, which accounted for 74.87% of the total value of Polish exports of goods. Of these 20 groups, three are particularly noteworthy. They include:

- Group 84 – nuclear reactors, boilers, machinery and mechanical equipment. The export value was equal to 26.11 billion EUR (13.21% of the value of total goods export). A small positive (0.1) value of the revealed comparative advantage index (RCA) was noted in this group, and the value of the surplus in trade in these goods amounted to 2.25 billion EUR. The largest share in this group had goods such as: automatic data processing machines; turbojets, turboprops and other gas turbines; compression-ignition engines with compression ignition; parts for engines with 8407 or 8408 positions; laundry machines for professional or household use; air or vacuum pumps; compressors and fans; refrigerators, freezers, air conditioners, and centrifuges, including centrifugal dryers.
- Group 87 – non-rail vehicles and their parts and accessories. The exports of goods value in this group in 2017 was equal to 23.72 billion EUR (12% of total goods export value). There was also a positive RCA in the trade of these goods, which had a value of 0.2, while the value of the surplus in trade in these goods were equal to 4.40 billion EUR. In this group, of significant importance were such goods

as: parts and accessories for motor vehicles under 8701 to 8705 positions; cars and other motor vehicles intended for the transport of people; motor vehicles for transporting goods.

- Group 85 – electrical machinery and equipment and parts thereof; recorders and sound players. The value of exports of these goods was equal to 21.40 billion EUR (10.83% of total goods export value). A small negative value of the RCA index (–0.1) was noted with a deficit in trade in these commodities reaching –1.59. It mainly includes such products as: electric transformers; converters (e.g., rectifiers) and inductors; water heaters and immersion heaters, electric; apparatus for telephone and line telegraphy and telecommunications apparatus; carriers for recording sound or other signals; reception apparatus for television, incorporating and not incorporating radio receivers; insulated wire, cables and other insulated electric wires.

Table 4.5. Export by product groups in 2017 (value in billion EUR, RCA indicator)

The code (a two-digit number) and the name of the product group/group names from the four-digit level		Export bln EUR	export %	Balance bln EUR	RCA
84:	nuclear reactors, boilers, machinery and mechanical equipment	26.11	13.21	2.25	0.1
	automatic data processing machines	3.77	1.91	0.74	0.2
	turbojets, turboprops and other gas turbines	2.44	1.23	1.25	0.7
	compression-ignition engines with self-ignition	1.85	0.94	1.19	1.0
	parts for engines with 8407 or 8408 positions	1.51	0.76	0.16	0.2
	household or professional type laundry machines	1.16	0.59	0.90	1.5
	air or vacuum pumps, compressors and fans	1.00	0.50	0.09	0.1
	refrigerators, freezers, air conditioners	1.00	0.50	0.44	0.6
	centrifuges, including centrifugal dryers	1.00	0.51	–0.06	–0.1
87:	non-rail vehicles and their parts and accessories	23.72	12.00	4.40	0.2
	parts and accessories for motor vehicles of 8701 to 8705 headings	11.08	5.61	4.47	0.5
	cars and other motor vehicles intended for the transport of persons	6.75	3.41	–1.37	–0.2
	motor vehicles for transporting goods	2.63	1.33	1.20	0.6
85:	electrical machines and devices and parts thereof	21.40	10.83	–1.59	–0.1
	electrical transformers, converters (e.g. rectifiers) and inductors	1.04	0.53	0.13	0.1
	water heaters and immersion heaters, electric	1.00	0.50	0.14	0.1
	apparatus for telephone and line telegraphy and telecommunications equipment	2.19	1.11	–1.39	–0.5
	carriers for recording sound and other signals	1.20	0.61	–0.27	–0.2
	reception apparatus for television, even incorporating radio receivers	3.97	2.01	2.97	1.4

The code (a two-digit number) and the name of the product group/group names from the four-digit level		Export bln EUR	export %	Balance bln EUR	RCA
insulated wire, cables and other insulated electric wires		2.46	1.24	1.08	0.6
94:	furniture; bedding, mattresses, mattress supports, pillows	11.50	5.82	8.63	1.4
39:	plastics and articles thereof	9.18	4.64	-2.28	-0.2
73:	iron and steel articles	6.10	3.08	1.40	0.2
27:	mineral fuels, mineral oils and their distillation products	5.04	2.55	-9.35	-1.1
40:	rubber and rubber articles	4.68	2.37	1.27	0.3
02:	meat and edible offal	4.53	2.29	2.98	1.1
72:	cast iron and steel	4.04	2.04	-3.49	-0.6
30:	pharmaceutical products	3.87	1.96	-1.74	-0.4
44:	wood and wood articles; charcoal	3.82	1.93	2.43	1.0
48:	paper and cardboard; articles of paper pulp, paper or cardboard	3.78	1.91	-0.23	-0.1
90:	optical, photographic and cinematographic instruments and apparatus	3.61	1.83	-0.66	-0.2
24:	tobacco and industrial tobacco substitutes	2.97	1.50	2.22	1.4
74:	copper and copper articles	2.96	1.50	1.54	0.7
33:	essential oils and resinoids; perfumery, cosmetics or toilet preparations	2.90	1.47	0.68	0.3
76:	aluminum and aluminum articles	2.76	1.40	-0.96	-0.3
62:	clothing and clothing accessories, knitwear	2.56	1.29	-0.30	-0.1
89:	ships, boats and floating structures	2.43	1.23	1.01	0.5

Source: Own study based on preliminary data of the Tax Administration Chamber [2018].

The five next groups with the highest export value were characterized by differentiated RCA values and were: 94 – furniture; bedding, mattresses, mattress supports, pillows (11.50 billion EUR, RCA: 1.4, surplus: 8.63 billion EUR); 39 – plastics and articles thereof (9.18 billion EUR, RCA: -0.2, deficit: -2.28 billion EUR); 73 – iron and steel articles (6.10 billion EUR, RCA: 0.2, surplus: 1.40 billion EUR); 27 – mineral fuels, mineral oils and products of their distillation (5.04 billion EUR, RCA: -1.1, deficit: -9.35 billion EUR); 40 – rubber and rubber articles (4.68 billion EUR, RCA: 0.3, surplus: 1.27 billion EUR). The total contribution to the export of goods from these groups was equal to 18.46%.

The contribution of the next 12 product groups in the Polish export of goods was equal to 20.36%. The highest value of exports had five groups: 02 – meat and edible offal (4.53 billion EUR, RCA: 1.1 surplus: 2.98 billion EUR); 72 – cast iron and steel (4.04 billion EUR, RCA: -0.6, deficit: -3.49 billion EUR); 30 – pharmaceutical products (3.87 billion EUR, RCA: -0.4, deficit: 1.74 billion EUR); 44 – wood and wood articles; charcoal (3.82 billion EUR, RCA: 1.0, surplus: 2.43 billion EUR); 48 – paper

and cardboard; articles made of paper pulp, paper or cardboard (3.78 billion EUR, RCA: -0.1, deficit: -0.23 billion EUR).

Trade in Services

At the time of preparing this edition of the *Report on Competitiveness*, data on trade in services for 2017 was not yet available. However, according to the 2016 data (see Table 4.6), Poland was noted to have the highest value of exports in such categories as: transport services (55.23 billion PLN, RCA: 0.24, surplus: 23.49 billion PLN); foreign travels (43.22 billion PLN, RCA: -0.03, surplus: 11.81 billion PLN), other business services (42.75 billion PLN, RCA: -0.10, surplus: PLN 9.10 billion PLN), telecommunications, IT and information services (21.01 billion PLN, RCA: 0.19, surplus: 8.64 billion PLN) and refinement (14.70 billion PLN, RCA: 2, surplus: 13.29 billion PLN). Similarly to the previous years, the largest deficit in Poland was also due to fees for the use of intellectual property (trade deficit: -8.87 billion PLN at RCA: -2.14).

Table 4.6. Polish trade in services in 2016 (RCA, in PLN million)

Name of service	Export	Import	Balance	RCA
Total services	196.43	135.00	61.43	0.03
Refinement	14.70	1.41	13.29	2.00
Repairs	5.21	3.27	1.95	0.12
Transportation services:	53.23	29.75	23.49	0.24
nautical transport	1.83	4.70	-2.87	-1.29
aerial transport	6.19	5.77	0.42	-0.27
other transport services (excluding nautical and aerial)	44.61	18.63	25.97	0.53
postal and courier services	0.61	0.64	-0.03	-0.39
Foreign travels	43.22	31.41	11.81	-0.03
Construction services	6.86	2.02	4.84	0.88
Insurance services	1.82	3.20	-1.38	-0.91
Financial services	3.12	3.79	-0.67	-0.54
Fees for the use of intellectual property	1.76	10.62	-8.87	-2.14
Telecommunications, IT and information services:	21.01	12.37	8.64	0.19
telecommunication services	1.91	1.92	-0.01	-0.35
IT services	17.52	9.45	8.07	0.27
information services	1.58	1.00	0.58	0.11

Name of service	Export	Import	Balance	RCA
Other business services:	42.75	33.65	9.10	-0.10
research and development services	4.20	1.23	2.97	0.88
services provided by professionals	23.12	19.43	3.69	-0.17
legal, accounting, management and public relations services	15.09	15.19	-0.09	-0.35
marketing services in the field of market research and public opinion	8.03	4.25	3.78	0.29
technical services related to trade and other business services	15.43	12.98	2.45	-0.17
Cultural and recreational services	2.75	3.08	-0.33	-0.46

Source: Own study based on NBP data [2018b].

Export from Polish Voivodship Cities: Geographical and Commodity Specialties

The analysis of the data presented in Table 4.7 indicates a very large diversity of voivodship cities (along with the headquarters of the voivode and/or regional voivodship authorities) in terms of the volume of exports in 2017. The undisputed leader of the ranking was Warsaw, which was responsible for the export worth 13.89 billion EUR. It was followed by Poznań, which had exports that reached half of the value of the Warsaw's exports – 7 billion EUR. The next four cities that stood out in the ranking were Gdańsk (2.88 billion EUR), Łódź (2.71 billion EUR), Wrocław (2.49 billion EUR) and Cracow (2.46 billion EUR). The total value of their exports was equal to 10.54 billion EUR, approximately on the halfway mark between Warsaw and Poznań. Subsequent voivodship cities can be divided into two groups – the ones in which the value of exports exceeded 1 billion EUR, and the ones in which the value of exports was lower than 1 billion EUR. Exports of the first group reached a total value of 7.77 billion EUR. The group included, by decreasing value: Szczecin (1.55 billion EUR), Gorzów Wielkopolski (1.45 billion EUR), Olsztyn (1.25 billion EUR), Katowice (1.23 billion EUR), Lublin (1.15 billion EUR) and Rzeszów (1.14 billion EUR). The second group, responsible for a total export of 4.23 billion EUR, included: Bydgoszcz (0.97 billion EUR), Toruń (0.93 billion EUR), Opole (0.76 billion EUR), Kielce (0.63 billion EUR), Białystok (0.56 billion EUR) and Zielona Góra (0.38 billion EUR). When concluding the above, it should also be noted that the value of exports of individual voivodship cities is very diverse, which reflects the economic potential of individual centers. The level of exports of individual cities compared to the exports of their voivodships was also very diversified, which in turn resulted from the economic geography of the provinces. The value of Warsaw's exports reached 55.1% of the value of exports of the entire

voivodship. Four cities had relatively high contribution to the export of voivodships: Lublin (39.6%), Łódź (37.6%), Olsztyn (34.7%), Poznań (32.9%). In the following seven cities, this contribution fluctuated between 20–30%: Szczecin (29.9%), Gdańsk (28.5%), Białystok (28.4%), Cracow (26.4%), Kielce (26.2%), Gorzów Wielkopolski (24.7%) and Opole (23.5%). In the following three cities, this contribution reached several percent: Rzeszów (17.6%), Bydgoszcz (17.6%), Toruń (16.9%) and Wrocław (15%). It did not exceed 10% in two cities: Zielona Góra (6.5%) and Katowice (4.8%).

Table 4.7. The value of exports in 2017 from voivodship cities

Voivodship city	City export (bln EUR)	Voivodship's export (bln EUR)	Export of the city as a % of export of the voivodship
Warsaw	13.89	25.19	55.1
Lublin	1.15	2.90	39.6
Łódź	2.71	7.21	37.6
Olsztyn	1.25	3.59	34.7
Poznań	7.00	21.27	32.9
Szczecin	1.55	5.19	29.9
Gdańsk	2.88	10.12	28.5
Białystok	0.56	1.97	28.4
Cracow	2.46	9.32	26.4
Kielce	0.63	2.42	26.2
Gorzów Wielkopolski	1.45	5.88	24.7
Opole	0.76	3.23	23.5
Rzeszów	1.14	6.50	17.6
Bydgoszcz	0.97	5.51	17.6
Toruń	0.93	5.51	16.9
Wrocław	2.49	16.62	15.0
Zielona Góra	0.38	5.88	6.5
Katowice	1.23	25.94	4.8

Source: Own study based on the data of the Tax Administration Chamber [2018].

The main geographical directions of exports from voivodship cities are similar to those that characterize the whole Polish export. There are, however, deviations in certain cities. Table 4.8 presents the top 10 export markets of individual voivodship cities. The analysis indicates that Germany, which is the main export market for Poland, occupies the first position among export markets of most voivodship cities, except for: Gdańsk, Kielce and Rzeszów. In the case of Gdańsk and Kielce, the Netherlands are their main export market, and in the case of Rzeszów – the USA.

Table 4.8. The main directions of voivodship cities export in 2017 – % of total goods export from the city

Białystok	%	Bydgoszcz	%	Gdańsk	%	Gorzów Wielkopolski	%	Katowice	%	Kielce	%
Germany	19.70	Germany	33.70	Netherlands	13.00	Germany	31.20	Germany	23.80	Netherlands	18.50
United Kingdom	7.89	USA	7.03	Germany	11.40	Ukraine	8.95	Czech Republic	18.60	Germany	18.50
Netherlands	6.99	France	6.38	Czech Republic	6.61	Netherlands	8.11	Slovakia	8.08	United Kingdom	7.74
USA	6.17	Netherlands	5.22	Norway	4.61	Hungary	7.33	Russia	5.35	France	7.56
France	5.29	Ukraine	4.13	Sweden	3.92	Sweden	6.43	Austria	5.20	Sweden	5.61
Italy	4.52	Sweden	3.55	Hungary	3.52	Italy	5.95	India	4.33	Ukraine	3.18
Belarus	4.50	Italy	3.38	Russia	3.38	Spain	4.59	Argentina	3.68	Hungary	3.06
Russia	4.02	United Kingdom	3.05	United Kingdom	3.37	France	4.01	France	3.19	Romania	2.86
Lithuania	4.00	Hungary	2.96	Estonia	3.20	China	3.52	Hungary	2.43	Austria	2.65
Ukraine	3.79	Belgium	2.77	Belgium	3.17	Belgium	3.41	Sweden	2.40	Slovakia	2.51
Cracow	%	Lublin	%	Łódź	%	Olsztyn	%	Opole	%	Poznań	%
Germany	22.00	Germany	23.70	Germany	13.30	Germany	17.90	Germany	37.80	Germany	29.50
Czech Republic	9.12	United Kingdom	17.80	United Kingdom	10.30	France	16.00	Czech Republic	9.54	Spain	7.76
France	7.26	Hungary	8.28	Russia	6.76	Italy	9.62	Italy	8.09	France	7.66
Ukraine	5.08	USA	6.35	Italy	6.74	Spain	6.86	Netherlands	7.58	United Kingdom	6.64
United Kingdom	4.89	Czech Republic	5.84	France	6.60	United Kingdom	6.03	Turkey	3.80	Italy	5.14
Italy	4.65	Italy	5.13	Czech Republic	6.26	Hungary	5.87	Hungary	3.35	Sweden	4.36

Romania	3.88	Ukraine	4.53	Ukraine	3.54	Russia	4.70	United Kingdom	2.67	Netherlands	3.58
Slovakia	3.83	Slovakia	4.37	Netherlands	3.35	USA	3.91	Ireland	2.52	Czech Republic	3.42
Hungary	3.81	Netherlands	2.91	Turkey	2.95	Romania	3.20	Slovakia	2.24	Turkey	2.92
Russia	3.62	Belgium	1.97	Slovakia	2.87	Turkey	2.67	Ukraine	2.08	Austria	2.49
Rzeszów	%	Szczecin	%	Toruń	%	Warsaw	%	Wrocław	%	Zielona Góra	%
USA	32.70	Germany	23.30	Germany	21.40	Germany	18.50	Germany	25.30	Germany	37.80
Canada	17.40	Bahamas	15.90	Russia	11.20	Czech Republic	7.25	USA	10.70	France	8.70
Russia	7.11	Antigua and Barbuda	9.75	Czech Republic	4.96	Italy	5.20	United Kingdom	4.87	United Kingdom	8.08
Germany	5.09	Norway	6.50	Slovakia	4.46	France	4.76	France	4.81	Czech Republic	6.14
Ukraine	3.50	USA	4.54	Romania	4.26	Netherlands	4.43	Italy	4.46	Netherlands	5.06
India	3.45	United Kingdom	3.27	Hungary	3.85	United Kingdom	4.22	Czech Republic	4.31	Romania	3.81
Brazil	1.97	France	2.65	France	3.56	Russia	3.86	Russia	3.28	Ukraine	2.89
France	1.72	Sweden	2.62	Ukraine	3.14	Lithuania	3.81	Sweden	2.95	Hungary	2.89
Saudi Arabia	1.66	Netherlands	2.54	Lithuania	2.81	Ukraine	3.56	Spain	2.71	Slovakia	2.35
Czech Republic	1.48	Denmark	2.52	United Kingdom	2.71	Slovakia	3.00	Slovakia	2.35	Italy	2.14

Source: Own study based on the data of the Tax Administration Chamber [2018].

The second and subsequent positions in the export markets of individual cities are very diverse, but they are primarily countries that constitute the main export markets for the entire Polish economy. However, there are some exceptions to this general regularity. The first of them is Szczecin, which additionally exports to markets such as Antigua and Barbuda, which results from the activities of the shipbuilding industry. The second is Rzeszów, which primarily exports products for the aerospace industry to the USA and Canada.

When analyzed from the perspective of its commodity structure, the export of Polish voivodship cities is much more diverse. Table 4.9 presents three main commodity groups in the export of individual voivodship cities, as well as the Herfindahl-Hirschman index (HHI), which measures trade concentration calculated on the basis of an analysis of the commodity structure of exports according to the Combined Nomenclature at the four-digit level. The higher the HHI value for a given city, the more concentrated its exports around a small number of commodity groups. In this perspective, the export of these three cities was the least diverse: Olsztyn (HHI 3614), Rzeszów (HHI 3153) and Gorzów Wielkopolski (HHI 2219). A moderate level of concentration was also recorded in exports from: Szczecin (HHI 1524), Poznań (HHI 1512), Kielce (HHI 1175), Gdańsk (HHI 1031), Katowice (HHI 916), Zielona Góra (HHI 833) and Toruń (HHI 802). The lowest concentration of exports was in turn recorded in: Warsaw (HHI 115), Cracow (HHI 253), Wrocław (HHI 269), Bydgoszcz (HHI 311), Białystok (HHI 321), Łódź (HHI 512), Lublin (HHI 514) and Opole (HHI 751).

Table 4.9. Main commodity groups of voivodship cities export in 2017, % of total goods export from the city

Białystok	%	Bydgoszcz	%
Water heaters and immersion heaters	11.6	Candles, thin candles and others	8.9
Furniture other than those in position 9401 and 9402 and parts thereof	6.8	Processed and preserved fish	7.3
Gases and other gaseous hydrocarbons	6.7	Cartons, etc. packaging containers, of paper, cardboard	5.9
HHI	321	HHI	311
Gdańsk	%	Gorzów Wielkopolski	%
Petroleum and oils	2.2	Reception apparatus for television	44.4
Passenger liners, cruise boats	7.8	Insulated wire, cables	10.0
Wheat and meslin	6.9	Polyamides in basic forms	8.5
HHI	1031	HHI	2219
Katowice	%	Kielce	%
Carbon; briquettes, briquettes and similar solid fuels	27.5	Carpentry and carpentry products for construction	21.4

Coking coal and semi-coke from coal, brown coal (lignite)	6.5	Rolling bearings:	20.8
Machines and mechanical devices	5.0	Paving slabs, tiles or wall tiles	10.6
HHI	916	HHI	1175
Cracow	%	Lublin	%
Parts and accessories for motor vehicles	6.7	Parts and accessories for motor vehicles	18.8
Corks, lids and lids, bottle caps	6.2	Pumps for liquids	6.4
Barrels, drums, cans, boxes, etc.	5.6	Coal	5.4
HHI	253	HHI	514
Łódź	%	Olsztyn	%
Razors and razor blades	17.1	Pneumatic, new and rubber tires	59.3
Dish washers; cleaning equipment	8.8	Rubber mixtures	5.1
Household washing machines	8.1	Cord fabric from yarn	4.2
HHI	512	HHI	3614
Opole	%	Poznań	%
Malt extract, food preparations of flour, groats, starch	22.3	Motor vehicles for the transport of goods	29.6
Clothing, clothing, jackets, blazers	7.2	Cars and other motor vehicles	20.4
Parts and accessories for motor vehicles	6.1	Medicines (excluding products from item 3002, 3005, item 3006)	13.5
HHI	751	HHI	1512
Rzeszów	%	Szczecin	%
Turbojet, turboprop engines	54.2	Passenger liners, cruise boats, ferries	35.8
Medicine consisting of mixed products	10.3	Structures (without item 9406) and structural parts made of cast iron	10.6
Drive shafts and cranks; bearing housings and plain bearings	8.1	Instruments and devices used in medicine, surgery, dentistry.	8.4
HHI	3153	HHI	1524
Toruń	%	Warsaw	%
Sanitary towels (pads) and tampons, diapers	16.8	Machines and installations for washing, cleaning and drying	4.2
Cane and beet sugar	16.6	Sanitary towels (pads) and tampons, diapers	3.4
Food preparations obtained by swelling l. Roasting of cereals	10.1	Household washing machines	3.3
HHI	802	HHI	115
Wrocław	%	Zielona Góra	%
Motor vehicles for transporting ten individuals	7.6	Continuously shaped wood	24.2
Other motors and actuators	7.1	Footwear with rubber soles	11.0
Parts and accessories for motor vehicles	5.9	Lamps and lighting fittings, including reflectors	4.6
HHI	269	HHI	833

Notes: HHI – Herfindahl-Hirschman index.

Source: Own study based on the data of the Tax Administration Chamber [2018].

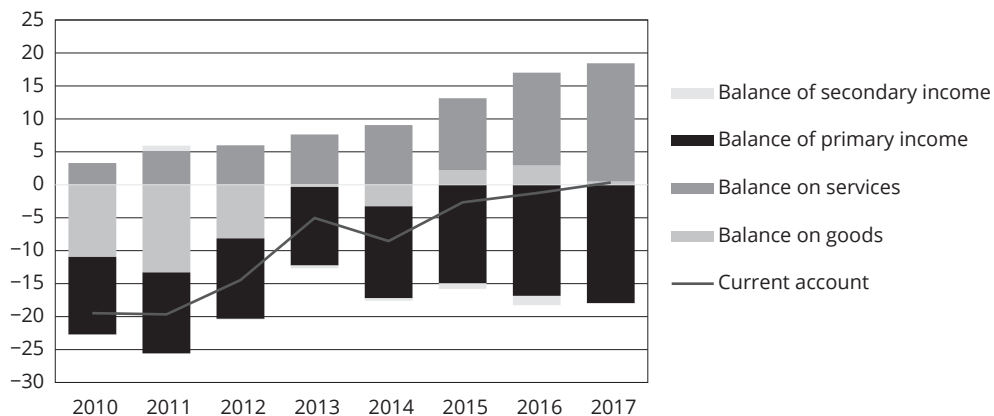
While it is difficult to indicate one group of goods characteristics for the profile of a given city with a large variety of export goods noted in voivodship cities, cities with higher levels of export concentration were very diverse in terms of their dominant export goods, with very distinct export specialization. Olsztyn was specialized in sending abroad pneumatic tires, rubber mixtures and cord fabric from yarn. Rzeszów – in turbojet and turboprop engines, complex drugs as well as drive shafts, cranks and bearings. Gorzów Wielkopolski was specialized in the export of receiving apparatus for television, insulated wires and cables as well as polyamides in basic forms. Szczecin mainly sold passenger liners, cruise boats and ferries, constructions and parts of cast iron structures, devices and equipment used in medicine. Poznań was specialized in the export of motor vehicles for transport, cars and other motor vehicles and medicines. Carpentry for construction, rolling bearings, paving slabs, tiles or wall tiles came from Kielce. Petroleum and oil, passenger liners, cruise boats and wheat were exported from Gdańsk. The biggest exporters of coal, coke as well as machinery and mechanical equipment were found in Katowice. Zielona Góra was specialized in the sale of continuously formed wood, footwear with rubber soles and lamps and lighting fitting, while Toruń mainly offered sanitary napkins (pads) and tampons as well as diapers, beet sugar and prepared food.

Payment Balance and Its Components

Poland recorded a small surplus for the first time in 2017, throughout the analyzed period of 2010–2017 (see Figure 4.1). It should be noted that, aside of 2014, it was the result of a continuous improvement in the balance, which mainly came from the surplus in trade in services, as well as, at the beginning of the period, a decrease in trade deficit, and then by a maintaining surplus. The factor that contributed to the deterioration of the current account in 2010–2017 was mainly the balance of primary incomes, resulting primarily from the transfer of income earned by foreign investors, which could not offset transfers from the European Union budget [NBP, 2015].

The analysis of the capital account based on data presented in Figure 4.2 shows that in the entire period 2010–2016, its balance was positive and increased until 2015, after which it dropped by about half in 2016. The balance increased again in 2017, which is most likely the beginning of a new upward period related to the financing of infrastructure investments in the current EU financial perspective, meaning that this tendency should be expected to continue in the following years.

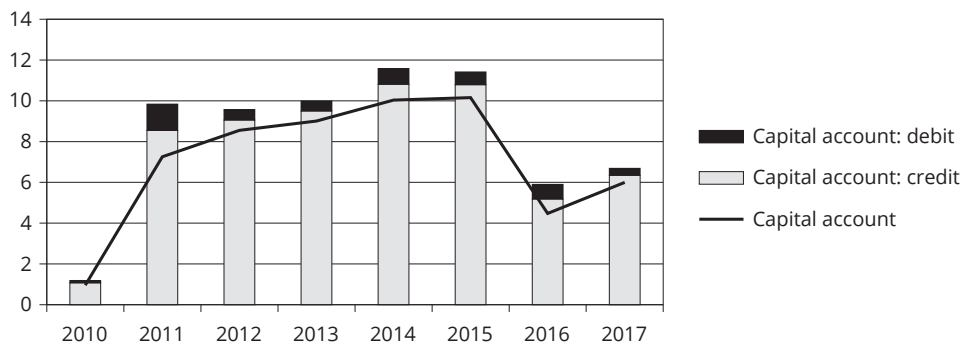
Figure 4.1. The current account and its components (2010–2017, in billion EUR)



Notes: Preliminary data for 2016 based on monthly estimates.

Source: Own study based on NBP data [2018a].

Figure 4.2. The capital account and its components (2010–2017, in billion EUR)



Notes: Preliminary data for 2016 based on monthly estimates.

Source: Own study based on NBP data [2018a].

Table 4.10. The financial account and its components (2010–2017, in billion EUR)

Specification	2010	2011	2012	2013	2014	2015	2016	2017
Financial account	-23.286	-19.686	-8.902	-4.478	-4.689	0.603	-0.499	0.515
Direct investments	7.051	3.412	1.055	-2.525	5.091	4.388	10.235	3.118
Direct investments	13.536	13.274	5.770	0.658	14.821	13.530	15.222	4.826
Portfolio investment - assets	-0.120	-0.610	0.340	1.651	4.229	9.961	-5.681	1.103
Portfolio investment - liabilities	21.795	11.730	15.635	1.776	2.422	7.091	-2.170	5.375

Specification	2010	2011	2012	2013	2014	2015	2016	2017
Other investments – assets	2.987	2.716	1.722	1.215	3.071	4.600	2.174	4.045
Other investments – liabilities	9.818	5.014	-2.786	2.613	0.277	-2.213	14.730	-10.648
Derivative financial instruments	0.449	0.119	-2.133	-0.526	-0.016	-0.879	0.125	-1.064
Official reserve assets	11.496	4.695	8.733	0.754	0.456	0.941	20.430	-7.134

Notes: Preliminary data for 2017 based on monthly estimates.

Source: Own study based on NBP data [2018a].

The last element of the balance of payments is the financial account. Table 4.10 presents data on its shape through time. It is clear that while Poland noted a significant deficit in the financial account in 2010–2014, the account has been practically balanced since 2015, with a small surplus of 0.515 billion EUR recorded in 2017.

Conclusions

It is worth mentioning that Poland recorded the highest trade surplus in its history in 2017, and for the first time in many years, there was also a small, positive, current account balance. It should also be noted that Poland has recorded a surplus in trade in goods for the third time in 2017, with an increased surplus in trade in services again throughout 2010–2017. As a result, 2017 was the first year throughout the entire period of 2010–2017, when Poland recorded a current account surplus, mainly due to a high surplus in trade. The value of Polish total exports in 2017 reached 249.8 billion EUR, of which 52 billion belonged to services, and 197.3 billion to the export of goods. Analysis of the main directions of Polish export of goods indicated that Germany remains the main market for Poland, followed by the United Kingdom, the Czech Republic, France, Italy and the Netherlands. Poland has also recorded a surplus in trade primarily with European countries, and Asian countries dominated among countries with which Poland had a trade deficit.

The analysis of the trade structure showed that the most important commodity groups in Polish exports, according to Combined Nomenclature, are: group 84 – nuclear reactors, boilers, machinery and mechanical devices, which is responsible for the export value of 26.11 billion EUR (13.21% of total export value of goods); group 87 – non-rail vehicles and their parts and accessories, which is responsible for the export worth 23.72 billion EUR (12.00% of the value of total export of goods) and group 85 – electrical machines and devices and their parts, recorders and sound players, which

corresponds to the export value of 21.40 billion EUR (10.83% of the value of total export of goods). Other major commodity groups include: 94 – furniture, bedding, mattresses, mattress supports, cushions; 39 – plastics and articles thereof; 73 – iron and steel articles; 27 – mineral fuels, mineral oils and their distillation products; 40 – rubber and rubber articles. Their combined contribution to the export of goods reached 18.46%. In regard to services in 2016 Poland recorded the highest value of exports in the following categories: transport services, international travel, other business services, telecommunications, IT and information services. As in previous years, the largest deficit in Poland was due to fees for the use of intellectual property.

The analysis of exports from the voivodship cities indicated their substantial diversification in terms of export volume. Warsaw remained an apparent leader, followed by Poznań, which reached almost half of Warsaw's exports. The next largest export cities are Gdańsk, Łódź, Wrocław and Cracow. The total value of their exports ranged halfway between Warsaw and Poznań. The main geographical directions of exports from Polish voivodship cities are similar to those that characterize Polish exports. The two cities that stood out from this general regularity were Szczecin, which additionally exported ships and boats to the countries of Antigua and Barbuda, as well as Rzeszów, which primarily exported to the USA and Canada. An analysis of the commodity structure of exports from voivodship cities indicated a considerable variety of goods, and Warsaw, Cracow, Wrocław and Bydgoszcz had a very diversified export structure. There was, however, a group of cities with very narrow export specialization, including: Olsztyn, which mainly offered pneumatic tires and rubber mixtures; Rzeszów, which exported turbojet and turboprop engines; Gorzów Wielkopolski, which specialized in, among others, the export of reception apparatus for television; Szczecin, which sold, among others, passenger liners, cruise boats and ferries.

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Impact of Foreign Direct Investment on the Urbanization Process in Poland. Heterogeneity of Regions

Tomasz Marcin Napiórkowski

Introduction

There is a significant number of literature that characterizes the relationship between Foreign Direct Investment (FDI) and the host country's economy from the macroeconomic level [e.g., Napiórkowski, 2017]. While the results of research carried out by various scientists are not always consistent with each other or theory [e.g. Nair-Reichert, Weinhold, 2001; McGrattan, 2011; Iamsiraroj, Ulubaşoğlu, 2016], the vast majority of literature and empirical conclusions confirms the positive impact of FDI on the state and economic development of the host country. This is due to: 1) increased investments and their value added (especially in developing countries, where the effect of crowding out domestic investments does not exist or its scale is very limited) [Pilbeam, Obolevičiute, 2012]; 2) higher incomes [Tomohara, Takii, 2011; Javorcik, 2015], which translate into an increased consumption; 3) technology transfer [Liu et al., 2016; Svedin, Stage, 2016] and the transfer of knowledge i.e., know-how [Tülüce, Doğan, 2014; Temiz, Gökmen, 2014].

The aim of the study is to analyze the relationship between the degree of urbanization and FDI as well as between the degree of urbanization and competitiveness (Figure 5.1), and answering two research questions (PB1 and PB2) will help in that:

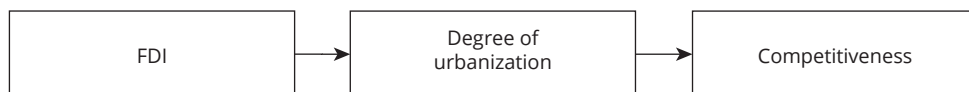
- (PB1) Is the investment activity of foreign companies in Poland linked to the degree of urbanization of voivodships in Poland?
- (PB2) Is the degree of urbanization in voivodships in Poland related to their competitiveness?

Research hypotheses corresponding to research questions have a positive character.

The first research tool is a literature review of the topic. The works were selected based on relevance and the times cited in the Web of Science and Science Direct databases. The second research tool is data analysis through mapping (i.e., by putting

data on the map of Poland) pairs of three issues, which will allow for a comparative analysis of each of the 16 voivodships. In addition, trend analysis and correlation analysis between the examined pairs are carried out¹.

Figure 5.1. Research presentation



Source: Own study.

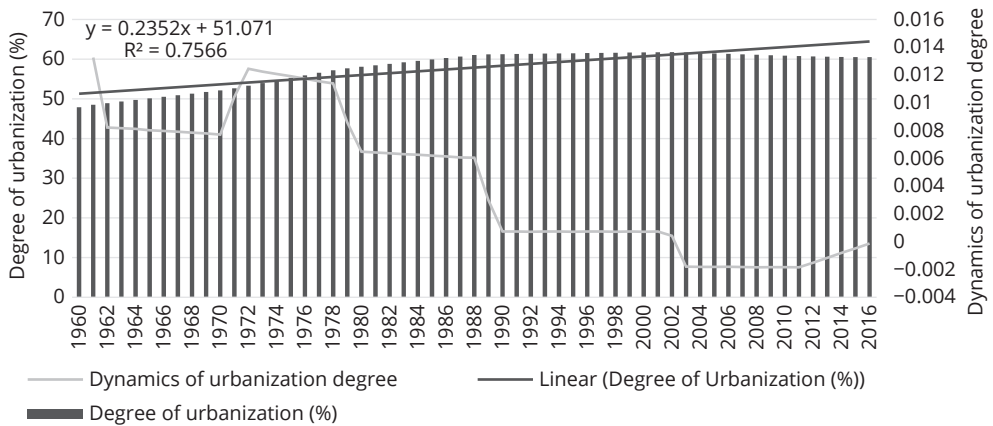
Degree of Urbanization in Polish Regions

The degree of urbanization (share of people living in cities in the total population according to the UN [2017]) in Poland in 2016 amounted to 60.53% [World Bank, 2017]. Analyzing the degree of urbanization in Poland from the historical perspective (1960–2016), it can be seen (see Figure 5.2) that the general upward trend is mainly due to changes from 1960 to the end of the 1980s. Afterwards, the upward trend stopped and (since 2003) the degree of urbanization has begun to decline. Interestingly, Poland is one of the five countries according to the UN report [2015], in which in 1990–2014 there was a decrease in urbanization with a parallel increase in rural areas. According to UN forecasts [2015], the level of urbanization in Poland should increase by 2050 to 70%, which is below the value calculated on the basis of a long-term linear trend (i.e., 72.47%).

In 2016, the largest share of population living in cities was recorded in the Śląskie voivodship (76.99%), and the smallest (41.18%) – in the Podkarpackie voivodship (Table 5.1). It is surprising that at a certain point in time, one can notice a lack of dynamics of the studied degree of urbanization. The average change in the years 2010–2016 for the whole group of voivodships is –0.47 p.p.; the largest increase was recorded in the Lubuskie voivodship (1.41 p.p.), and the lowest (–1.68 p.p.) – in the Pomorskie voivodship (Figure 5.3).

¹ The original assumption of the study was to use econometric models in which the urbanization variables (PB1) and competitiveness (PB2) would be dependent variables but based on the available data, it was not possible to build models that would meet the restrictive requirements allowing for interpretation of estimated parameters and thus ratios (i.e., coefficients) of used explanatory variables.

Figure 5.2. Degree of urbanization in Poland



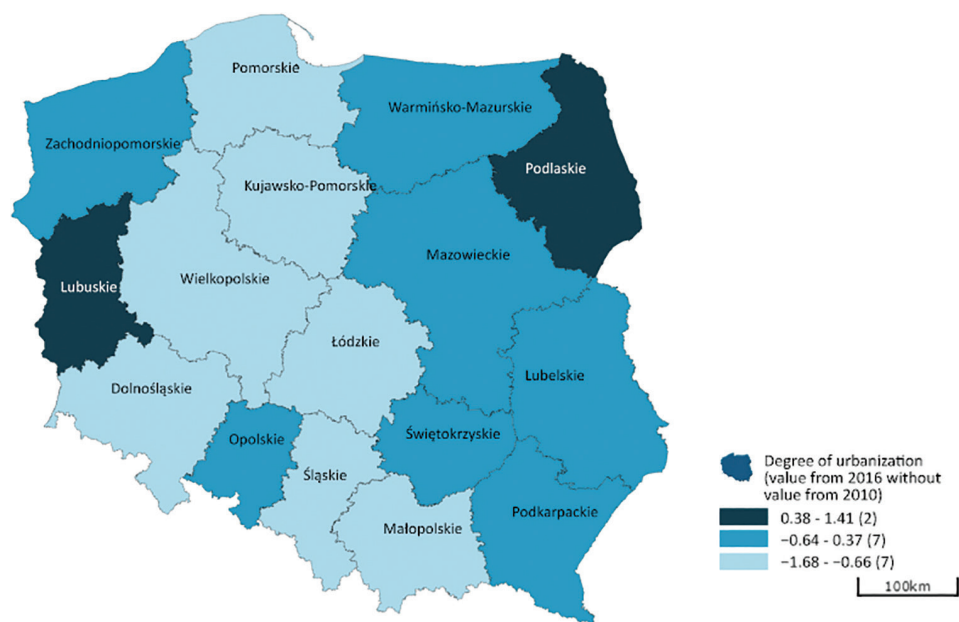
Source: Own study based on World Bank's data [2017].

Table 5.1. Degree of urbanization in Polish voivodships (in %)

Voivodship	2010	2011	2012	2013	2014	2015	2016
Łódzkie	63.83	63.76	63.62	63.39	63.23	63.08	62.91
Mazowieckie	64.19	64.19	64.18	64.16	64.25	64.28	64.29
Małopolskie	49.16	49.06	48.87	48.72	48.62	48.48	48.41
Śląskie	77.83	77.69	77.56	77.40	77.26	77.13	76.99
Lubelskie	46.50	46.47	46.42	46.25	46.22	46.18	46.38
Podkarpackie	41.29	41.37	41.35	41.25	41.35	41.25	41.18
Podlaskie	60.03	60.29	60.34	60.41	60.48	60.56	60.65
Świętokrzyskie	45.14	45.03	44.91	44.77	44.64	44.64	44.57
Lubuskie	63.50	63.40	63.28	63.14	63.09	64.96	64.91
Wielkopolskie	55.92	55.68	55.46	55.20	55.07	54.87	54.68
Zachodniopomorskie	68.81	68.84	68.76	68.63	68.65	68.56	68.50
Dolnośląskie	69.94	69.76	69.60	69.42	69.28	69.17	68.95
Opolskie	52.39	52.31	52.24	52.12	52.02	51.92	51.86
Kujawsko-Pomorskie	60.58	60.39	60.20	60.04	59.83	59.64	59.47
Pomorskie	65.89	65.62	65.39	65.14	64.87	64.42	64.21
Warmińsko-Mazurskie	59.48	59.37	59.30	59.25	59.16	59.07	59.03

Source: Own study based on GUS data [2017a].

Figure 5.3. Dynamics of urbanization in the period 2010–2016 in Polish voivodships



Source: Figure according to GUS data [2017a], generated in the Dzielnicowa Baza Wiedzy Atlas Regionów [GUS, 2017a].

Literature Review: Attractiveness of Regions for Foreign Direct Investment and Urbanization

The aim of the literature review is to show the relation between the FDI, urbanization (PB1) and the resulting competitiveness of the regions (PB2). The literature of the subject is dominated by research on the regions of China, which is reflected in the selection of works. It is worth noting that in the cited research on China, the authors' conclusions are virtually identical.

Hosting FDI has a positive impact on the urbanization process (PB1). Such a conclusion was reached, e.g., by Chen and Wu [2017]. The authors used data on 262 Chinese cities and showed that this effect is heterogeneous with respect to regions. More precisely, it occurs in coastal regions, but not in regions located inside China. Hu and Chen [2015] see a significant role of FDI activity in the urbanization process, especially in developing countries. According to the authors, the accelerated urbanization process in developing countries is a response to the ongoing globalization process. The role of FDI (along with economic growth and policy on urbanization), as a factor determining the urbanization process (with the heterogeneity of this impact

depending on the region), was also emphasized by Zhang [2002]. Can-Ming and Jin-Jun [2015] point out that the relationship between FDI and the urbanization process is bilateral. Based on the research on American companies by Poelhekke and van der Ploeg [2009], the authors also indicate cities as significant factors attracting FDI. In addition, authors say that their results emphasize the risk of too large cities i.e., the effect of urbanization as a factor determining FDI flows will be significantly reduced by such negative aspects as overpopulation or environmental pollution.

The authors of the studies claim that heterogeneous distribution of FDI activity between host country's regions translates into an uneven urbanization process, which leads to the deepening of differences between regions and their relative competitiveness (PB2). The described differences usually appear at the economic level and in wages. The research results of Hu and Chen [2015] coincide with what Chen and Wu have pointed out [2017] i.e., the activity of FDI has contributed to the widening the gap in the level of urbanization and economic progress between regions. Hu and Chen [2015] state that the majority of FDI activity in China (70%) is concentrated in coastal regions which is the factor behind such divergence. Liu et al. [2014], while studying the impact of FDI on the economic development of regions in China, concluded that the uneven distribution of FDI among regions deepens the gap in development between the surveyed areas. The channels through which the described FDI phenomenon takes place include physical capital and technological development. On the other hand, the authors emphasize that FDI contributes to the reduction of the described gap by influencing the level of education (especially higher education), infrastructure, government revenues, opening up to trade and surplus of exports. Similar conclusions were reached by Wen [2012], who in a study on two areas in China (Yangtze Delta and Pearl River Delta) showed that FDI can affect the convergence of economic growth both, positively (Yangtze Delta) and negatively (Pearl River Delta). The author emphasizes that the described differences (including the impact of FDI on labor productivity) underline the importance of policies related to attracting FDI and promoting urbanization. Chintrakarn et al. [2012], when examining the relationship between FDI inflow and heterogeneity of wages in the US, proved that in the long run FDI is a significant factor supporting wage homogenization and emphasized that these conclusions cannot be transferred to individual states, which highlights the heterogeneity of results between the panel and aggregate of individual elements. Lin et al. [2013] showed that FDI has a disproportionate positive impact on regions with a relatively low-income level, but only up to a certain critical point represented by the level of human capital. After exceeding this point, the benefits of FDI are focused on the "not-poor" at the expense of "not-rich", increasing the heterogeneity of income. The influence of FDI on income inequality, based on the study of Latin American economies,

was proved by Herzer et al. [2014]. Chen [2016] identified channels through which FDI diminishes the income gap between urban and rural areas. These are: stimulating employment, indirect knowledge transfer and impact on economic growth. At the same time, the impact of FDI on foreign trade has the opposite effect.

Turning to the relationship between the degree of urbanization and the competitiveness of regions (PB2), the first step is to define the dependent variable given. The competitiveness of regions (urban competitiveness) can be defined as the ability to produce welfare for citizens effectively in relation to other regions [Ni et al., 2014]. From an empirical point of view, Hlaváček [2016] analyzed the competitiveness of regions in the Czech Republic and Slovakia. The result of this study was the conclusion that regions with higher competitiveness potential are characterized by a higher degree of urbanization. Zhu [2016] while examining Guangxi, an autonomous region in the south of China, mentions the level of urbanization as one of the main factors determining the competitiveness of services.

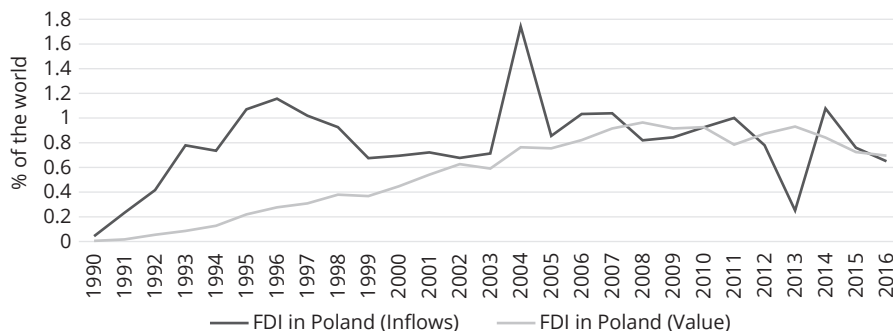
The analysis of the literature on the subject shows that FDI flows positively affect the degree of urbanization – mainly by stimulating economic growth (PB1) and the degree of urbanization positively translates into the competitiveness of the regions (PB2). However, these relations are not homogeneous across cross-sections of the host country.

Activity and Location of Foreign Companies in Poland

When analyzing the activity of foreign investors in Poland, key changes can be noticed in recent years (Figure 5.4). Due to Poland's accession to the European Union in 2004, there has been an increase in the relative attractiveness (measured as a share of the world's FDI located in Poland) of Poland for FDI investors. After 2008, the relative attractiveness of Poland halted its growth at 0.96% level. This is connected with the occurrence of a financial crisis in this period. The first significant decrease in the relative attractiveness of Poland has already occurred in 2011, but it is since 2013 when Poland has been constantly losing relative FDI attractiveness. These changes are also reflected to some extent in FDI inflows.

Observing the activity of foreign investors in individual Polish voivodships, one can notice a significant heterogeneity of the studied phenomenon, which coincides with the conclusions encountered during the analysis of the literature on the subject. Using the foreign capital variable expressed in PLN million [GUS, 2017b], it can be seen that in each of the analyzed years the highest value of foreign capital is recorded in the Mazowieckie voivodship, and the lowest – in the Podlaskie voivodship (see Table 5.2).

Figure 5.4. Relative attractiveness of Poland as a FDI host country



Source: Own study based on UNCTAD data [2017].

Table 5.2. Foreign capital in Polish voivodships (million PLN)

Voivodship	2010	2011	2012	2013	2014	2015
Łódzkie	4,370.80	4,735.70	4,854.50	4,892.30	4,994.60	5,147.50
Mazowieckie	79,178.10	79,866.10	88,643.00	93,014.60	97,115.50	96,592.00
Małopolskie	10,424.20	10,588.30	12,233.90	12,471.70	12,963.00	12,578.10
Śląskie	14,025.80	14,598.50	15,431.40	15,634.80	16,162.10	17,094.30
Lubelskie	1,024.50	1,238.30	1,252.20	1,310.50	1,473.90	1,578.50
Podkarpackie	1,989.40	2,014.10	2,270.20	5,422.00	5,476.00	5,440.70
Podlaskie	422.70	445.70	547.10	636.20	395.30	438.50
Świętokrzyskie	2,589.00	2,487.70	2,576.70	2,801.80	2,900.80	2,685.60
Lubuskie	1,881.40	1,834.40	1,843.60	1,898.50	1,497.20	1,443.70
Wielkopolskie	14,284.10	14,771.80	15,529.30	15,648.00	15,841.10	21,930.90
Zachodniopomorskie	4,253.70	4,083.80	4,795.60	5,079.30	7,669.10	7,789.40
Dolnośląskie	14,509.90	14,961.10	16,11.50	16,136.30	15,696.10	16,875.20
Opolskie	1,525.60	1,473.10	1,556.70	2,092.90	2,045.90	2,093.90
Kujawsko-Pomorskie	2,771.20	3,010.90	3,017.80	2,989.70	2,865.20	2,774.30
Pomorskie	4,585.40	6,896.40	7,146.00	6,734.90	7,184.60	7,976.40
Warmińsko-Mazurskie	1,431.60	1,553.40	1,562.90	1,479.60	1,516.40	1,458.80

Source: Own study based on GUS data [2017b].

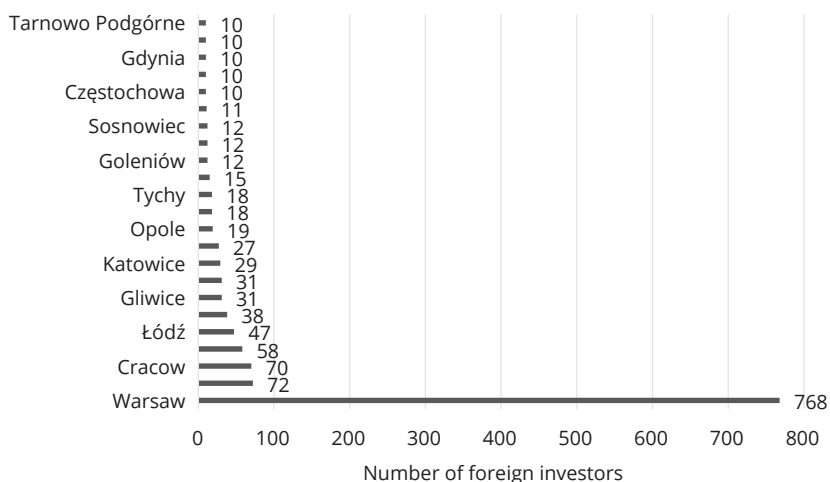
Using the variable "entities with foreign capital per 10,000 population" [GUS, 2017a] the Mazowieckie voivodship was and still is located in the first place in each of the surveyed years (see Table 5.3). In 2015, enterprises with foreign capital in this voivodship accounted for 21.94% of the total. The lowest values are recorded in the Podlaskie and Świętokrzyskie voivodships.

Table 5.3. Entities with foreign capital per 10,000 population

Voivodship	2010	2011	2012	2013	2014	2015
Łódzkie	3.7	4.1	4.2	4.3	4.2	4.2
Mazowieckie	16.3	17.9	18.8	19.0	19.3	18.8
Małopolskie	4.4	4.7	4.9	4.9	5.2	5.2
Śląskie	4.5	4.9	5.1	5.2	5.3	5.3
Lubelskie	1.6	1.6	1.8	1.9	2.1	2.1
Podkarpackie	1.6	1.8	2.0	2.2	2.3	2.5
Podlaskie	1.2	1.3	1.5	1.5	1.5	1.6
Świętokrzyskie	1.4	1.4	1.4	1.5	1.5	1.4
Lubuskie	7.6	7.9	7.5	7.2	7.0	6.5
Wielkopolskie	6.0	6.4	6.6	6.6	6.7	6.6
Zachodniopomorskie	7.5	8.0	8.4	8.5	8.4	8.8
Dolnośląskie	7.8	8.1	8.2	8.1	8.0	7.8
Opolskie	4.6	4.9	5.0	4.9	4.7	4.4
Kujawsko-Pomorskie	2.7	2.8	2.8	2.8	2.7	2.7
Pomorskie	5.5	5.9	6.1	6.2	6.2	5.9
Warmińsko-Mazurskie	2.1	2.2	2.2	2.1	2.1	1.9

Source: Own study based on GUS data [2017a].

The presented results coincide with data showing the number of the largest foreign investors in Poland at the city level (Figure 5.5).

Figure 5.5. List of cities with a number of foreign investors (minimum 10)

Source: Own study based on the data of the Polish Investment and Trade Agency [2016].

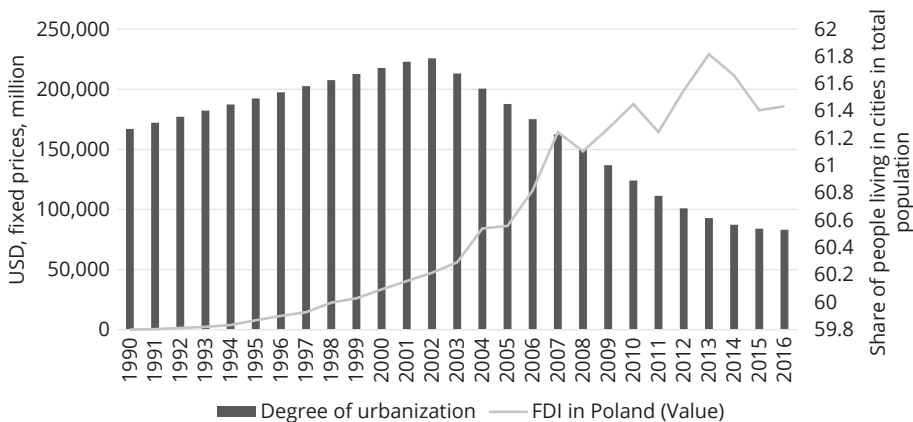
The presented data show the occurrence of heterogeneity among regions regarding the FDI activity, which (in comparison with the conclusions derived from the literature review) provides the basis for the occurrence of uneven impacts on economic development of the studied voivodships.

Relationship of Foreign Direct Investments with the Urbanization Process in Poland

The aim of this part of the study is to translate the first main conclusion derived from the review of literature, namely the existence of a relationship between the degree of urbanization and FDI (PB1), with data for Poland.

When analyzing the relationship between FDI resources in Poland and the degree of urbanization in the whole country (Figure 5.6), it is difficult to notice a significant relationship. This is because in 1990–2002 both values grew, but after 2002 FDI resources started their greatest growth, while the degree of urbanization in Poland began to decline. While the value of FDI inflows to Poland is more in line with the parabolic shape of changes in the degree of urbanization, there are still no indication for FDI inflows, characterized by significant dynamics, to translate into a relatively static urbanization process in Poland (Figure 5.7).

Figure 5.6. Degree of urbanization and FDI state in Poland in the period 1990–2016

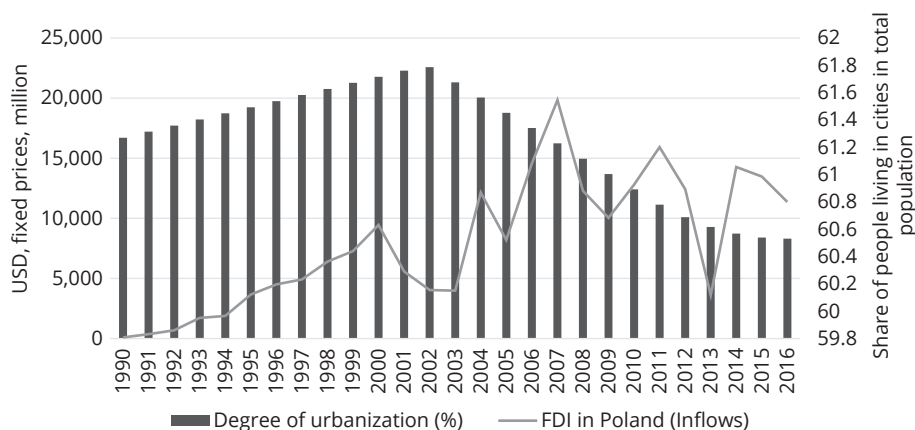


Source: Own study based on UNCTAD [2017] and GUS [2017a] data.

Putting values representing FDI activity (i.e., foreign capital value – Figures 5.8 and 5.9 – and entities with foreign capital per 10,000 population – Figures 5.10 and 5.11) and the degree of urbanization on the map of Poland, suggests that the level of

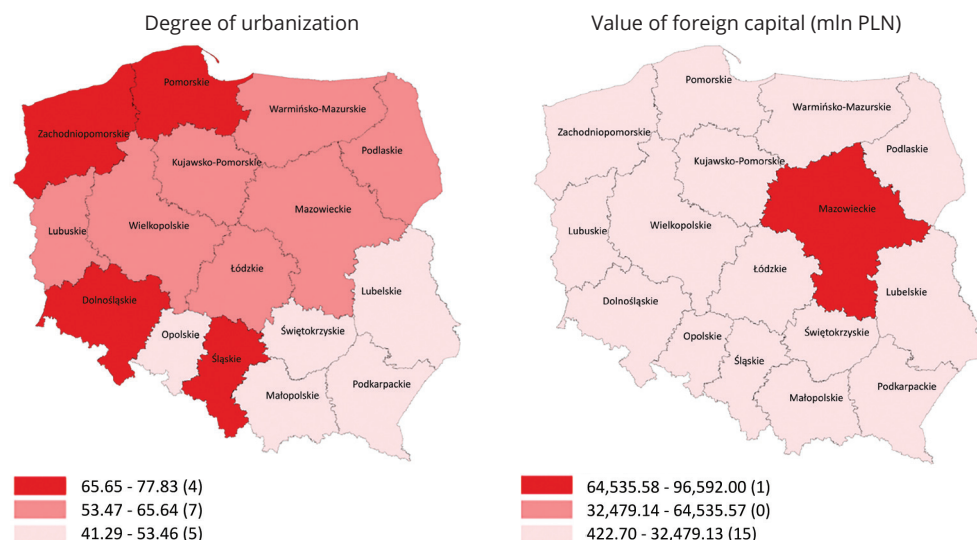
urbanization is not related to FDI activity. For example, the Mazowieckie voivodship enjoys high FDI activity, but is included among medium-urbanized voivodships; while the Śląskie voivodship has a high degree of urbanization, but relatively low FDI activity.

Figure 5.7. Degree of urbanization and FDI inflow in Poland in the period 1990–2016



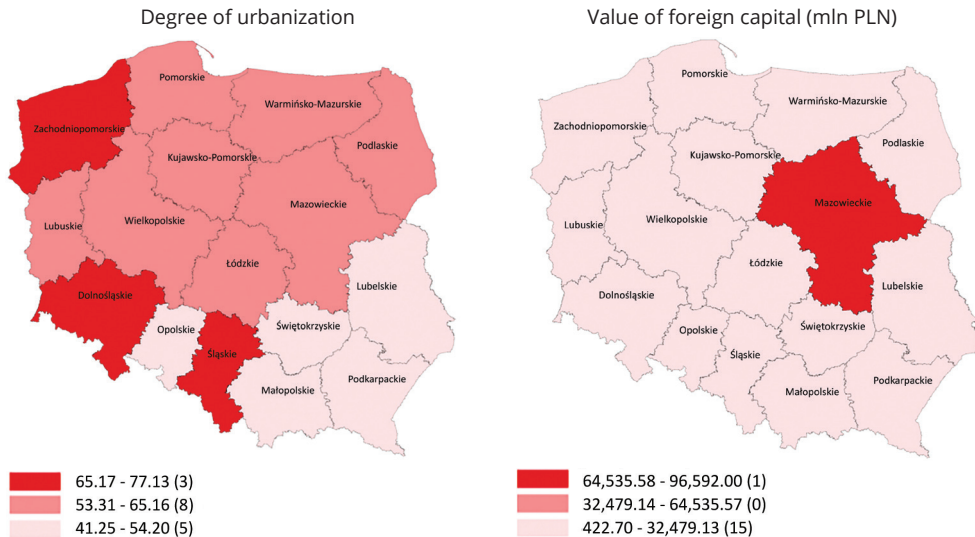
Source: Own study based on UNCTAD [2017] and GUS [2017a] data.

Figure 5.8. Comparison of degree of urbanization and value of foreign capital in entities with foreign capital in Polish voivodships in 2010



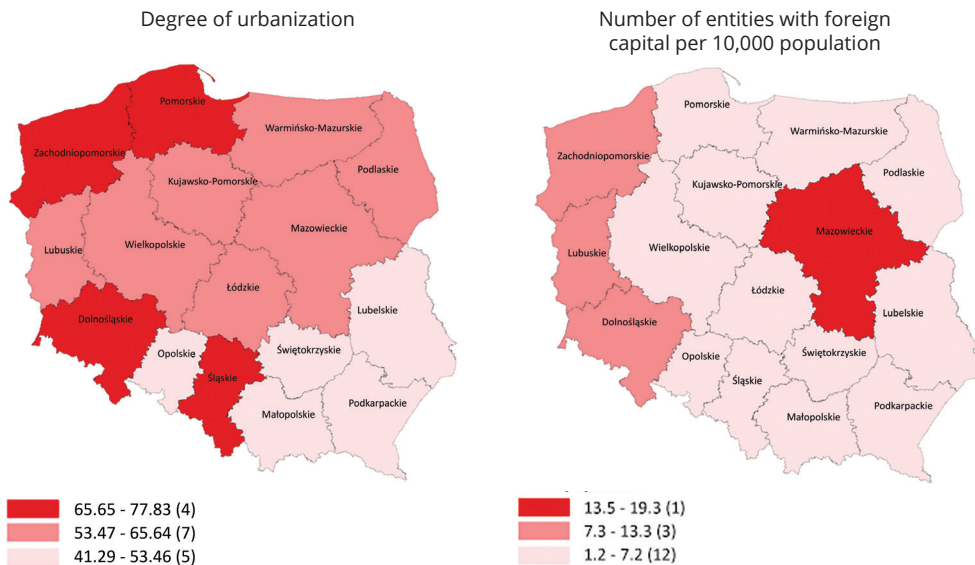
Source: Figure based on GUS data [2017a, 2017b], generated in Dziedzina Baza Wiedzy Atlas Regionów [GUS, 2017a].

Figure 5.9. Comparison of degree of urbanization and value of foreign capital in entities with foreign capital in Poland in 2015



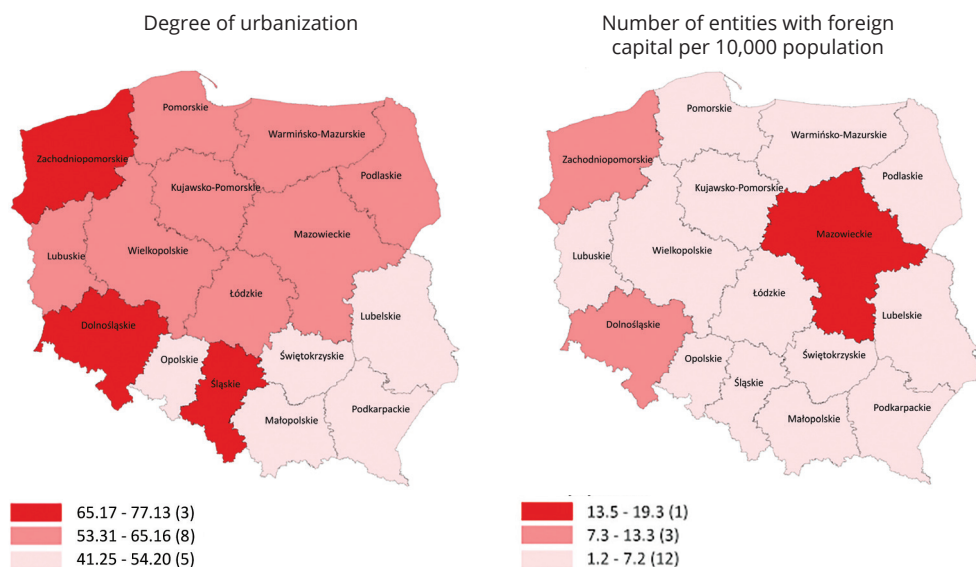
Source: Figure based on GUS data [2017a, 2017b] generated in the Działdzinowa Baza Wiedzy Atlas Regionów [GUS, 2017a].

Figure 5.10. Comparison of degree of urbanization with number of entities with foreign capital per 10,000 population in Polish voivodships in 2010



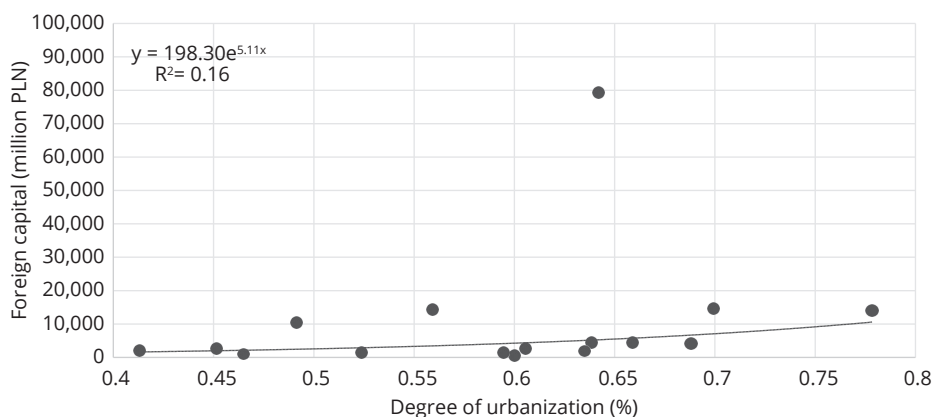
Source: Figure based on GUS data [2017a], generated in Działdzinowa Baza Wiedzy Atlas Regionów [GUS, 2017a].

Figure 5.11. Comparison of degree of urbanization with number of entities with foreign capital per 10,000 population in Polish voivodships in 2015



Source: Figure based on GUS data [2017a], generated in Dziedzina Baza Wiedzy Atlas Regionów [GUS, 2017a].

Figure 5.12. Degree of urbanization and value of foreign capital in entities with foreign capital in Polish voivodships in 2010

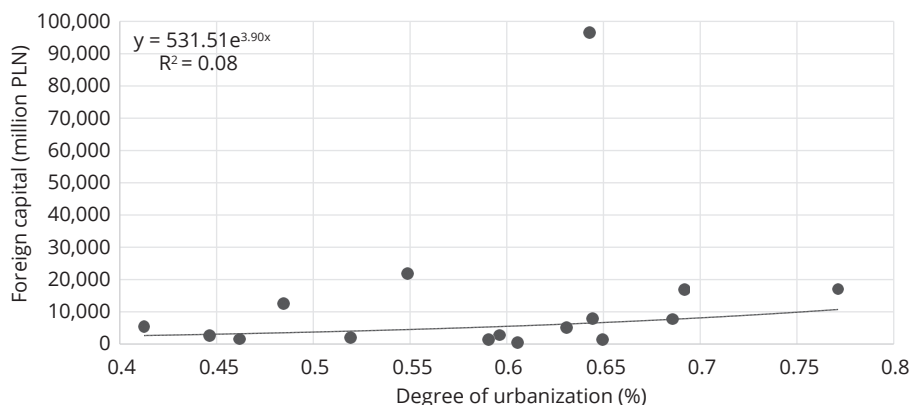


Source: Own study based on GUS data [2017b, 2017a].

By using the first measure (i.e., the value of foreign capital) for the first year of analysis i.e., for 2010 (Figure 5.12) and for 2015 – the final year of analysis (Figure 5.13), it is not possible to determine the existence of a direct relationship between foreign capital and the degree of urbanization, or at least not of a significant power. Using

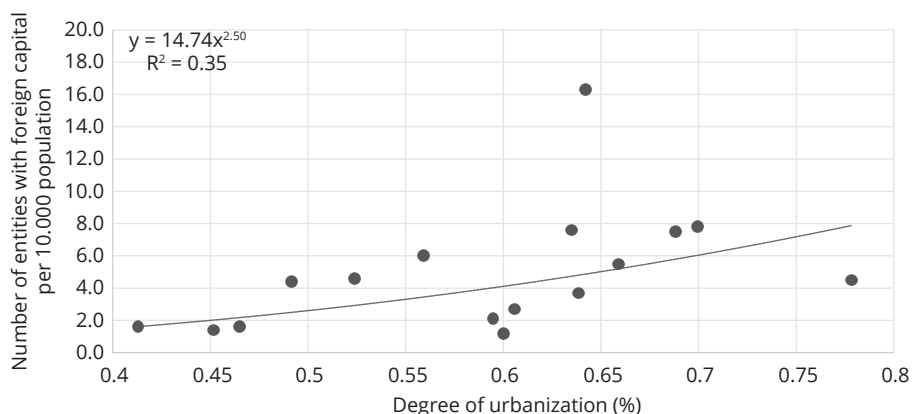
the number of entities with foreign capital per 10,000 population (2010 – Figure 5.14; 2015 – Figure 5.15), an increase in the value of the trend's determination coefficient can be observed, the type of which (e.g., linear versus exponential) was selected with the objective of maximizing the R^2 statistics.

Figure 5.13. Degree of urbanization and value of foreign capital in entities with foreign capital in Polish voivodships in 2015



Source: Own study based on GUS data [2017b, 2017a].

Figure 5.14. Degree of urbanization and number of entities with foreign capital per 10,000 population in Polish voivodships in 2010

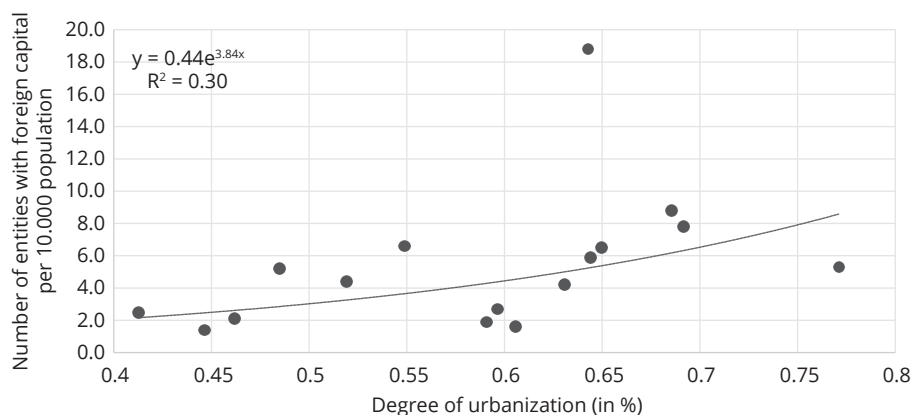


Source: Own study based on GUS data [2017b, 2017a].

The analysis of Pearson linear correlation coefficient shows that there is a positive and weak (0.2377) and statistically (with a statistical significance level of 5%) significant (p value = 0.0197) correlation between the degree of urbanization and the value of

foreign capital. For the second pair (i.e., the degree of urbanization and the number of entities with foreign capital per 10,000 population), the calculated correlation is positive, moderate (0.4423) and statistically significant (p value = 0.000).

Figure 5.15. Degree of urbanization and number of entities with foreign capital per 10,000 population in Polish voivodships in 2015



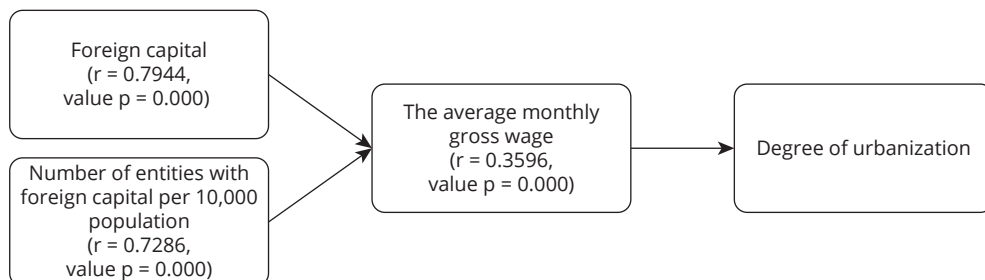
Source: Own study based on GUS data [2017a].

Bearing in mind that hosting FDI affects both, a significant number of macroeconomic variables directly and indirectly, it is possible that the results of correlation analysis deviate from previous observations due to the occurrence of the so-called third variable. Such a variable can be, for example, an average remuneration, which increases with the increase in FDI activity, which leads to an increase in the number of people interested in working in a given region/city, which increases the degree of urbanization there (Figure 5.16)².

The results of the analysis conducted so far suggest that although there is no direct relationship between FDI activity and the degree of urbanization, it is possible (based on the analysis of the literature related to urbanization and benefits of hosting FDI) to hypothesize that the studied relationship exists, but it is not direct, which coincides with the conclusions presented during the literature review.

² Bearing in mind that economic development is a factor determining the degree of urbanization [e.g., Zhang, 2002; Hofmann, Wan, 2013], any variable influenced by FDI, which itself affects economic development, can fulfill the described function.

Figure 5.16. The scenario of the relationship between FDI activity and the degree of urbanization through average wages



Notes: The direction of the relationship was determined on the basis of the literature, given values regarding the Pearson linear correlation coefficient apply to a given variable with the next variable in the chain.

Source: Own study based on GUS data [2017b, 2017a].

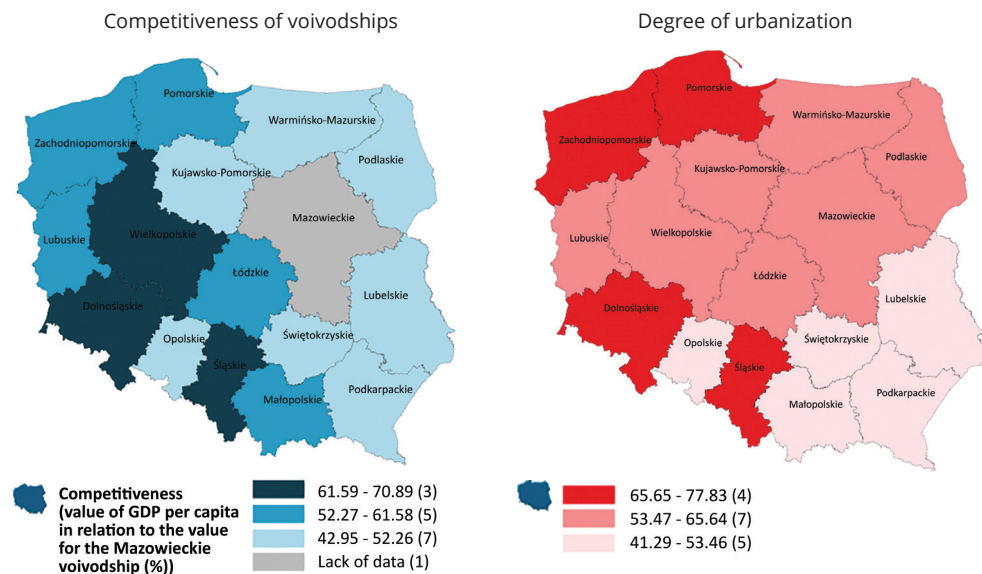
The Relationship Between the Degree of Urbanization in Poland and the Competitiveness of Regions

The last part of the empirical study is devoted to finding an answer to the second research question regarding the existence of a connection between the degree of urbanization and competitiveness of voivodships (PB2). The definition of competitiveness in the sense of relative production efficiency [Ni et al., 2014] is represented as the value of GDP per capita [GUS, 2017a]³ (a measure often used to measure welfare) in each of the individual voivodships in relation to the value for the Mazowieckie voivodship.

By analyzing the trend lines between the degree of urbanization and competitiveness of individual voivodships (without the Mazowieckie voivodship, as it is the reference point) both for 2010 (Figure 5.19) and for 2015 (Figure 5.20), one can notice a positive relationship between the studied variables. In both years, the Śląskie and Dolnośląskie voivodships simultaneously have a high degree of urbanization and high competitiveness. On the other hand, the spectrum includes Lubuskie, Podkarpackie and Świętokrzyskie voivodships. In the case of the study of the relation between FDI activity and the degree of urbanization, the Mazowieckie voivodship was an extreme value but, in this case, the Wielkopolskie voivodship has such a value. It shows a very high (third in 2010 and second in 2015) competitiveness with a relatively average degree of urbanization.

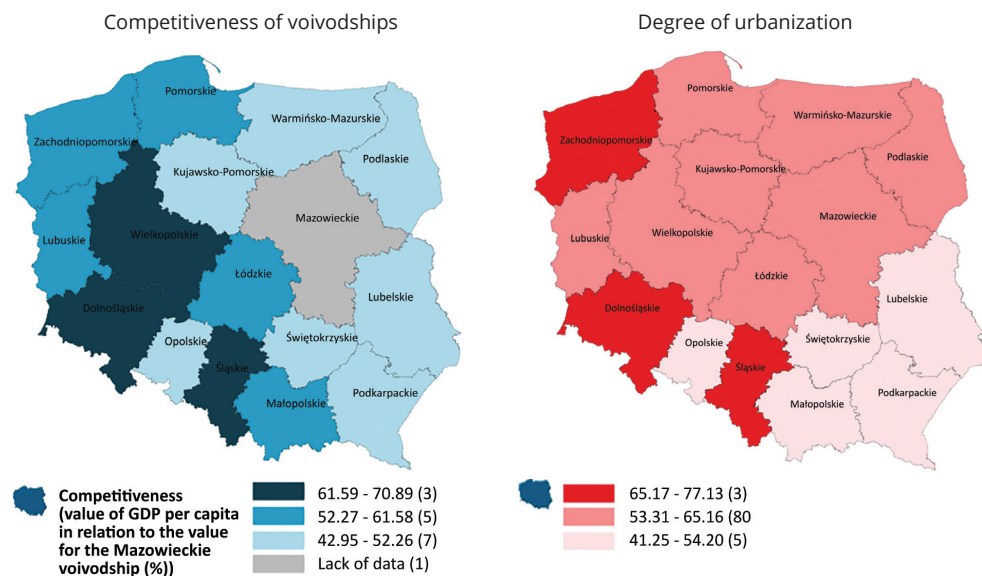
³ For 2015, for the variable gross domestic product per capita, the data had to be estimated for the needs of the study assuming that the value changes seen in the period 2013–2014 are continued in the period 2014–2015.

Figure 5.17. Comparison of competitiveness of voivodships with the degree of urbanization in 2010



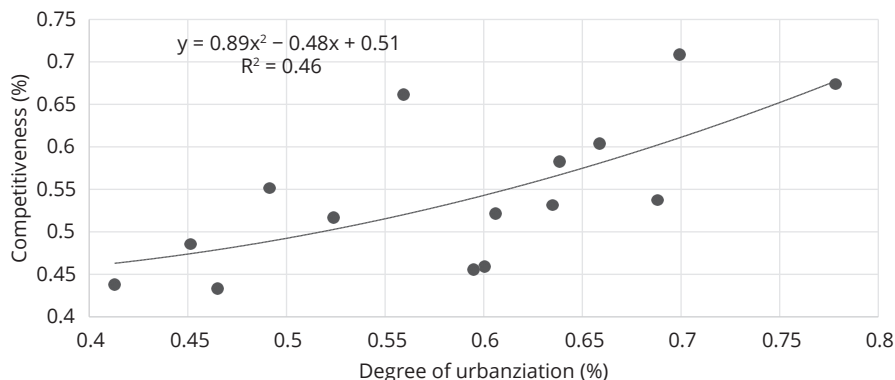
Source: Figure based on GUS data [2017a], generated in Dziedzina Baza Wiedzy Atlas Regionów [GUS, 2017a].

Figure 5.18. Comparison of competitiveness of voivodships with the degree of urbanization in 2015



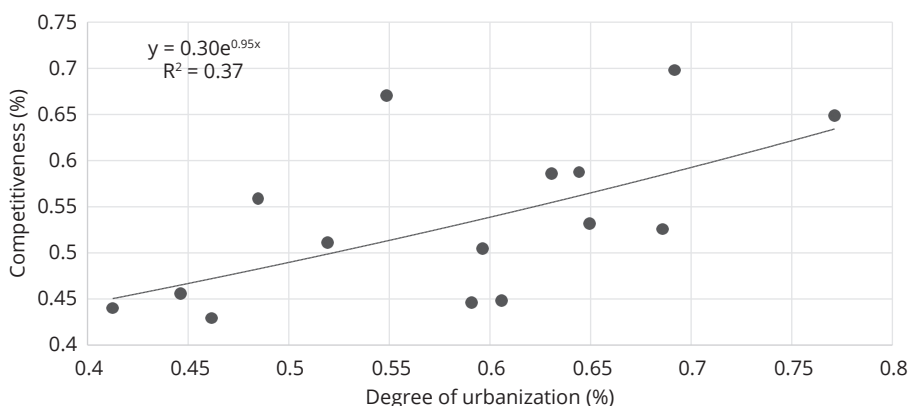
Source: Figure based on GUS data [2017a], generated in Dziedzina Baza Wiedzy Atlas Regionów [GUS, 2017a].

Figure 5.19. Competitiveness and degree of urbanization in Polish voivodships in 2010



Source: Figure based on GUS data [2017a], generated in Dziedzina Baza Wiedzy Atlas Regionów [GUS, 2017a].

Figure 5.20. Competitiveness and degree of urbanization in Polish voivodships in 2015



Source: Figure based on GUS data [2017a], generated in Dziedzina Baza Wiedzy Atlas Regionów [GUS, 2017a].

Turning to the analysis of Pearson correlation, this coefficient for a pair competitiveness-degree of urbanization is positive, high (0.627) and statistically significant (p value = 0.000), which fits with earlier conclusions.

Conclusions

The aim of the study was to analyze the relationship between the degree of urbanization and FDI as well as between the degree of urbanization and competitiveness. Based on a review of the literature, the existence of tested relationships was confirmed.

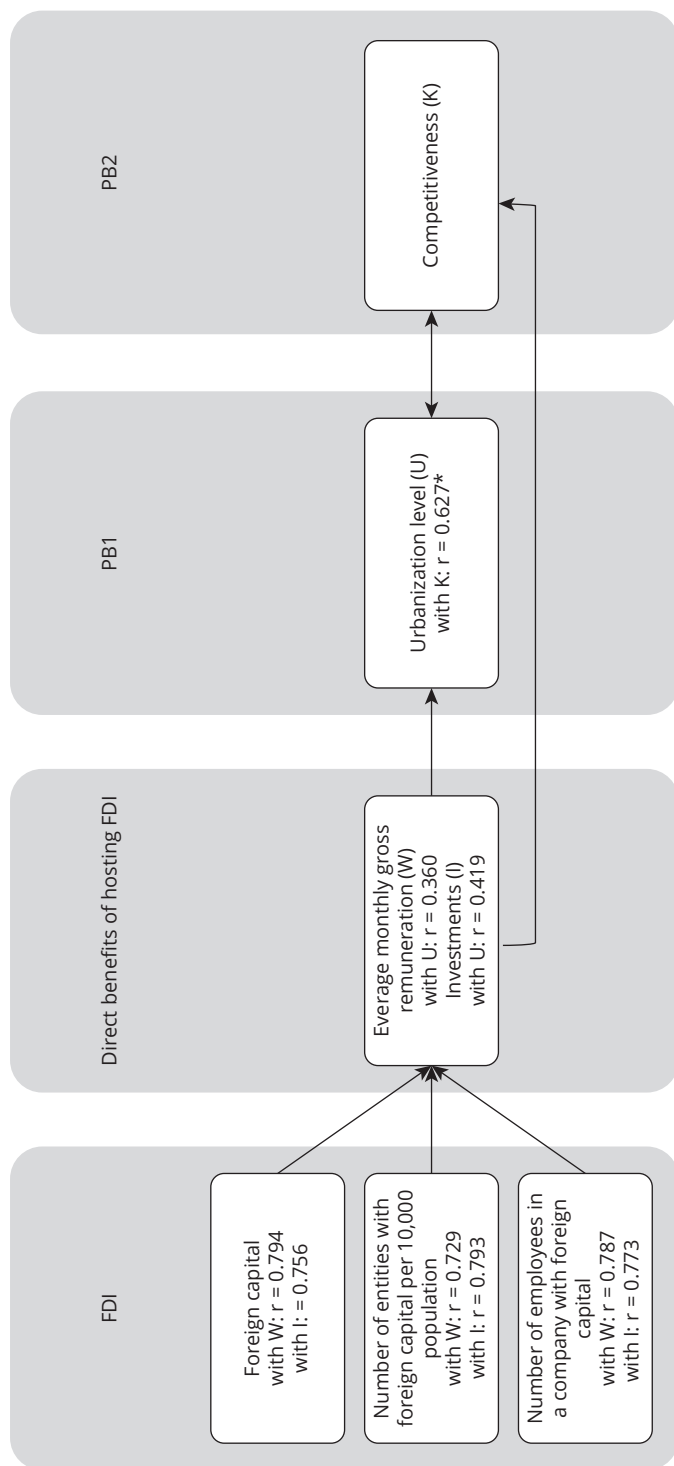
At the same time, a point was made on the danger for sustainable development of Polish regions, resulting from the heterogeneity of the FDI occurrence and the degree of urbanization.

On the basis of the literature describing the impact of FDI on the host economy as well as the trend and correlation analyses, it was established that there is a relation between FDI activity and the degree of urbanization, but this relationship is not of a direct one. Using the GDP per capita ratio in each of the Polish voivodships in relation to GDP per capita in the Mazowieckie voivodship as the most developed region, not only heterogeneity of economic development among voivodships in Poland was emphasized, but also it was shown that there is a connection between the degree of urbanization and relative competitiveness of voivodships (Figure 5.21).

The implication of the results is to emphasize the need to stimulate the urbanization process in Poland, bearing in mind that the activity of FDI (or the benefits of hosting them) is just one of many factors determining this process. As previous research has shown, stimulation of the urbanization process itself is not sufficient i.e., it should be supplemented with efforts of equal progress of this phenomenon. Otherwise, the heterogeneity of the dynamics of urbanization among the regions will only deepen the economic gap between the voivodships [see Buckley et al., 2002]. Additionally, high degree of heterogeneity among voivodships in terms of foreign investment activity with a major concentration of this phenomenon in Mazowieckie voivodship and especially in Warsaw is a high threat to sustainable development of Poland. Selected strategies aimed at the economically convenient location of FDI in Poland have been described by Napiórkowski [2016].

The main limitation of the research are the empirical methods used in it, or rather the lack of methods that would allow for an establishment of a cause-and-effect relationship between the degree of urbanization and FDI, and between the competitiveness and the degree of urbanization in voivodships in Poland (econometric model could be such a tool). The reason for the limitation is a relatively limited access to data. The results of this study should serve as hypotheses that (after acquiring access to a larger database) should be tested with more advanced econometric methods.

Figure 5.21. Summary of the analysis



r – Pearson correlation coefficient. The given ratios are statistically significant at the statistical significance level of 5%.

* Value for 15 voivodships, except the Mazowieckie voivodship.

The indicated directions have been established on the basis of the literature review. However, it should be noted that reverse relationships are also possible. For example, an increase in investment expenditures results in GDP growth, which is a factor determining FDI inflows. The degree of urbanization may affect the attractiveness of FDI [e.g., Blonigen, Piger, 2014], as well as competitiveness itself [Węclawowicz, 2016].

Source: Own study based on GUS [2017b, 2017a] and UNCTAD [2017] data.

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Part II

**Main Competitive Factors
of Polish Economy
in the Years 2010–2017**

Directions of Economic Policy and the Most Significant Challenges in 2010–2017

Adam Czerniak, Ryszard Rapacki

Introduction

The purpose of this chapter is to assess the main economic policy directions in 2010–2017, with particular emphasis on a change of its paradigm after the presidential and parliamentary elections in 2015. Due to the exceptionally high intensity of changes in 2016–2017, we focus exclusively on the most important areas of macroeconomic policy i.e., on measures in the field of fiscal policy and the labor market, at the same time indicating their wider non-fiscal consequences¹ [see Weresa, 2015]. Secondly, we also present the most important challenges for economic policy after two years of ruling by Law and Justice (PiS). In this context, we also indicate the potential effects of actions taken in other non-economic areas of state policy, especially in the field of legal order, which in our opinion had a very strong impact on the conditions for conducting business and investments in Poland.

Directions of Macroeconomic Policy

The changes in economic policy in Poland will be divided into two stages for the purposes of this report:

- 1) post-crisis years 2010–2015, which were characterized by strong economic fluctuations, high uncertainty and numerous changes in economic policy, especially related to the consolidation of public finances;
- 2) period of expansionary fiscal policy implemented at a rapid pace by the new government elected at the end of 2015.

¹ More comprehensive assessment of the economic policy on the supply side (structural policy) is included in the *Competitiveness Report 2015*. The conclusions and findings, formulated by us, remain valid until today.

Restrictive fiscal policy in 2010–2015 was conducted on both income and expenditure sides. The most important actions, aimed at increasing the inflow into the state budget, were:

- increasing VAT rates since January 2010, including the main rate from 22% to 23%;
- raising the disability insurance premium contribution by 2 percentage points to 8% since February 2012;
- a several times increase of the excise tax on tobacco products and alcoholic beverages;
- freezing thresholds for income tax at the level from 2008;
- introduction of measures aimed at increasing tax collection, including prevention of VAT fraud by companies trading goods with hard to determine sources of origin (including steel bars, fuels, precious metals), taxation of special purpose companies with Polish capital registered in tax havens (including Cyprus, Malta, Luxembourg), taxation of undisclosed revenues, and launching the so-called receipt lottery.

The vast majority of the fiscal tightening program, implemented by the government in the post-crisis period, nevertheless concerned the expenditure side of fiscal policy and was implemented in 2010–2014. The obtained savings amounted to 4.1 percentage points of gross domestic product (GDP) compared to 0.1 percentage point of GDP on the income side in 2010–2014 [CMRP, 2015]. In 2015, a further decline of the general government deficit (GG) to 2.6% of GDP was a result of maintaining a restrictive fiscal policy, including preserving unchanged tax thresholds and the tax-free amount, along with further freeze of wages in the public sector at a level comparable to 2014 amid accelerating economic growth.

The most important measures are those connected to changes in the pension system – reduction of its capital part (i.e., second pillar) and raising the retirement age. The first changes in the organization of pension contributions' transfers to Private Pension Funds (OFE) were performed in 2011 – the value of funds, which the Social Insurance Institution (ZUS) had transferred to OFE, was temporarily reduced from 7.3% to 2.3% of taxable income. In 2013, this rate was raised to 2.8%. The key change in the system, however, was introduced at the beginning of February 2014, when 51.5% of pension funds' assets were transferred to ZUS. According to the ESA2010 methodology, the transferred treasury bonds were redeemed, which reduced the SFP's debt by 8 percentage points – to 48.5% of GDP at the end of the first quarter of 2014.

Another key change in the capital part of the pension system was also the correction of the amount of funds transferred from ZUS to OFE in the subsequent years. In the initial stage, the entire contribution of 7.3%, which before 2011 went to the capital part of the system, started being registered on special sub-accounts in ZUS and with the nominal GDP growth rate. People who wished to continue saving

in OFE could do this by sending a special opt-in declaration and have 2.98% of their taxable income transferred from ZUS to OFE. Two and half million Poles decided to take such a step, i.e. 15.1% of all those entitled to submit declarations. This was not enough in order to keep a positive balance of transfers between ZUS and OFE—one year after the reform, in January 2015, ZUS transferred 184.5 million PLN to the funds due to contributions, and OFE transferred assets worth 346 million PLN to ZUS to pay benefits to people in pre-retirement age. As a result, GG spending were lower in 2015 by 18.6 billion PLN (1% of GDP), as compared to a no policy change scenario. This was reflected in a lower deficit of the Social Insurance Fund (FUS) and lower public debt servicing costs [MFLSP, 2014].

The second important change in the pension system was raising the retirement age to 67 in 2012 and its equalization for women (62 years before the reform) and men (65 years). Raising the retirement age was not of a sudden nature. Since 2013, it was gradually increased by 3 months each year of the new regulations. As a result, the target retirement age was to be reached in 2020 for men and in 2040 for women. Thanks to this, total budget savings in 2012–2015 amounted to approximately 6 billion PLN [MFLSP, 2012].

In order to reduce nominal and structural deficit, the PO-PSL government decided to implement the institutional changes. Since 2010 a number of expenditure rules have been adopted, which were aimed at limiting the growth of GG spending, both at the central and local government level. The most important of them was the stabilizing expenditure rule, introduced in 2014, which replaced the ineffective disciplining rule. This new rule was based on a complex mathematical formula for calculating the upper limit of public spending that can be saved in budgets for the next year. This limit depends on the historical and forecasted real GDP growth rate, projected inflation of consumer goods' prices (CPI–Consumer Price Index), as well as the deficit and debt of the general government. The threshold also took into account discretionary changes in the state budget's income policy. The rule covered nearly 90% of GG spending and was used for the first time to prepare a budget plan for 2015. Its introduction changed the process of preparing the budget act. Previously, central budgets, budgets of local government units (LGUs) and other public institutions were prepared independently. According to the new rule, the Ministry of Finance must receive information on the amount of expenditures planned for the next year by all institutions covered by the new regulations and adjust the budget expenditure, so that the limit for public expenditure will not be exceeded. As a result, the control of the central administration over the fiscal policy within the entire public finance sector has increased.

In order to reduce the budget deficit, the Ministry of Finance introduced another significant systemic change – central liquidity management in the public finance sector.

Some public institutions (NFZ, Lasy Państwowe and others) were forced to hold their current financial surpluses on their accounts in BGK, so that other public-sector entities could use these funds in the first place instead of issuing bonds or borrowing from financial institutions. As a result, in the years 2010–2014, the Ministry of Finance lowered the debt servicing costs by several hundred million PLN and reduced the borrowing needs by 33 billion PLN (2% of GDP). An important measure, aimed at "hardening" the budget constraint on the expenditure side, was also freezing the wage fund in the public sector at the nominal level from 2009, which in 2014 alone brought savings of 2.2 billion PLN [MF, 2014].

Thanks to the aforementioned measures, the government managed to permanently reduce the GG deficit from 7.6% of GDP in 2010 to 2.6% in 2015. As a consequence, in June 2015 the European Commission closed the excessive deficit procedure for Poland [CEU, 2015]. The introduction of long-term changes (reform of the pension system, creation of the expenditure rule, implementation of central liquidity management) caused a reduction of the structural deficit from 8.0% in 2010 to 2.3% of GDP in 2015.

After winning the election by Law and Justice (PiS) in October 2015, the new legislature power found itself in a very comfortable position in terms of freedom in running its own fiscal policy. The budget act for 2016, for the first time in six years, did not have to be the subject of consultations with Brussels, and the government could increase expenses and lower taxes, as well as introduce other measures to increase the expansiveness of fiscal policy without the risk of fines being imposed by European institutions under the excessive deficit procedure. What is more, after performing auction for selling the LTE frequencies to mobile phone operators, the state obtained a one-time windfall of 9.2 billion PLN, and thanks to changes in the prices of assets, the NBP (National Bank of Poland) paid to the budget respectively 7.9 and 8.7 billion PLN from the generated profit in 2016 and 2017 [CMRP, 2016a; 2017b]. This allowed – together with historically low debt servicing costs – for temporarily large space for loosening fiscal policy in Poland.

In connection with the above, in December 2015 the new parliament amended the budget law and announced the introduction of one of the most expensive social programs in the history of Poland, namely the "Family 500+" program. Under this regulation, which entered into force on 1 April 2016, the state has paid parents a monthly benefit of 500 PLN for the second and each subsequent child. Additionally, a benefited for the first child was also granted, only if their household's monthly income did not exceed 800 PLN per family. In 2017 parents of 3.8 million children [CMRP, 2017a] benefit from the program, which costs 1.9 billion PLN monthly. Additionally, the state also spends over 400 million PLN a year on handling these benefits. In total, the cost of the program amounted to 17 billion PLN in 2016 and

23 billion PLN in 2017, thus 1.2% of GDP (or 6.2% of budget expenditure and 3.1% of GG expenses). Childcare benefits are the sixth position in the budget in terms of costs – they exceed states expenses on higher education, research and development, unemployment, road investments and justice.

According to the government's announcements, the program's goal is to stimulate the birth rate, which at least partially will increase the future workforce and, thus, the potential rate of economic growth. The Ministry of Family, Labor and Social Policy (MRPiPS) assumes that thanks to benefit payments, the most optimistic forecast scenario of GUS in 2014 will be achieved, that is, the birth rate in Poland will increase to 1.60 in 2025 against 1.30 – in the worst-case scenario, and 1.38 – in the most likely scenario. In the optimistic birth forecast of GUS by 2050 in Poland an annual average of 14% more children will be born than in the medium scenario. It is worth noting, however, that these forecasts did not take into account changes in family policy implemented in 2014–2016, including annual parental leave or parental benefit for unemployed people.

In the medium term, however, the impact of the "Family 500+" program on labor supply will be negative, as it will discourage people with lower wages from undertaking or continuing employment, especially second earners in the households. After the first year of the program, the number of professionally active women aged 25–49 was lower by 65,000 than in the scenario which excludes introducing the "Family 500+" program, and better educated women were those that left the labor market in the first place. This number will increase in the following years as more Polish women and men, motivated by the mechanism of 500+ benefits payment, will restrain from entering the labor market. Thus, if the government scenario is fulfilled, the impact of the "Family 500+" program on the demography and the labor market will be balanced after ca. 35 years. Only then a sufficient number of young people, born thanks to the program, will start working to offset the fall in the professional activity of their mothers. If the program runs until 2050, an additional 2.5 million Poles will be born [Myck, 2016; Arak, 2016].

The second most important change implemented by PiS in economic policy was the reversal of the pension reform of 2012 by restoring, since October 2017, the retirement age of women at the level of 60 and men at the level of 65. The reversal of the reform from 2012 increased pension expenditure, reduced social security contributions and lowered tax revenue for the budget. Data available at the time of closing the analysis indicate that due to lowering of the retirement age, applications for benefits were submitted by 336,000 Poles – 5,000 more than it was estimated by ZUS. Nonetheless, it should be remembered that some new retirees will return to the labor market – they will simultaneously receive benefits and remunerations.

Using the government's calculations, it can be estimated that in 2018, during the first full year of the act being effective, the GG deficit will increase by over 9 billion PLN [CMRP, 2017b]. In 2017, due to one-off high transfer of the assets of people in the pre-retirement age from OFE to ZUS, the net costs of the reform will be close to zero. It is worth noting, however, that according to Eurostat regulations (ESA2010) transfers from OFE to ZUS cannot be included in the income of the social security fund, they can only be used to finance its deficit. As a result, after lowering the retirement age, the GG deficit will increase by 0.3% of GDP in 2017 and by 0.8–0.9% in 2018–2020, generating a total cost of 2.8% of GDP by 2020. In the next decade, the cost of reducing the retirement age may even exceed 1% of GDP annually.

In order to at least partially finance the costs of the aforementioned changes, the Ministry of Economy and Labor proposed to disestablish from 2018 the 30-fold limit of the average remuneration, above which persons employed under an employment contract do not pay compulsory pension contributions. If this solution comes into force, approximately 350,000 of the top earning Poles will have to pay to the Social Security Office an additional 5.4 billion PLN in contributions in 2018. Such a change will improve the current fiscal situation of the social security sector, but it will deepen the future deficit of the social security fund, when people who are hitherto covered by the limit retire and will be entitled to receive proportionally higher pensions.

The second important implication of the reversal of the 2012 reform will be the decline in pension benefits. In the current system, their level depends on seniority and remuneration. Therefore, the shorter the Poles work, the lower the pensions they receive. Women will be able to finish their professional career seven years earlier than planned, which means they will receive much lower benefits than men. As a result, a Pole earning the national average after retiring will most probably receive a minimum pension [GRAPE, 2016], which, in accordance with the decision of the PiS government, increased in March 2017 to 1,000 PLN, and is to be indexed every year by at least 10 PLN [CMRP, 2017a].

Similarly to the "Family 500+" program, reducing the retirement age will affect the decline in professional activity of Poles, which will lead to a decrease in the labor force and will have a negative contribution to the pace of potential economic growth in Poland. When taking into account the changes discussed above, in comparison to 2016, in 2025 almost 900,000 less people will work, and in 2050 – as many as 1,6 million less people, which means a decrease in the labor resources by 11%.

Apart from the above-mentioned measures, PiS also introduced a number of other smaller-scale changes to fiscal policy, whose expansive impact on the economy has already started to materialize in 2016 or will be felt in the following years. One of the most important is the introduction of a progressive tax credit. Since 2017, persons with

tax base up to 6,600.00 PLN annually are released from income tax (PIT), and people with income exceeding the second tax threshold (85,500.00 PLN) have benefit from a lower tax credit than before the change. Starting from 2018, the tax-free amount will be further increased to 8,000.00 PLN. Thus, according to preliminary estimates, the changes will increase the GG deficit by 1 billion PLN in 2018, and by a further several hundred million PLN in the following years.

In addition to changing the tax free amount, PiS decided on a partial unfreezing of wages in the public sector, salary increases in public security services, and for teachers, young doctors and paramedics, as well as on a CIT reduction for small and micro entrepreneurs from 19% to 15%, easing the fiscal rule by replacing the forecasted inflation with the inflation target of the National Bank of Poland, introducing an hourly minimum wage for persons employed under mandatory contracts and the highest minimum wage increase in a decade – to 2,000 PLN as from 2017.

The total costs of all reforms introduced by PiS for the public finance sector will exceed 35 billion PLN annually in 2018. Only partially they will be covered by tax increases and sealing the tax system. Since February 2016, the government has introduced a tax on some financial institutions (i.e., bank tax). It covered banks operating in Poland, insurance companies, savings and credit unions (SKOK) and loan companies, whose assets exceed 2 billion PLN and are not subject to a recovery program. Each of these institutions pay annually 0.44% of their assets value corrected by the value of equity and treasury bonds in their portfolio. In 2016, the budget received a total of 3.5 billion PLN – much less than it was stated in the budget act (5.5 billion PLN). In 2017, due to a longer tax period and an increase in asset prices, as a result income increased to 4.3 billion PLN. In addition to a tax on certain financial institutions, in September 2016 PiS also introduced a turnover tax for retail sellers, but the Ministry of Finance, due to the European Commission's objection, had to suspend its implementation before any payments were made to the budget.

The main source of GG revenue growth, therefore, is the increase in tax collection, in particular of indirect taxes. Therefore, the PiS government continued the policy of fighting tax evasion and aggressive tax optimization, initiated at the end of the PO-PSL government. Obligation for companies was introduced, among others, to prepare a uniform control file, which has been expanded since January 2018, the road transport monitoring system was activated, reverse VAT was introduced for some goods, as well as the so-called fuel package, and in the near future the monitoring system of financial transactions of companies will be launched (i.e., STIR) as well as VAT split payment system. Additionally, the PiS government has made changes in functioning of the tax administration, which are to improve its operations. The effects of these regulatory changes can be seen in the increase in tax revenue of VAT, which in the first half of

2017 were higher by 28.1% (17.6 billion PLN) in comparison to the corresponding period of 2016. It can be estimated that approximately 8.5 billion PLN of the increase resulted from the tax system tightening (including 4.4 billion PLN from the increase of the tax base), and 4.2 billion PLN due to reduction of VAT refunds, which were the main vehicle for tax fraud under the so-called international tax carousels.

The Most Important Challenges of Polish Economic Policy

The greatest challenges, which economic policy in Poland faces, include two categories of development threats. The first consists of known threats, the ones that have been augmenting for many years, including those resulting from omissions and errors committed by previous governments. The second category incorporates new challenges that are a direct consequence of the first two years of PiS being in power.

Major economic policy challenges in Poland can be classified into two interconnected categories. The first one includes conceptual, political and institutional factors that form a broadly understood framework of business operations and determine structure and strength of incentives affecting the behavior and decisions of economic agents. In the second category we point to those development challenges that are associated with economy's functioning – the growth factors and macroeconomic performance.

A. Conceptual, Political and Institutional Challenges

The first of the fundamental weaknesses of the economic policy pursued in Poland is the lack of vision of the target model of capitalism that best suits the conditions and development aspirations of the country. The goal of systemic transformation in Poland – both at the beginning of the road leading from the plan to the market, as well as throughout it – was defined in a very abstract way as creating a liberal market economy (capitalism), without prejudging its concrete shape. It caused, among other things, that the market economy established in Poland has, to a large extent, the characteristics of a "patchwork" construction. Individual parts of its institutional matrix derive from different institutional orders, are internally incoherent and show a low level of complementarity. As a consequence, instead of triggering positive synergies and improved operational efficiency, this institutional ambiguity generates rising frictions and increased idle capacity of the entire system.

Secondly, until now Poland's current and future role in the European Union has not been clearly defined – other than being mainly a beneficiary of the EU funds. The necessity of meaningful and effective use of the EU funds (and institutions) is beyond

discussion. Directions and ways of using the EU funds should be, however, a function of adopted development strategy (whose outline i.e.. Morawiecki's plan, after two years of PiS government, in fact has not yet entered the implementation phase). Poland has mastered the art of acquiring the EU funds, but it has performed much worse when it comes to defining development priorities when using them, as well as generating a full balance sheet of costs and benefits of the various EU programs, in terms of its own national interest.

In this context, **the third development challenge** should be perceived as the risk of perpetuating the peripheral position of Poland in the European Union. In such case, our country would increasingly specialize in the production of simple manufacturing goods at a low level of processing, with a relatively low value added and a small high-tech content, as well as a subcontractor of more technologically advanced products in global networks of transnational corporations. Using the terminology of the 'economics of comparative capitalism', Poland would be, thus, a classic example of the "dependent market economy" model [Nölke, Vliegthart, 2009], or the "FDI-based, second-rank market economy" [Myant, Drahokoupil, 2011].

Fourthly, failure of the state to create conditions conducive to long-term economic development should be considered as one of the greatest challenges, including ensuring positive externalities for the private sector. This mainly concerns the underfunding of the Research & Development sector, the lack of support for creating and improving the quality of human capital, misapprehension of the meaning of one of the biggest barriers for Polish economy development i.e., a low level of social capital and insufficient support for the advancement of information and communication technologies.

Fifth, this weakness results from, among others, a strong redistributive bias in public spending policy at the expense of development expenditures, not accomplishing the so-called "golden rule" of public finances, growing scale of rent seeking and persistence of the unproductive entrepreneurship pattern [cf. Baumol, 1990].

What is more, the symptoms of Myrdalian soft state in Poland are maintained – **for sixth** – the incidence of corruption is still too big, whereas the compliance with the law is too weak, which means, among others, a strong asymmetry between formal and informal institutions, towards the latter [Rapacki, 2012]. At the same time, there are more and more manifestations of insufficient quantity and decreasing quality of public goods and merit goods supplied by the state (e.g., health care and education).

Finally, **seventh**, unlike several other transition countries in our region (Slovakia, the Baltic states), Poland failed to substantially downsize its government and to reduce the scope of its functions in the past seven years. If the proportion of public expenditure to GDP is adopted as the basic gauge of the size of government, this index has remained stable in Poland since the early 1990s, at above 40%. This is an indicator approximately

two times higher than in countries with a similar level of economic development (23–24%), and similar to the average in the European Union and the Organization for Economic Co-operation and Development (OECD). This means that we carry a lot more of the state on our shoulders than we are able to bear.

B. Macroeconomic Challenges

The most important development challenges of broadly understood macroeconomic nature that Polish economic policy faces include:

1. Unfavorable demographic trends – a significant population decline (in the next 30–45 years), change in the society's age structure, emigration and brain drain, permanent decline in the dependency ratio showing the number of employees per one retiree.
2. Imperfections of the labor market, whose symptoms include low level of population's participation in the labor market, high unemployment rate among young people and a large share of the so-called flexible forms of employment. In addition, on the labor market in the recent years the so-called negative feedback has strengthened. On the one hand, in the short term the labor market is becoming more and more flexible, which facilitates the absorption of asymmetric shocks. However, on the other hand, this tendency undermines, in the long run, the current foundations of international competitiveness of Polish economy (low costs, low and medium degree of export processing, low value added), as it weakens incentives to upgrade qualifications and to innovate [Rapacki, 2016].
3. The lowest propensity to save and the lowest investment-to-GDP ratio in the countries of Central and Eastern Europe. In the light of endogenous model of economic growth, it is the investment rate and national savings that ultimately finance these investments and are a prerequisite for fast and sustainable economic growth.
4. Low economy's innovativeness that has been maintained for years. Among its many symptoms, one can mention low, only 8% contribution of high-tech products in the export of processed goods, or a huge deficit in the international exchange of licenses (the ratio of expenditure on importing licenses to revenues from their exports is 10:1).
5. Low (as some studies show – even decreasing) stock of social capital in Poland. Therefore, our country could be included in the category of low-trust society [Fukuyama, 1995]. Moreover, while the persisting lack of trust among Poles in the state institutions is strongly conditioned by history, a new phenomenon in Poland is the emergence of a symmetrical distrust in relations between the state-citizen

and the state-private entrepreneur. Its symptoms are i.e. public administration expanding bureaucratic barriers, and increasing the scope of interference that may limit the scope of already achieved economic freedom.

6. More and more clearly on the horizon is disclosed another serious development threat in the form of rapidly growing tensions in the national energy balance, resulting, inter alia, from delayed investments in the development and modernization of the energy base. They are reflected in the prospect of a significant increase in the costs of electricity generation and supply in Poland, stemming from the intergovernmental arrangements in the European Union, adopted in autumn 2014 (climate package), concerning the reduction of harmful emissions and the emerging need to switch energy production into more environmentally friendly technologies.

The New Challenges of Polish Economic Policy

In this subsection we indicate the most important policy challenges resulting from actions taken by PiS during the first two years of exercising power. We assume that PiS will continue pursuing the majority of election promises, of which there is a high probability of maintaining an expansionary fiscal policy and a loose monetary policy. We also consider it probable to continue the scenario of institutional changes initiated in November 2015, which are aimed at adjusting the basis of the legal order existing so far in Poland, which may lead to further deterioration of Poland's image abroad, weakening its international position and growing marginalization in the European Union. The fulfillment of this scenario will entail occurring of new challenges for economic policy in the form of the following developmental threats of a short, medium and long-term nature.

A. Short-Term Effects

- Strong fiscal expansion, mainly due to the increase in budget expenses for large families benefits (the "Family 500+" program for a total amount of approximately 23 billion PLN in 2017). As we estimated in the first part of the chapter, the total costs for the public finance sector of all reforms introduced by PiS will exceed 35 billion PLN in 2018. Also, meeting all of the ruling party's election promises, in terms of social transfers, may mean an increase in additional state budget burdens up to 50 billion PLN a year.
- Increased budget expenditures (mostly intended for consumption) financed from the growing deficit and public debt will activate the mechanism of crowding out

private investments from the economy, which, as a consequence, will lead to a change in the structure of national income distribution (from the demand side) – the private sector's share will fall in favor of the public sector.

- Simultaneously, as a result of the increase in rigid budget expenditures, which will not be accompanied by a parallel, sustainable increase in the sources of their financing, the structural deficit may also increase. These fears are confirmed by the recent forecast of the European Commission [EC, 2016], according to which the structural deficit in Poland is expected to reach 3.3% of GDP in 2018 (compared to 2.3% in 2015), which will be one of the worst results in the entire European Union.
- The growing deficit of general government, indicating an increase in negative government savings, will limit the possibilities of financing domestic investments from private sector savings (firms and households).
- The shrinking stream of private savings will have a similar effect, which will be a part of very probable scenario in 2018: Monetary Policy Council will maintain expansionary monetary policy stance -> expectations and inflationary pressure will further increase -> negative real interest rate -> decrease in marginal propensity to save.
- Increase in the perceived risk of investing in Poland, which will result in rising costs of borrowing on international financial markets.
- High probability of complete dismantling of the three-pillar pension system by taking over the remaining part of pension assets accumulated in OFE (nationalization of retirement savings).

B. Medium and Long-Term Effects

a) Macroeconomic challenges:

- Increased inflationary pressure and expectations. This increase will be a derivative of two interrelated factors: significant loosening of fiscal and monetary policy as well as almost full use of production capacity in the Polish economy (the output gap is estimated at only approximately -0.6% of potential GDP), as well as a significant deceleration of the potential growth rate (up to a maximum of 2.5% per year).
- This may mean that additional growth stimuli, generated by fiscal and/or monetary expansion (in the form of e.g., increased lending to SMEs), can lead to overheating of Polish economy and – instead of accelerating its growth – to accelerated inflation.

- In a longer perspective, the factor that can slow down the growth of Polish economy may be insufficient propensity to save (currently about 17% of GDP) and too low investment rate (18% instead of at least 24–25% of GDP).
- The crowding out effect may have a similar consequence (see above). It will lead to decrease of the average efficiency of resource allocation in Poland (decrease in the TFP growth rate) and, thus, further to the deceleration of the potential growth rate of Polish economy.
- In this context, it is also worth pointing to the continuing contradiction between concrete actions of the ruling political formation and the most important goals of Strategy for Responsible Development announced by the Prime Minister Mateusz Morawiecki in mid-February 2016 (including a significant increase in the rate of domestic savings and the rate of investment, coupled with increased national innovative capacity and support for domestic capital). However, as it is well-known from the principles of economic theory, the rate of consumption and the investment rate cannot be increased at the same time, assuming that the role of foreign savings in the economy is to be further limited.
- In the Morawiecki's plan one can also see an internal contradiction of a deeper institutional nature. While the objectives formulated in the plan (e.g., increasing the ability of Polish economy to innovate) were transplanted mainly from the model of capitalism called the liberal market economy (or the Anglo-Saxon model of capitalism), the means and methods to achieve them (strong etatism and the increase in the importance of non-market forms of coordination, renationalization) come from a completely different institutional order, referred to as a coordinated market economy (or otherwise – the continental European or Nordic model of capitalism)².
- The government's acquisition of the remaining part of the OFE assets will result in, among others, exchanging (reallocation in time) the official "visible" part of the public debt into a hidden debt, or otherwise "invisible" (future pensions payment promises) and a significant increase in the latter form of debt³.
- Starting January 2018, the abolition of the limit on payment of contributions to pension insurance in the national economy, in the form of 30 times the average remuneration, will also work in a similar direction.

² This reflection can be further expanded and the development strategy, being effectively implemented in Poland, can be assessed as a peculiar combination of: 1) neoliberal goals, 2) conservative values combined with 3) statist means and tools employed by an authoritarian political power, 4) under deep political divisions and lack of social dialogue.

³ According to a recent information released by GUS on 20 April 2018, the "invisible" debt in Poland amounted in end-2015 to some 4.6 trillion PLN that is to some 276 per cent of this year GDP [GUS, 2018]. The ratio of "invisible" debt to its "visible" counterpart can be thus estimated as 5:1.

- Lowering the retirement age will reduce the labor supply, drastically lower the replacement rate for future retirees and may at the same time threaten the foundations of the long-term solvency of ZUS and the public finance sector.
- Similarly, this decision could further weaken the Warsaw Stock Exchange.

b) Institutional challenges:

The first two years of the PiS government also caused the emergence of new development challenges emerging in the institutional environment of the Polish economy. The most important include the following phenomena (processes):

- violation of the very foundations of a liberal democracy system based on checks and balances and a tripartition of executive, legislative and judiciary powers,
- increasing centralization of power and intensifying attempts to weaken local self-government,
- restricting the freedom of actions of the third sector i.e., non-governmental organizations;
- progressive dismantling of the civil service,
- limiting the scope of media freedom,
- deepening existing divisions in society, disappearing of the sense of community,
- a further decline in the level of trust and willingness to cooperate in society,
- weakening of incentives for productive entrepreneurship and investment.

Conclusions

In this part of our study, it is worth pointing out that the cumulative impact of the developmental challenges discussed above and the insufficient response of economic policy may ultimately result in a decline in the international competitiveness of Polish economy. In particular, it is worth signaling the possibility of the following long-term consequences of this scenario:

- consolidation of the imitative and peripheral pattern of development of Polish economy,
- increasing the role of informal institutions at the expense of formal ones,
- progressive process of disengagement and anomie in society,
- strengthening incentives for unproductive and destructive entrepreneurship
- further increase in the idle capacity of the institutional system and the progressive erosion of the institutional comparative advantage of Poland.

All these factors may cause a permanent decline in the potential rate of economic growth. The symptoms of this unfavorable tendency have already appeared in Poland – in the last few years there has been a reduction in the potential growth rate of Polish

economy from over 5% to about 2.5% i.e., by half. What is more, as it appears, among others, in the long-term projections of the European Commission, OECD and our own forecasts [Matkowski, Próchniak, Rapacki, 2016]⁴, after 2020, this rate may further decrease – below 2% per annum.

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Investments and Domestic Savings in Poland in 2010–2017

Piotr Maszczyk

Introduction

The investment outlays and domestic savings level that partially determines this variable, are one of the most important factors affecting the rate of growth of gross domestic product (GDP) and economies' competitiveness. Domestic funds are the main source of financing investments in Poland, and the inflow of foreign capital, although significant, is systematically decreasing¹. This chapter includes an analysis of the impact of these variables on the competitiveness of Polish economy, with a particular emphasis on changes that have occurred in 2010–2017 in the light of tendencies observed in the other EU countries.

An Analysis of Current Tendencies

When analyzing the dynamics of changes in investment outlays in Poland in 2010–2017, two key factors that determine this component of global demand should be considered. First of all, a systematic decrease in the negative consequences of the 2008 crisis was noted throughout the last eight years in the global economy, especially in the economies of most EU countries. By 2017, there were practically no more signs of the crisis. This means that pace and level of changes in investment outlays in Poland have been neutrally affected by exogenous factors since 2014, and then favorably in 2017. Secondly, a rather fundamental change in Polish economic policy took place in 2016, which was related to the change of government after the 2015 elections. A thorough revision of fiscal policy combined with specific rhetoric, used in more or less skillful

¹ A decrease by nearly 1.5 p.p., from 4% to almost 3% in relation to GDP in 2010–2016 compared to 2005–2010.

manner by coalition politicians from the right-wing parties forming the government, meant that endogenous factors were crucial in the context of new investments. This strong negative impact of adaptation-related expectations of business entities was of a short-term nature, as can be inferred from the 2017 data. Beneficial tendencies that were thus observed in the entire global economy, as well as in all of Poland's major trading partners, gradually decreased its importance. Nevertheless, when assessing investment outlays in 2017, it is hard not to admit that their moderately positive dynamics was still primarily influenced by variables strongly determined by the relations between the state and the enterprises. Especially when one considers the fact that the investment value growth rate was higher in all benchmark countries for Poland (the Czech Republic, Hungary and Slovakia). This imposes relativization of an opinion, quite common among politicians and analysts sympathizing with the ruling camp that the investment outlays increase after the collapse in 2016 was a derivative of the beneficial influence of the political environment on the decisions of the enterprise sector in this area.

The first three years of the analyzed period (2010–2012) were stagnant in terms of investment value in Poland, with the exception of 2011, when the value of investment increased by nearly 9% along with a significant acceleration of the GDP growth rate. During these three years, negative tendencies in the investment structure were related to the spreading adverse consequences of the 2008 global economic crisis, which started in the US, and expanded to the global economy in the following years. It is worth noting that although the GDP growth rate in 2011 was over 1.5 p.p. higher than in 2014 (5.0% vs. 3.3%), the growth rate of investment outlays was lower by more than 1 p.p. (8.8% vs. 10.0%). Therefore, negative consequences of the crisis reduced the influence of beneficial tendencies observed in Poland for as long as they were present in a global economy. Only after the final overcoming of its negative consequences in the Polish economy in 2014 it became possible to stabilize the positive (though not increasing) rate of growth of investment outlays in two subsequent years. It should, however be emphasized that just as in the context of GDP, the negative impact of global economic turbulence on the value of investment outlays in Poland was relatively limited compared to the other EU countries. The year-on-year calculation of investment value has not decreased in the analyzed sub-period more than by 1.8%, while in the 2007 the amount intended for investment increased by as much as 17.6%.

On the one hand, growing investment outlays undoubtedly stimulated the increase of Polish economy's competitiveness. On the other hand, Polish companies gaining position on the EU markets increased investments, and thus production capacity in order to meet the growing demand. The trajectory of changes of both gross domestic product as well as global demand and investments in 2010–2017 confirms theoretical

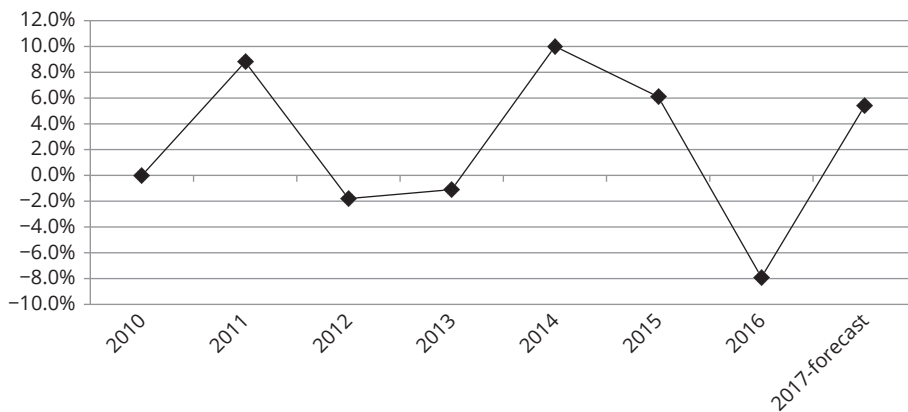
observations included in the demand model. According to its assumptions, investments are the component of global demand, which reacts to changes in the economic situation much more strongly than its other parts and contributes to these changes itself by creating a specific feedback mechanism. Investments therefore stimulated both the demand and supply sides of the Polish economy. As indicated by the data analyzed later in this chapter, such a relationship between investments and the rate of economic growth has been confirmed in the economy throughout the past 10 years. Despite a slight acceleration of the economic growth rate, a decrease in the pace of growth rate of gross fixed capital formation in 2015 should be treated as a one-off event, being a specific “correction” of the two-digit dynamics from the previous year. However, it should also be noted as a positive effect of the balance of foreign trade turnover on the rate of economic growth. The rate of changes in domestic demand was nearly 1.5 p.p. lower in 2015 than in the previous year (3.4% compared to 4.7% in 2014), which, according to the assumptions of the Keynesian model, had to result in a lower investment growth rate.

In 2010 Poland recorded a 3.6% GDP growth, which allowed for the reversal of unbeneficial tendencies from the previous year. As a result, the value of investment outlays in relation to the previous year has not changed (as compared to a decrease by over 2% in 2009). GDP in Poland increased by 5% in 2011, which resulted in a dynamic increase in investment by nearly 9%, according to the aforementioned demand model mechanism. The year 2012, uncoincidentally called “the year of the second wave of the crisis”, showed a sharp decline in GDP growth rate (only 1.6%) and, in effect, a decrease in investment value by 1.8%. It was therefore reasonable to expect that 2013, which noted a decrease in GDP growth rate of 0.2 p.p. in relation to the previous period, will be characterized by another decline in the value of investment outlays. The expected effect occurred and the value of investments decreased by 1.1%. The rate of economic growth accelerated by nearly 2 p.p. in 2014, which, according to expectations based on the basis of the demand model, allowed to increase gross fixed capital formation by 10%. The GDP growth rate was even faster in 2015 (3.8%), and investment outlays increased again, albeit slower than in the previous year (6.1%, or nearly 4 p.p. slower). The decline of investment outlays growth rate dynamics in this case was, as proven above, caused by the slower growth rate of domestic demand. In 2016 the rate of economic growth decreased by almost 1 p.p. in relation to the previous period, which in accordance with the demand model, led to a decrease in the value of investment outlays of almost 8%.

It can be concluded that given the preliminary data for 2017, the relationship between the rate of changes in investment and GDP is fairly stable. Acceleration of the economic growth rate by nearly 2 p.p. (2.9% in 2016 against the forecasted 4.6%

in 2017) was correlated with the increase in gross fixed capital formation by the forecasted 5.4%. The next part of this chapter attempts to estimate investment outlays in 2018, although it can be expected that their value will increase due to the continued high dynamics of economic growth rate predicted by the majority of economists. Therefore, this will maintain the mechanism and dependencies observed in 2010–2017 (Figure 7.1).

Figure 7.1. The dynamics of changes in investment outlays in Poland during 2010–2017



Source: Own calculations based on GUS data.

According to preliminary data published by GUS (end of January 2018), the value of investment outlays increased in Poland by over 5% in 2017. On the one hand, this value is consistent with the forecasts of base scenario included in the *Report on Competitiveness 2017*. However, the forecast that indicated a minimum investment growth rate of 5% in 2017 was created with the reservation that the GDP growth rate in the same period will be at the level of approx. 3.5%. Considering the fact that the real growth rate of the global product in Poland in 2017 was 1 p.p. higher, change in fixed capital formation to gross resources can be described as moderately disappointing. Based on the previous year's forecasts, it can be said that both the external and internal situation in Poland was determined by a set of factors enabling a two-digit growth rate of investment. GUS data (February 2018) show a total investment outlays of 80.2 billion PLN at the end of the third quarter of 2017 i.e., 0.5 p.p. higher than at the end of the corresponding period of the previous year. According to a preliminary GUS's GDP estimate in 2017, it can be expected that the value of investment in the entire economy will reach about 257.6 billion PLN i.e., 5.4% increase compared to the previous period (the value of capital outlays in the entire economy decreased by 7.9% in 2016). Therefore, the rate of investment in the national economy (the relation of

gross fixed capital formation to GDP in current prices) in 2017 decreased once again and was equal to 18% (based on preliminary estimates of the GUS), compared to 18.1% in 2016 and 20.1% in 2015.

The reversal of current negative investment tendencies in Poland in 2017 should be interpreted primarily in the context of exogenous factors, as indicated above. However, the relatively moderate increase in fixed assets formation should be related to the internal situation in Poland, especially in the context of a relatively high GDP growth rate. Government's policy characterized by a high level of risk associated with possible changes in the tax system, along with an intensification of the tax authorities' control mechanisms, significantly reduced willingness to invest, despite the persistently high level of production factors utilization (around 80%) and the record high current assets on bank deposits in the enterprise sector. Enterprises should increase their investments very quickly, considering the above values, as well as the record low unemployment rate and negative real interest rates that could be used to "leverage" credit. However, an analysis of the fixed capital formation in the following quarters of 2017 indicates that a significant increase appeared only in the last three months, and investment outlays of enterprises almost did not change for the remaining part of the year (year-on-year). Especially, since the value of investment in the German economy, which is our most important economic partner, increased by approx. 5% in 2017.

The flow of direct foreign investment (FDI) is an additional argument confirming the hypothesis of endogenous and expectations-driven factors determining very moderate, in relation to GDP dynamics, increase in investment outlays in Poland in 2017. According to the preliminary information (full data will be available in the third quarter of 2018) presented in 2017 by the Polish Investment and Trade Agency (PAIH)² it can be estimated that the value of FDI stream increased by nearly 5%, which indicates a reversal of the tendencies from the previous year. The value of FDI in 2016 amounted to 54.9 billion PLN and was lower by almost 5% than in 2015, according to NBP data. Foreign entities invested around 13 billion EUR in Poland in 2017, which translated into 335 investment projects, as a result of which 86,000 jobs are supposed to be created. Thus, compared to the previous period, the number of declared investment projects increased by 63. The total value of FDI projects (increase of 52%), as well as the number of new jobs declared by foreign investors (increase of 48%) doubled in 2017, which is also worth noting. These values only slightly deviate from the record for Poland in 2008, in which foreign investors announced the implementation of 387 projects with an estimated value of 23 billion EUR. Poland has become a leader in the European

² The name of the Polish Information and Foreign Investment Agency (PAIiIZ) since 3rd February 2017.

Union in terms of the number of foreign investments and jobs that may be created, while ranking second when taking into account the total value of investment projects.

PAIH informs that the majority of projects implemented by foreign entities concerns the construction sector (95), ICT (73) and automotive sector (49) – investment in this industry are expected to bring most capital to Poland (2.1 billion EUR in total). The transport sector (47 projects) and modern services (37) were next in order.

In turn, research carried out by EY at the beginning of 2017 shows that foreign investors have been consistently pointing to improvement of the investment attractiveness of Poland since mid-2016. Nearly half of the representatives of the management boards of transnational corporations (48%) are also expecting rise in Poland's attractiveness in the next three years. Investors list elements of the labor market – employees' skills and relatively low labor costs, as well as the potential to increase productivity – as the Polish economy's strong suits. However, the service sector is to be the main driving force in the future. Interestingly, Poland will compete primarily with the Czech Republic for direct foreign investment. Investors surveyed by EY see this country as Poland's main competitor in the battle for new FDI projects. Poland is among top five most popular European destinations for foreign investors for the first time since 2008.

The amount of foreign investment announced in Poland during the last three years has rapidly increased. While foreign investors announced on average 142 projects a year in our country in 2004–2013, this number increased to 200 in 2014–2016. This is more than in other countries of the region in which, the average number of annually announced projects increased by 25.4% in the last three years compared to the previous decade. Foreign direct investment that not only generates employment but also consists technology transfer, and increases productivity employees' skills and knowledge is particularly valuable.

A record number of funds invested by Polish entities outside the country as well as the number of created jobs should also be underlined in the context of cross-border capital flows. Polish enterprises declared creating a total of 6.5 thousand jobs as part of foreign investment in 2017, the value of which is approximately 1.14 billion EUR.

Quite low rate of absorption of the EU structural funds, had a definite negative impact on the change dynamics and the level of investment outlays in Poland in 2017. While the situation in this area is not as dramatic as it was in 2016, the rate of EU aid utilization still leaves much to be desired.

The “n + 2” rule regulates the expenditure of the EU funds. It allows for the use of these funds for two years, starting from the year in which they became a formal liability of the budget. This period, related to financial perspective 2007–2013 – ended in December 2015, which means that projects financed with transfers from the previous

financial perspective also had to be completed. Projects financed with funds from the current financial perspective could not be launched on a wider scale, hence the decline in the value of investment projects carried out in the public as well as private sector, mainly supplied from the European Regional Development Fund (ERDF) and, to a lesser extent, from rural area development funds.

Delays in the implementation of funds in the majority of operational programs, which fluctuated around 12 months during the first quarter of 2017, and over 20 months in the case of railway investments, slightly decreased at the end of the last year. Local government enterprises, particularly affected by this downturn, gradually increased tenders supply, especially in construction. Nevertheless, it remains at a relatively low level. What is more, tenders are often left unsettled due to the lack of companies interested in the investment. The degree of utilizing production capacity in construction companies is at such a high level that these entities are not interested in co-operation with local government units, mainly due to insufficient supply of employees. As a result, a very slow increase of the absorption of the EU funds that allow financing construction projects can be noted. The investment reluctance of local governments also results from continued concerns about controls and mismanagement accusations.

Unfortunately, the Ministry of Development, along with the end of the previous financial perspective, has ceased the regular publications of data on the value of eligible expenses of beneficiaries, resulting from submitted payment applications. According to the available, partial data³, 69.7 thousand payment agreements were successfully signed with the beneficiaries with the co-financing from the EU funds amounting to 39.3 billion PLN at the end of 2017. This constitutes 12.7% of allocation in the 2014–2020 financial perspective (the amount in the Polish national envelope under the European Social Fund and the European Regional Development Fund is approximately 310 billion PLN)⁴. The utilization rate of these funds appears to be extremely small, given the fact that payments under the current financial perspective can only be made by the end of 2022. Analogical indicators in 2016 were nevertheless at a significantly lower level. The number of payment agreements signed with the beneficiaries was lower by as much as 50 thousand (only 13.6 thousand contracts were signed), for the co-financing from the EU funds in the amount of 15.5 billion PLN. Thus, during 2017, we managed to increase the amount in the payment applications by as much as 23.5 billion PLN, in the part attributable to the EU funds. In order to relativize this moderately optimistic image, it is worth noting that the total value of eligible

³ See www.funduszeuropejskie.gov.pl

⁴ Using an artificial conversion rate of 4 PLN/EUR.

expenditure of beneficiaries resulting from submitted payment applications reached 52.5 billion PLN in 2015 (compared to 64.2 billion PLN in 2014), with the EU funding totaling to 37.8 billion PLN (45.4 billion PLN in 2014).

A comparison of the rate of changes in investment outlays in 2010–2017 Poland, the Czech Republic, Slovakia and Hungary, countries that have traditionally been our main competitors in the absorption of investment in the region, clearly indicates that although the level and dynamics of accumulation in all Central and Eastern European countries, which joined the EU in 2004, are primarily under the influence of exogenous factors (global crisis, EU membership, economic situation in Germany), they differ quite significantly⁵. More precisely there is a visible progressive trend and dynamics convergence of the investment outlays in Poland, the Czech Republic and Slovakia, while a relatively similar pattern for this group begins to increasingly differ from mechanisms in Hungary.

During the entire analyzed period, investment in the Czech Republic increased in 2010–2011, 2014–2015 and again in 2017. Thus, the direction of changes in the value of investment outlays of global demand was in line with the tendency observed in Poland as much as seven times. The only difference was noted in 2010, when the value of investment outlays in the Czech Republic increased only slightly (by 1.3%), while in Poland it remained unchanged. The direction of changes in the value of investment in Poland and the Czech Republic was convergent in the remaining years. The amplitude of fluctuations in the value of investment in the Czech Republic and Poland was also similar. The increase in the value of the investment did not exceed 10%, while the drops did not exceed 5%. Year 2016 in Poland constituted an exception, as the value of gross fixed capital formation decreased by nearly 8%. The Czech Republic not only failed to achieve a stable upward trend in this component of demand, as was the case in Poland, but was also unable to return to the level of investment recorded before the 2008 crisis.

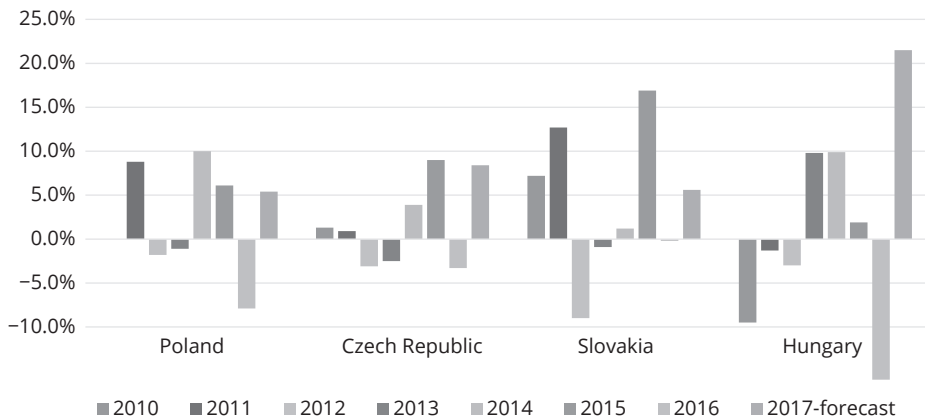
Until recently, the pace and dynamics of the investment outlays in Slovakia were the most similar to Poland's. In the analyzed period, just as in the context of the Czech Republic, the direction of investment changes was consistent with the pattern observed in Poland as much as seven times. The only difference was noted in 2010 (similarly to the Czech Republic), when the value of investment outlays in Slovakia increased significantly (by over 7%), while it remained unchanged in Poland. The amplitude of fluctuations in the value of investment in Slovakia was, however, much higher than in Poland and the Czech Republic – both for years in which investment outlays grew, as well as during the decrease of this component of global demand.

⁵ Investment outlays in the Czech Republic, Slovakia and Hungary in 2010–2017 on the basis of Eurostat data published on the website: <http://epp.eurostat.ec.eu.int>. Annual data have been estimated based on quarterly statements.

Hungary (like Poland, Slovakia and the Czech Republic) not only managed to achieve a positive growth rate of investment outlays in 2017, but it was also an impressive two-digit number (21.5%). Such a significant difference in this component of global demand's growth rate is additionally aggravating the divergent tendency describing investment in Hungary in relation to Poland, the Czech Republic and Slovakia. It should also be noted that this impressive growth rate followed an equally dynamic decline in investment outlays in 2016 (by 16%). Hungary also experienced a decline in investment not only in 2010 (as it was in Poland), but in 2012 and 2013 as well. However, the value of investment in Hungary increased not only in 2014 and 2015 (as in other countries of the Visegrad Group), but also in 2013. The impressive investment growth rate in 2017 allows one to state that the negative impact of the public finance crisis on the investment level faced by the Hungarian economy until recently has actually run out, even though the increase in this component of global demand in 2015 was symbolic (by 1.9%), with a significant decrease in 2016.

A comparison of investment outlays growth in Poland and in the other new EU member states in 2010–2017 is presented in Figure 7.2.

Figure 7.2. A comparison of investment outlays growth in Poland, the Czech Republic, Slovakia and Hungary in 2010–2017



Source: Own calculations based on Eurostat data.

The analysis of domestic savings in Poland in 2010–2017 is very difficult, as comparable data available in the GUS reached only as far as 2013. The amount of domestic savings in the following years can only be estimated based on NBP data.

Most economists agree that an insufficient level of domestic savings can slow down investment processes, necessitating the use of foreign savings that flow into

the country in the form of FDI and other sources of foreign capital. Domestic savings are thus a factor stabilizing long-term economic growth.

A systematic increase in the gross domestic savings rate in relation to GDP was noted in 2004–2007, with an increase of 3.9 p.p. in 2007, as compared to 2004. The ratio of gross domestic savings to GDP dropped along with the start of the 2008 crisis in the USA. This tendency continued until 2010, when the negative factors related to the global crisis, as is presumed, have started to run out. The value of the indicator increased again in the following years. The gross domestic savings rate in relation to GDP amounted to 18.1% in 2013, with: 15.8% in the non-financial enterprises sector, 2.3% in the household sector, 1.2% in the financial institutions sector, –0.7% in the general government sector, and –0.5% in the non-commercial institutions sector. Savings are allocated in part to accumulation and receivables in all institutional sectors, while the largest investment contribution made in 2013 was noted in the non-financial enterprises sector.

According to the analyzes of household budgets published by the NBP, in the following two years the gross domestic savings rate has systematically increased up to the level of 19.5% of GDP at the end of 2015. Similarly to the previous period, the sector of non-financial enterprises was the most responsible for the increase in savings in relation to GDP, with a consistent, positive contribution of households and a negative contribution of the general government sector. The favorable tendencies reversed in 2016 and the ratio of domestic savings to GDP decreased by approximately 0.5 p.p. This was mainly due to the lower level of savings in the household sector and the increasingly negative impact of the public sector. It is worth noting that the savings rate dropped in 2016 just as the government began to implement the strategy of increasing domestic savings. It can be assumed that the relative level of gross savings in the Polish economy increased again in 2017, but the growth rate is still very low (approximately 0.2 p.p.).

NBP statements provide the most current data on household sector savings⁶. The *Report on the Labor Market and Household Situation (Raport o rynku pracy i sytuacji gospodarstw domowych)* (November 2017) indicated that the household savings rate at the end of the third quarter of 2016 decreased to 2% (seasonally adjusted), both due to the decrease in voluntary savings and those collected in the capital pillar of the pension system. It is important to point out that the average savings rate in 2006–2016 amounted to 2.4%. At the end of the period under study the financial assets of households equaled slightly over 1.8 trillion PLN, which constitutes a quarterly increase

⁶ *The Financial Situation of the Household Sector Report* starting from the second half of 2017 became a part of a broader report – *the Report on the Labor Market and Household Situation*.

of 2% and a 5.5% annual increase. The household savings rate remained at the level of approximately 2% in the second quarter of 2017, after removing seasonal effects. Therefore, NBP estimates seem to indicate the end of the voluntary savings rate decline and a low stabilization in 2017 of around 1.5–2%, after removing seasonal effects.

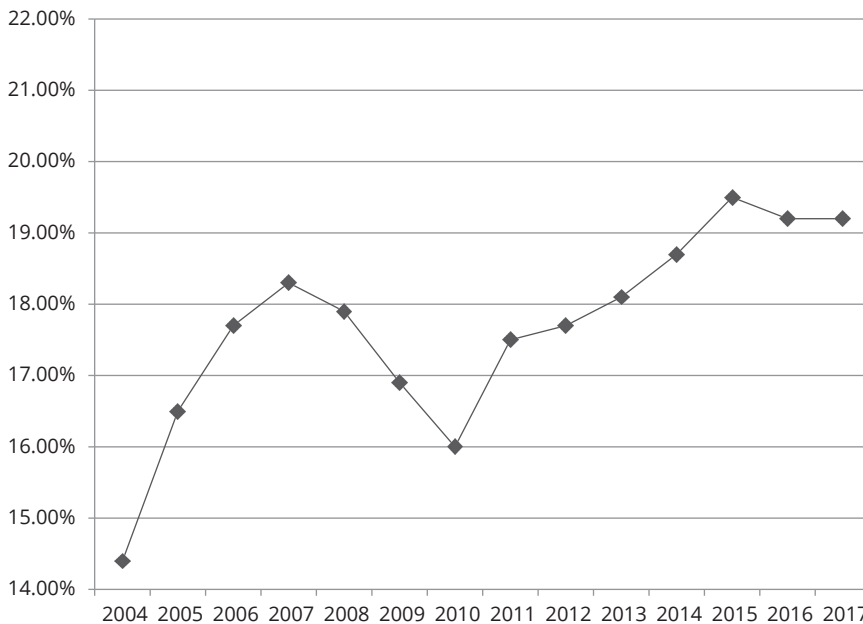
An upward tendency in real gross disposable income, supported by fast-growing income from labor was visible during the same period. According to NBP estimates, gross disposable income increased in the second quarter of the analyzed period at a rate of approximately 3.5%. After nearly two years of the “Family 500+” program, a hypothesis can be stated that the connected transfer of funds, especially increasing the disposable income of families with two and more children, were assessed as permanent and increased consumption, but only slightly increase buffer savings. The start of Employee Capital Programs announced by the government may give rise to an increased household savings in subsequent years. Tax incentives and bonuses paid out of public funds as well as alleged consent to participate in this program may result in a relatively high involvement of employees and employers. However, the voluntary nature of this tool, as well as the negative experiences associated with the functioning⁷ of a similar program of voluntary pension savings in OFE, ultimately do not allow for a reliable assessment of its impact on the domestic savings rate in Poland.

Poland is the only country in the group of the new EU members that still has a gross savings rate below 20% (Figure 7.3). It is very difficult to determine why Polish households save less than other societies in our region, as colloquial explanations based on the statement that Poles have nothing to save from, are hard to accept. It is easy to find poorer economies amongst Central and Eastern European countries (Romania, Bulgaria), which have a higher savings rate in relation to GDP. It can be said that a low level of savings results from a chronic budget deficit in the public sector, but deficits in public finance in Romania or Hungary are similar to Poland, and their savings rates are still higher. Moreover, Poland has likely the best developed financial market in the region. Relatively high real interest rates in the analyzed period, as well as the Polish pension system that creates incentives to save, also did change saving propensity.

While analyzing the above data, it should be noted that the funds not used by enterprise sector play a key role in domestic savings. This is attributed to the significance of equity in financing investment, which results not only from the barriers to access to funds from the banks and capital market, but also from entrepreneurs' preferences.

⁷ It concerns both the amount of commission or, more broadly, the fees charged by companies managing pension funds, as well as the approach of subsequent governments that have decided to cancel this program. A significant proportion of those who were directly affected by these decisions considered this to be “theft” of pension funds.

Figure 7.3. The rate of gross domestic savings in relation to GDP in 2004–2017



Source: For 2004–2013 – *Sustainable Development Indicators for Poland 2015*, GUS. For the following years – own calculations.

The Dynamics of Investment Changes – an Attempt to Forecast

When considering the set of factors described above, contributing to the moderate increase in the investment value in 2017, forecasting the value of this component of global demand in 2018 seems to be a fairly easy and low-risk task. Especially that the majority of analytical institutions expects not only the favorable tendencies in the investment outlays to continue, but even to accelerate.

Trends in the supply side of the Polish economy, mainly capital productivity, have been the subject of the analysis in previous editions of the *Report on Competitiveness* numerous times. To conclude, it can be reminded that the hypothesis on the correlation of the high investment outlays growth rate with equally high dynamics of the GDP growth rate was subject to an unequivocally positive, empirical verification for many years in Poland. When a downward tendency in the fixed capital formation appears (e.g., in 1997–2003), a decrease in the GDP growth rate can almost automatically be observed. The same tendency can be noted in terms of the GDP index when there is a reversal of the downward tendency of investment outlays growth rate (2004–2008

as well as 2017). A specific "business cycle" can even be mentioned in this context, in which the periods of rapid growth in investment outlays and productivity drops happen between periods when capital and labor outlays decrease, while TFP value grows maintaining GDP growth on a positive level.

Based on that and the data published by the GUS [2018], as well as an analysis of quarterly changes in GDP, global demand and its major components, combined with business climate allow one to hope for a maintenance or just a slight deceleration in economic growth (by about 0.5 p.p.). The structure of global demand determining the volume of production is to undergo significant changes, which is especially important. Growth is to be driven primarily by growing investment outlays in 2018, and by further consumption growth, although to a much smaller extent. In the context of data published by GUS on February 28, 2018 showing the decomposition of global demand in the fourth quarter of 2017, the forecast seems to be all the more credible, as investments in the fourth quarter of 2017 grew by as much as 11.3%, making this the best result since the first quarter of 2015 when they increased by 12.7%. According to GUS data, it was also investment that stimulated GDP growth to the greatest extent at the end of 2017. The contribution of household consumption to the growth of the global product in this period was only 2.5% (least in a year), and investments – 2.8%. Public consumption i.e., government spending, has additionally contributed 1%.

With a projected economic growth rate of 4% (and a tolerable fluctuation band of ± 0.5 p.p.), all of these signs suggest that a growth rate of investment in Poland in 2018 will be not less than 6%, with the possibility of exceeding this value by as much as 4 p.p., especially since endogenous factors limiting the growth rate have ceased to play a significant role in the fourth quarter of 2017. It seems that the prospect of a profound income tax reform has been postponed to an unspecified future. The ailment of new tools used to "seal" the tax system has also been mastered and accepted by most entrepreneurs. Considering the stability of the Monetary Policy Council, which basically excludes the interest rate hike in 2018 and the accumulation of public investment co-financed from the EU funds, which will take place in the second and third quarters (the upcoming local elections will act as a strong accelerator of this process), this year will bring a long-awaited increase in investment outlays. Investments are needed to meet the growing demand, as the financial situation of Polish companies is good, the financing conditions are favorable, and the capacity utilization in the economy is high.

Conclusions

The forecasts presented above are based on the assumption that the European and global economy will develop accordingly with a relatively conservative base scenario, in which there are to be no positive or negative unexpected factors in 2018, and internal political risk in Poland will remain at the current level. A neutral attitude of the Monetary Policy Council will only be possible if the current decreasing tendency on the energy raw materials market is not rapidly reversed, as this would stimulate the growth of the value of the loan for enterprises in the case of negative real interest rates.

The economic or political perturbations in one of the largest economies in the world (USA, Germany, China) would have a similar negative impact on the level of investment outlays in the Polish economy, as it seems that the greatest risk is posed by the situation in the Chinese economy, as noted by the beginning of 2018. In early December 2017, the International Monetary Fund warned that China's debt crisis could easily spread to all of Asia and the rest of the world. The representatives of this institution have emphasized that the dependence of China on debt is growing at a "dangerous pace", adding that the policy focusing primarily on GDP growth and job creation caused a systemic risk. The total indebtedness of this country currently exceeds its GDP threefold. By using only part of their production capacities, Chinese companies continue to take loans to expand them, thus creating artificial demand for the production of other factories. The ratio of debt to corporate assets is higher than in the US in 2007, but fortunately, the likelihood of a crisis outbreak in 2018 is still minimal. Chinese leaders are aware of the risks posed by the indebtedness of the economy and are expecting that their "flight forward" plan will be successful and the economy will become so powerful within the next decade that the ratio of debt to corporate assets and GDP will decrease.

However, the progressing improvement of the economic situation in the EU countries (mainly in Germany, where a stable ruling coalition will likely be formed only after months of perturbations) and the persistently relatively high rate of growth in the US would mean a positive effect of exogenous factors on GDP growth and investment in Poland. It is however difficult to assess the likelihood of such a positive and negative scenario in February 2018.

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R&D, Innovation and the Competitiveness of the Polish Economy

Marzenna Anna Weresa

Introduction

In this monograph we have a broad approach to competitiveness (see Preface), which goes beyond growth and international economic relations and also includes social and ecological factors [see Porter, 1990; Narula, 2003; Aiginger et al., 2013; Porter et al., 2016]. In this context a question arises concerning the determinants of a country's competitive advantages. This chapter focuses on the importance of innovation in this process. The objective is to determine Poland's ability to innovate and its innovative position [see Weresa, 2012, p. 32]¹ compared to the other European Union member states, especially countries with a similar level of economic development. The analysis covers the period of 2010–2017 and contributes to determining the role of innovation in shaping the competitive advantages of the Polish economy.

Innovation and Competitiveness: A Literature Review

Models of economic growth can serve as a starting point for the analysis of the relationship between innovation and competitiveness. Growth and welfare increase are one of the facets of economy's competitiveness [Porter, 1990]. The works of J. Schumpeter [1912; 1960], among others, indicate innovation as a factor of economic growth. According to Schumpeter, innovation can be understood as a microeconomic factor that is locally accumulated in the process of enterprise development. Economic

¹ The provided definition of the ability to innovate and the innovative position is the same as in the cited work.

development is a result of constant structural changes determined by internal conditions that are related to earlier achievements [Schumpeter, 1960].

The Schumpeterian paradigm, which emphasizes the close relationship between innovation and entrepreneurship, can also be seen in contemporary theories of economic growth [Aghion, Howitt, 1992; 1998]. The Schumpeter's model of economic growth shows that innovation and education influence the rate of economic growth, which has also been confirmed by empirical studies [see for instance: Aghion et al., 2005]. The results of these studies show that long term economic growth is largely based on innovation [Aghion et al., 2015], which, among others, is dependent on research and development (R&D), skills, as well as on expansion to new markets, which enables to gain specific advantages.

Evolutionary economics research on economic growth emphasizes also the importance of institutions in the growth process. This is reflected in the evolution of technology and production structure [Nelson, Winter, 2002, pp. 37–39]. Competitiveness is shaped not only by technological changes, but also by institutional innovations, such as new regulations, as well as improvements of existing law [Freeman, 1996]. This is also confirmed by an analysis of the technological gap and its change over time [Gomułka, 1998; Kubiela, 2009]. The transfer of innovation and organizational progress from countries with a higher technological level may promote the acceleration of economic growth, but the use of new technology requires investing in human and physical capital, as well as introducing necessary institutional changes [Gomułka, 1998; Romer, 2010].

Competitiveness is not, however, limited to economic growth, but is also determined by a given country's position on the international market. Furthermore, the concept of sustainable competitiveness adds environmental protection and social sustainability issues to this economic dimension of competitiveness [Blanke et al., 2011; Aiginger et al., 2013; Corrigan et al., 2014; Weresa, 2016]. Theory, as well as empirical studies theory confirm that a nation's competitive advantages arise from implementing innovation [Porter, 1990; 2008; Cantwell, 2006; Peneder, 2017; Dole, Perez-Alaniz, 2017], while both domestic and foreign resources can be used to create them. In an open economy, the ability to use local and foreign production factors more efficiently than other countries is significant, as it translates into an increase in the well-being of residents [Misala, 2014]. When summarizing the analysis of the relationship between innovation and competitiveness, J. Cantwell [2006] stated that competitiveness results from using innovations to create locally diversified resources and capabilities needed to maintain growth and a stable position on the international market.

There are two main groups of factors determining competitiveness indicated in the literature. These are: the level of technological development that is related to the

ability to create and use knowledge for the production of goods and services, and social abilities resulting from the local social environment that affect enterprise operations [Fagerberg, Srholec, 2017]. In other words, determinants of competitiveness can be grouped into technological and institutional factors.

An analysis of the first of the aforementioned groups of factors (i.e., technological factors) has been conducted in the next part of this chapter. Both the resources necessary for the creation of innovations, as well as the results of research, development and innovation activities have been compared in Poland and other European Union countries that have a level of innovativeness that is similar to Poland's.

The Innovative Position of Poland in 2017 Compared to Other European Union Countries

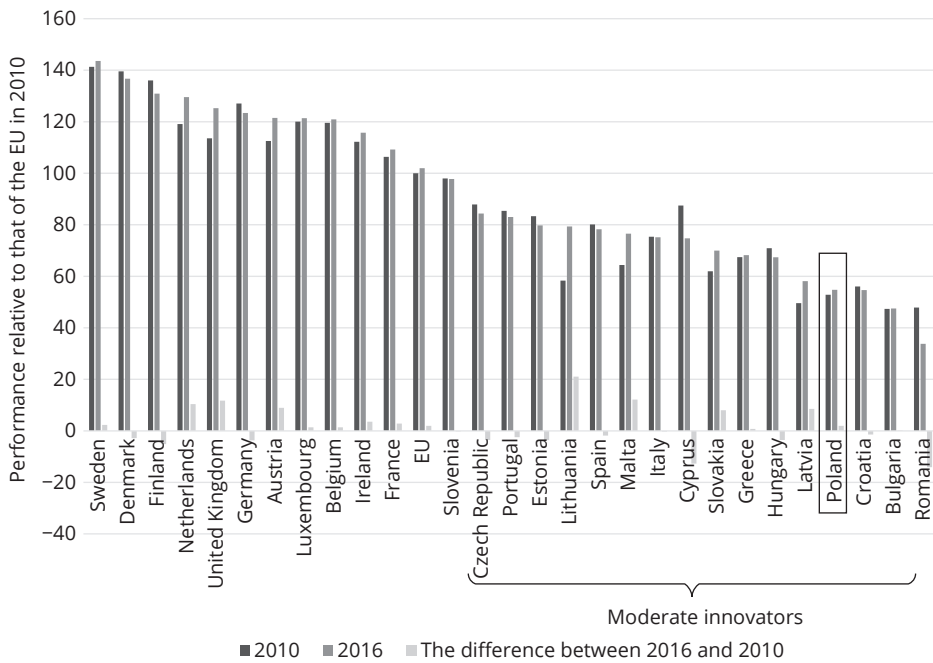
Poland is characterized by, the so-called, catching-up type of national innovation system [Weresa, 2012]. As a result of Poland's systemic transformation from planned to market economy, the research and development (R&D) domain, as well as its university education system, were subject to changes in the last decade of the 20th century. However, while the role of private universities in providing third level education has increased as a result of the transformation, the changes noted in the R&D sector were less significant. As a result, Poland's innovative position is still relatively low in comparison to the majority of the EU countries. This is illustrated by the value of the summary innovation index, which is composed of 27 different innovation indicators [EC, 2017a]². Poland is placed in the category of "moderate innovators", occupying the 25th place in the EU in terms of the summary innovation index (SII) (Figure 8.1). SII for Poland amounted to 52.8% of the EU average in 2010, with a value increase of only 2 p.p. within 5 years. In 2010–2016, the innovative position showed the greatest improvement (which is reflected in the largest increases in the index) in Lithuania (by as much as 21 p.p.), Malta (12.2 p.p.), the United Kingdom (11.7 p.p.) and the Netherlands (10.4 p.p.). Innovativeness weakened the most significantly in Romania, as noted by the fall in SII (a drop by 14.1 p.p.) followed by Cyprus (by 12.7 p.p.).

A decrease in SII was noted in the majority of the EU countries from Central and Eastern Europe during the analyzed period e.g., indices for the Czech Republic and Hungary measured in relation to the EU average of 2010 decreased in 2010–2016 by 3.5 p.p. A similar decrease was noted in Estonia (by 3.6 p.p.) and a slight decrease

² A description of the methodology used in creating this index can be found in the cited report.

in Slovenia (by 0.2 p.p.). A significant increase in SII (Figure 8.1) was recorded only in Slovakia (by 8 p.p.) with a slight increase in Bulgaria (by 0.1 p.p.).

Figure 8.1. Summary Innovation Index (SII): Poland compared to other European countries, the value of the index in 2010 and 2016 compared to the EU average in 2010



Source: Own study based on data from the European Commission [EC, 2017b].

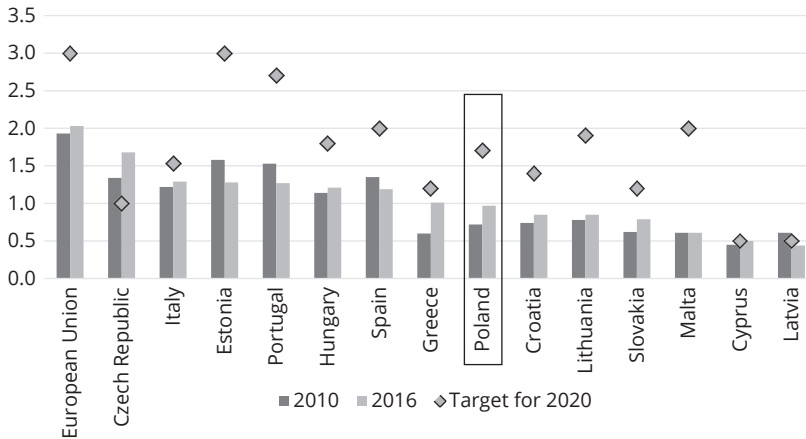
The value and changes of the summary innovation index are determined by indexes constituting its components and their changes over time. These indicators can be divided into two main groups: input and output indicators. The next sections of this study are focused on the trends of the most important indicators from both groups. The scope of this work does not allow for an extensive analysis of all 27 indicators, therefore it was limited to a comparative analysis of several key innovativeness measures. The indicators for Poland were compared to the EU average and to countries similar to Poland in terms of their levels of innovativeness, representing the group of “moderate innovators” [EC, 2017b]. The analysis of input indicators includes: R&D funding, expenditure on innovative activities and indicators concerning the development of human resources for science and technology. Innovation output analysis takes into account: selected indicators of patent statistics (e.g., patent applications, trademarks, utility models) and the number of innovations introduced by Polish enterprises in 2010–2016.

Research and Development (R&D) Expenditure

One of the factors determining a country's ability to innovate is its expenditure on research and development [Furman et al., 2002; Ulku, 2007]. According to the “Europe 2020” strategy of the European Union, R&D expenditures should reach a level of 3% of gross domestic product (GDP) by 2020. When this strategy was established for the next decade in 2010, Poland aimed at reaching the level of 2.2–3% [OECD, 2010, p. 89], later reducing it to 1.7% [Eurostat, 2018]. In 2010–2016, expenditure on R&D gradually increased from 0.72% of GDP in 2010 to 0.97% in 2016. Both the level of R&D expenditure and Poland's target are much lower than the average for the whole EU-28 and are much lower than in most countries classified to the group of “moderate innovators” (Figure 8.2) in the “European Innovation Scoreboard 2017”. Despite some growth of R&D expenditures, Poland is still among the countries with the lowest expenditure in the EU. However, it should be noted that Poland increased its R&D expenditure expressed in relation to GDP in 2010–2016. Among the surveyed group of “moderate innovators”, the highest increase was observed in Greece (by 0.4 p.p.), with Poland ranking second (a 0.25 p.p. increase in rate). This resulted in an increase in R&D expenditure per capita. In 2010–2016, this indicator grew in Poland from 69EUR to 108EUR. In per capita terms Poland spends on R&D over five times less per capita than the EU-28 average, and the gap dividing Poland and the EU is still significant [Eurostat, 2018].

The analysis of statistical data presented in Table 8.1 reveals some positive trends in R&D activity in Poland when it comes to the contributions of different sources of research and development funding (Table 8.1). After many years of the dominance of public R&D funding and a relatively small contribution of the private sector, the structure of R&D funding has changed in Poland. The contribution of enterprises in R&D financing increased from 24% in 2010 to 39% in 2015, and government sector contribution dropped from 60% to 41%. In addition, the share of foreign funds in total R&D funding increased significantly (by as much as 5 p.p. in 2010–2015 i.e., from 11.8% to 16.7%).

Figure 8.2. R&D expenditure as percentage of GDP in Poland and in other EU “moderate innovators”: 2010 and 2016 compared



Source: Own study based on data from the Eurostat database.

A change in the significance of individual sources of R&D financing can also be observed in the other EU countries in Central Europe. Changes similar to those observed in Poland were also noted in Hungary, while in the Czech Republic and Slovakia a different structure of R&D financing emerged. In these countries, the role of both the enterprise sector and the government sector decreased in 2010–2015, while the importance of foreign funds increased substantially. As a result, each of these three sources of funding in the Czech Republic accounted for about 1/3 of the entire R&D budget in 2015, while foreign sources with the share of 39% became the most important element of R&D expenditures in Slovakia (Table 8.1).

Multi-directional changes in the importance of individual components of R&D expenditure can also be observed in other “moderate innovators”. In most Mediterranean countries, the corporate sector dominates in the funding structure of R&D, although its role slightly decreased in 2010–2015 in Portugal, Greece and Malta, with an increase noted in Spain, Italy and Cyprus. However, the level of involvement of the enterprise sector in R&D funding did not reach the EU average amounting to 55.3% in 2015 in any of the “moderate innovator” countries. As shown by examples of the EU innovation leaders, innovative position improvement is impossible without a substantial increase in the involvement of the enterprise sector in financing and conducting research.

Table 8.1. Intramural R&D expenditure in Poland and in the selected EU countries by source of funds: 2010 and 2015 compared (in %)

	Business sector		Government sector		Higher education		Non-profit private sector		Foreign funds	
	2010	2015	2010	2015	2010	2015	2010	2015	2010	2015
EU	53.8	55.3	34.8	31.3	0.9	0.9	1.6	1.7	8.9	10.8
Czech Republic	40.8	34.5	44.4	32.2	0.9	0.7	0.0	0.1	13.9	32.5
Estonia	43.6	41.0	44.1	46.4	0.6	0.2	0.2	0.2	11.4	12.2
Greece	36.5	31.4	48.3	53.1	2.3	2.5	1.0	0.4	11.9	12.7
Spain	43.0	45.8	46.6	40.9	3.9	4.3	0.7	0.9	5.7	8.0
Croatia	38.8	46.6	49.2	36.4	2.0	2.0	0.2	0.5	9.9	14.5
Italy	44.7	50.0	41.6	38.0	0.9	1.0	3.1	2.7	9.8	8.3
Cyprus	12.7	20.0	68.3	50.6	3.5	5.8	0.5	0.6	15.0	23.0
Latvia	38.8	20.0	26.4	32.7	1.4	2.2	:	:	33.4	45.0
Lithuania	32.4	28.5	46.0	35.3	1.5	1.5	0.2	0.3	19.9	34.3
Hungary	47.4	49.7	39.3	34.6	:	:	0.9	0.7	12.4	15.0
Malta	52.5	45.6	34.4	32.8	1.3	1.1	0.1	0.1	11.7	20.4
Poland	24.4	39.0	60.9	41.8	2.5	2.2	0.3	0.2	11.8	16.7
Portugal	43.9	42.7	45.1	44.3	3.2	4.4	4.6	1.3	3.2	7.4
Slovakia	35.1	25.1	49.6	31.9	0.4	3.3	0.3	0.3	14.7	39.4

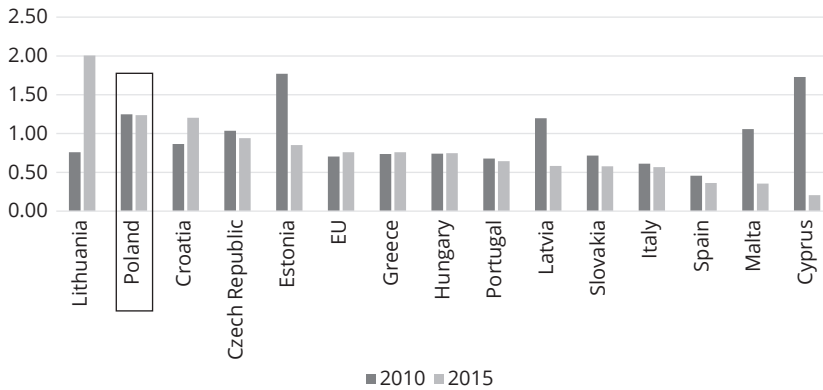
Source: Own study based on data from the Eurostat database.

Expenditure on Innovation Activity

In addition to research and development, which includes basic and applied research and development work, implementation of innovations requires some additional investment related to commercialization process. In this respect, Poland clearly stands out from other EU “moderate innovators”. The expenditures measured as a percentage of enterprise turnover remained rather stable in Poland in 2010–2015 at the level of about 1.25%, and they were still over 1.5 times higher than the EU average – only Lithuania has achieved a better result in the analyzed group of countries (Figure 8.3).

The structure of these expenses depends on the sector specific features. In 2010–2016, a significant change in the structure of expenditure occurred in Poland in the services sector. The largest share had expenditures on current development activities (as much as 41% in 2016), which have been tripled since 2010. Machinery and equipment, which accounted for as much as 41% of expenditure on innovation in the services sector in 2010, dropped to 19% in 2016 [GUS, 2017].

Figure 8.3. Expenditure on innovation activity as a percentage of enterprises' turnover in Poland compared to the selected EU countries in 2010 and 2015



Source: Own study based on the “2017 European Innovation Scoreboard” database.

In 2016 – similarly to 2010 – enterprises in manufacturing spent the largest part of their innovation expenditures on machinery and technical equipment (respectively: 49.4% and 52.6% of total expenditure). Buildings were also a significant part of innovation expenditures (26.7% in 2016 compared to 22.8% in 2010) [GUS, 2017].

In conclusion, expenditures on innovative activities measured as a percentage of enterprises' turnover in 2010–2016 were relatively high in Poland, and their structure was rather stable in the industry sector, while changes in service sector were reported. A tendency of shifting expenditures on innovative activities from machinery and equipment to development activities, knowledge purchases from external sources and software purchases was noted in the service sector in the 2010–2016 period.

Human Resources for Creating Innovations

Running an R&D activity requires not only the allocation of adequate financial resources, but also educating specialized research staff. In order to determine whether a structural change in the country's innovation system allows to move from a strategy based on low labor costs to that of using innovations, it is necessary to analyze changes in human resources development indicators. The most important indicators in this group are: the proportion of people who graduated from university and people who obtained doctoral degrees in relation to the number of inhabitants in the ages of 25–34, as well as employment in high-tech industries and employment in innovative enterprises with high growth potential in relation to the number of people employed

in the economy. Statistical data concerning the development of the five indicators of human potential have been presented in Table 8.2.

Upon analyzing table 8.2. it can be noticed that Poland is one of the countries that has noted a rapid increase in the percentage of people between the ages of 25–34 having higher education. This indicator reached 43.5% in 2016 and was higher than the average in the EU-28. However, some other “moderate innovators”, namely Cyprus and Lithuania achieved better results than Poland in this area.

The second indicator that distinguishes Poland from the analyzed group of countries is employment in fast-growing enterprises shown as a percentage of total employment. Although this percentage decreased in Poland from 6.3% in 2010 to 5.5% in 2015, it still remains higher than the average in the EU-28 (4.8%), placing Poland in the fourth position among the analyzed moderately innovative EU countries, after Hungary, Slovakia and Malta (Table 8.2).

Table 8.2. Changes in human resources in 2010–2016: Poland compared to the other EU countries from the group of “moderate innovators”

	New doctorate graduates per 1,000 population aged 25–34		Population aged 25–34 having completed tertiary education (percentage share)		Population aged 25–64 involved in lifelong learning (percentage share)		Employment in knowledge-intensive activities (percentage of total employment)		Employment in fast growing enterprises (percentage of total employment)	
	2010	2015	2010	2016	2010	2016	2010	2015	2010	2015
EU-28	1.50	1.85	33.3	38.2	10.7	10.8	13.7	14.1	5.0	4.8
Czech Republic	1.30	1.68	22.6	32.6	10.0	8.8	12.3	12.8	6.7	5.0
Estonia	0.90	1.08	38.2	41.2	11.0	15.7	10.8	12.7	2.7	3.0
Greece	1.10	1.13	30.6	41.0	3.3	4.0	11.4	12.2	:	:
Spain	1.20	1.91	40.3	41.0	10.1	9.4	11.8	12.3	3.2	3.5
Croatia	1.40	1.57	25.8	33.0	3.0	3.0	10.6	11.7	1.5	2.8
Italy	1.60	1.53	20.8	25.6	6.2	8.3	13.5	13.9	2.9	2.7
Cyprus	0.20	0.55	48.1	56.3	8.1	6.9	15.1	16.3	1.3	0.8
Latvia	0.50	0.91	34.7	42.1	5.4	7.3	9.0	11.1	3.3	4.8
Lithuania	1.00	1.12	46.3	54.9	4.4	6.0	8.9	9.7	4.5	4.0
Hungary	0.80	0.96	26.1	30.4	7.1	6.3	13.0	12.2	7.5	7.6
Malta	0.20	0.48	24.3	34.0	6.2	7.5	16.2	18.4	5.9	7.3
Poland	0.50	0.63	37.1	43.5	4.3	3.7	9.2	10.0	6.3	5.5
Portugal	1.90	1.90	25.5	35.0	11.5	9.6	9.1	10.9	3.1	3.7
Slovakia	3.20	2.25	24.0	33.4	4.1	2.9	10.4	10.0	9.6	7.4

Source: Own study based on the “2017 European Innovation Scoreboard” database.

The involvement of people in lifelong learning is a downside of human resources in Poland compared to the average in the EU-28. The percentage of people employed in knowledge-intensive activities in Poland is also relatively low, and this rate is increasing at a very slow pace (only by 0.8 p.p. from 9.2% in 2010 to 10% in 2015). This is one of the lowest indicators among EU “moderate innovators” (see Table 8.2).

Inventions Resulting from R&D Activity

Inventions are one of the results of research and development activity. They can be proxied by the number of patent applications, utility models, and trademarks. A comparative analysis of this aspect of innovativeness will be conducted using indicators calculated as the ratio of the number of patent applications, trademarks and utility models to GDP. All of these innovativeness indicators increased in Poland during 2010–2016 (Table 8.3), while various “moderate innovators” recorded a decrease in at least one of these indicators (e.g., Latvia, Hungary, Croatia, Spain, Portugal, Italy, Slovakia).

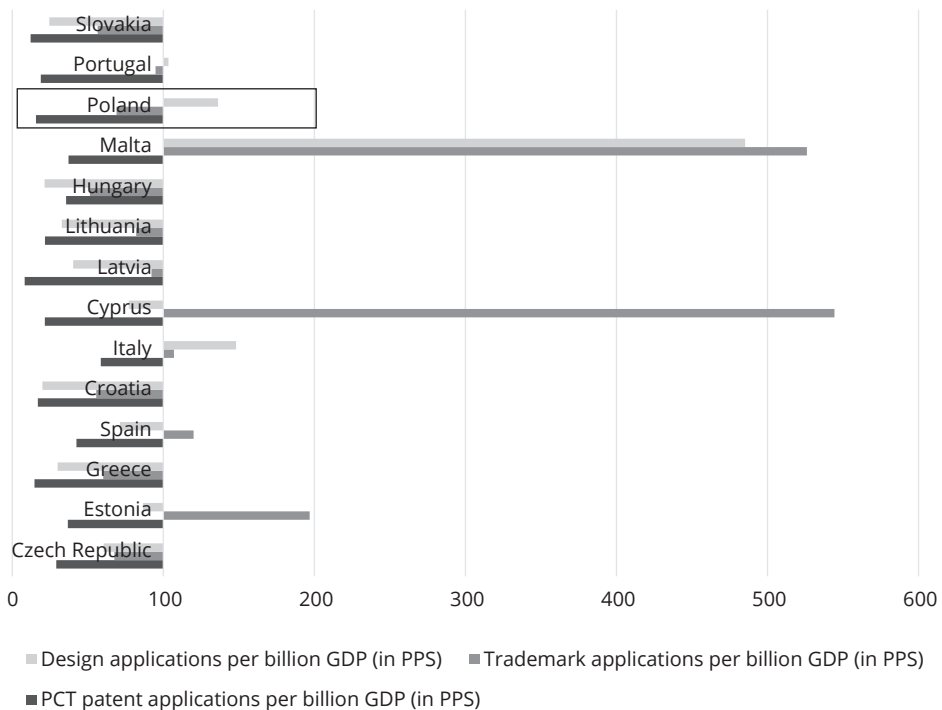
Table 8.3. The number of patents, trademarks and utility models applications filed by countries’ residents per 1 billion GDP (according to the purchasing power standard – PPS): Poland compared to the EU “moderate innovators”

	PCT patent applications		Trademark applications		Utility model applications	
	2010	2015	2010	2016	2010	2016
EU-28	3.90	3.70	6.8	7.6	4.60	4.33
Czech Republic	0.84	1.08	4.25	5.14	2.34	2.62
Estonia	2.44	1.36	8.26	14.97	2.16	3.74
Greece	0.43	0.55	1.89	4.58	0.46	1.30
Spain	1.55	1.57	7.34	9.13	3.46	3.08
Croatia	0.68	0.63	3.40	4.22	0.15	0.86
Italy	2.07	2.17	6.43	8.14	6.53	6.41
Cyprus	0.58	0.80	16.70	41.39	1.24	3.34
Latvia	1.15	0.31	7.24	7.01	2.99	1.75
Lithuania	0.33	0.80	3.76	6.24	0.60	1.42
Hungary	1.49	1.32	3.48	3.91	0.99	0.93
Malta	0.26	1.38	17.10	40.00	0.65	21.00
Poland	0.47	0.58	3.45	5.25	4.26	5.90
Portugal	0.67	0.70	5.01	7.21	4.64	4.47
Slovakia	0.39	0.45	3.24	4.30	1.41	1.06

Source: Own study based on the “2017 European Innovation Scoreboard” database.

Figure 8.4, along with the comparative data (Table 8.3), allows an analysis of the results in human capital development achieved in 2016 by Poland and other “moderate innovators” in comparison to the EU-28 average. Poland is still considerably below the EU average in this respect, despite an increase in the number of patent, trademark and utility model applications. Poland’s performance of utility model applications differs from that of patents and trademarks. In 2010, the number of applications in relation to GDP in Poland was close to the average level in the European Union, and in 2016 this rate was over 30% higher than the EU average (see Table 8.3 and Figure 8.4).

Figure 8.4. The number of patent, trademarks and utility models applications filed by countries’ residents per 1 billion of GDP (according to the purchasing power standard – PPS, UE-28 = 100) – Poland compared to the EU “moderate innovators” in 2016



Source: Own study based on the “European Innovation Scoreboard 2017” database.

A comparison of data from Table 8.3 and Figure 8.4 allows for the following observations:

- if changes in patent, trademark and utility model applications compared to the GDP were to be used as an assessment of the innovation system, a significant improvement would be noted in Poland in 2010–2016 in this respect. However,

the distance to the EU average values is still significant in terms of the number of patents and trademarks; none of the EU “moderate innovators” has a higher number of patent applications in comparison to the average values of the entire EU;

- a rapid increase in the number of utility model applications in Poland in 2010–2016 led to exceeding the EU average in this respect; in the group of “moderate innovators”, Italy, Malta and Portugal also have higher level of utility models applications than the EU average;
- five countries from the analyzed group of “moderate innovators” (i.e., Cyprus, Malta, Estonia, Spain and Italy) stand out in terms of their higher than the average EU values of registered trademarks per unit of GDP; Poland is unfortunately not included in this group, but an improvement in this indicator can be noted, both in absolute and relative terms.

Innovation and Export of High Technology

The share of revenues from the sale of new or improved products in the value of total sales can be used, according to Oslo Manual guidelines [OECD, 2005], to assess the economic effects of innovative activity, as it indicates changes in the modernization of the product range and their competitiveness. Another indicator useful for such an assessment can be the share of high technology products in exports. Therefore, it is worth analyzing if the gradual increase in expenditures on R&D and innovation in Poland have been accompanied by the increase in the sales of innovative goods and services, as well as relevant changes in the structure of Polish exports, such as the growing share of technologically advanced industries. It appears that the changes of the first indicator i.e., the share of sales of innovative production in total turnover were not significant over the analyzed period. The data presented in Figure 8.5 show that in 2010–2015, revenue from sales of products that are new to the market or new to the company as a percentage of the total turnover, was in Poland, one of the lowest among countries included in the group of “moderate innovators”. Moreover, this share dropped by 3.4 p.p. in the analyzed period, from 9.8% to 6.4%. The GUS data indicates a further decline in this share in 2016 to 6.3% [GUS, 2017, p. 58]³, and the decrease in 2016 in relation to the previous year mainly concerned the industry (by 1.4 p.p.), while services reported a small increase (by 0.9 p.p.) [GUS, 2017, p. 51]. It is also worth noting that revenues from sales of products new to the company prevail

³ The GUS data concern Poland, unfortunately data provided by Eurostat for the EU countries for 2016 were not available at the time of preparing this monograph for printing, which makes comparative analysis of Poland's achievements in 2016 impossible.

in both industry and service sectors. In 2016, they accounted for more than a half of the sales revenues of new or significantly improved products in the industry, and for almost 60% in the service sector [GUS, 2017, p. 52]. Although this percentage decreased in 2016 compared to the previous year by 6 p.p. in the industry in favor of revenues from sales of products that are new to the market, this change is still not sufficient enough to significantly improve Poland's innovativeness.

In order to determine the relative competitiveness level of Polish enterprises in different sectors classified by technology (in the industry sector) or knowledge intensity (in the service sector) and the competitiveness in the ICT sector (broken down into ICT production and ICT services) the relative competitiveness indicator will be calculated according to the formula below:

$$K_{ij} = (\text{Inn}_{rij} / \text{Inn}_{pij}) : (\text{Inn}_{rj} / \text{Inn}_{pj})$$

in which:

K_{ij} – the relative competitiveness index of enterprises in the j sector (j stands for industry, services or the ICT sector),

Inn_{rij} – revenues from sales of products that are new to the market in total sales of enterprises in the i group of technology / knowledge and in the j sector,

Inn_{pij} – revenues from sales of products that are new only to the company in total sales of enterprises in i group of technology / knowledge and in the j sector,

Inn_{rj} – revenues from sales of products that are new to the market in total sales of enterprises in the j sector,

Inn_{pj} – revenues from sales of products that are new only to the enterprise in total sales in the j sector.

The index value higher than one ($K_{ij} > 1$) indicates that enterprises included in a given sector with a given technology/knowledge intensity, are relatively more competitive than the companies in a sector considered as a whole. In other words, the percentage of revenues from the sale of products that are new to the market in relation to the percentage of sales of products that are new to the enterprise in a given group of technology is higher than that for the whole industry or service sector on average. The results of calculations for Poland in 2014–2016 have been presented in the last column of Table 8.4.

This analysis of the data presented in Table 8.4. shows that only companies from low-tech industries are relatively competitive, as they gain relatively higher revenues from sales of products that are new to the market than all the companies taken together in the industry sector as a whole (index $K_{ij} = 1.28$). In the services sector, knowledge-based financial services were indicated as competitive in relative terms

(index $K_{ij} = 1.07$). In industries included in the ICT sector, products of the ICT industry are relatively more competitive compared to the entire sector, as ICT production had a relatively higher revenue from sales of products that are new to the market than the ICT sector taken as a whole.

Table 8.4. Sales of innovative products and relative competitiveness by technology/knowledge intensity in industry, service and the ICT sectors

	Revenues from the sales of products introduced to the market in 2014–2016 as a % of total sales		Relative competitiveness indicator of K_{ij}
	new for the market	new only for the enterprise	
Total industry	4.0	4.2	–
High technology enterprises	4.3	5.9	0.77
Medium-high technology enterprises	9.5	10.1	0.99
Medium-low technology enterprises	2.4	3.2	0.79
Enterprises of low technology	3.3	2.7	1.28
Total services	1.6	2.3	–
High-tech services	4.5	10.9	0.59
Financial services based on knowledge	2.6	3.5	1.07
Total ICT sector	3.8	7.6	–
ICT production	4.5	4.9	1.84
ICT services	3.6	8.4	0.86

Note: Data for the total ICT sector and ICT services do not include enterprises classified in the PKD 95.1 group.

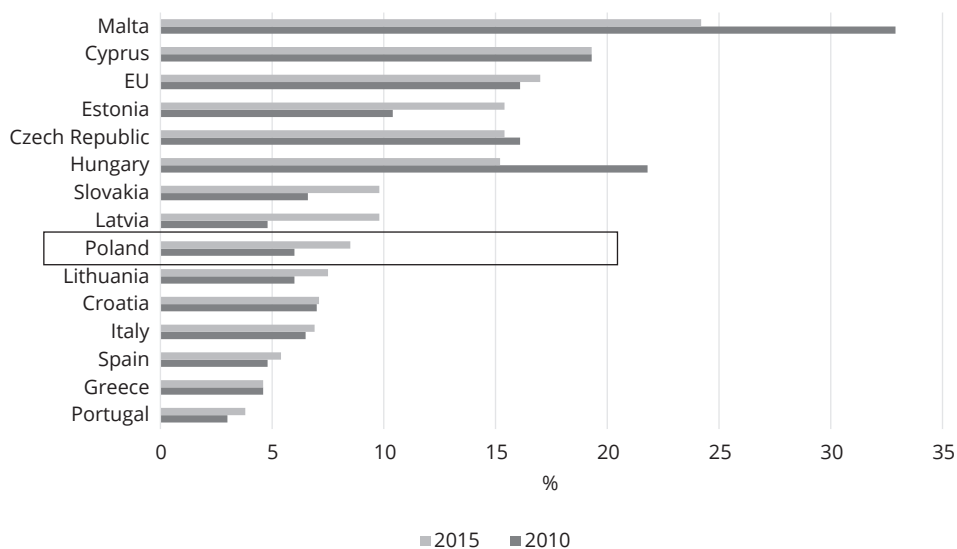
Source: Own study based on the GUS [2017, pp. 57–58] and the GUS database.

The tendencies described above regarding the sales of innovative production are one of the causes of a relatively low share of high-tech goods and knowledge-intensive services in Polish exports.

The share of high-tech goods in total Polish exports of goods reached 8.5% in 2015. This is lower than a half of the average level of this indicator for the entire EU, which was at 17% in 2015. Countries with a level of development similar to Poland, such as Estonia, the Czech Republic and Hungary, had significantly higher rates than Poland (Figure 8.5). This comparison indicates a technological backwardness in Poland in comparison to the majority of countries that constitute “moderate innovators” group in the EU. The growth rate of the analyzed index shows, however, a positive trend. In 2010–2015, an increase by 2.5 p.p. was noted in Poland, while at the same time a decrease occurred in Hungary and the Czech Republic (by 6.3 p.p. and 0.7

p.p. respectively). It should also be noted that “moderate innovators” from Southern Europe, such as Italy, Spain, Greece and Portugal, not only have a lower share of high technology exports in total exports, but also the growth rate of this indicator is lower than in Poland (Figure 8.5).

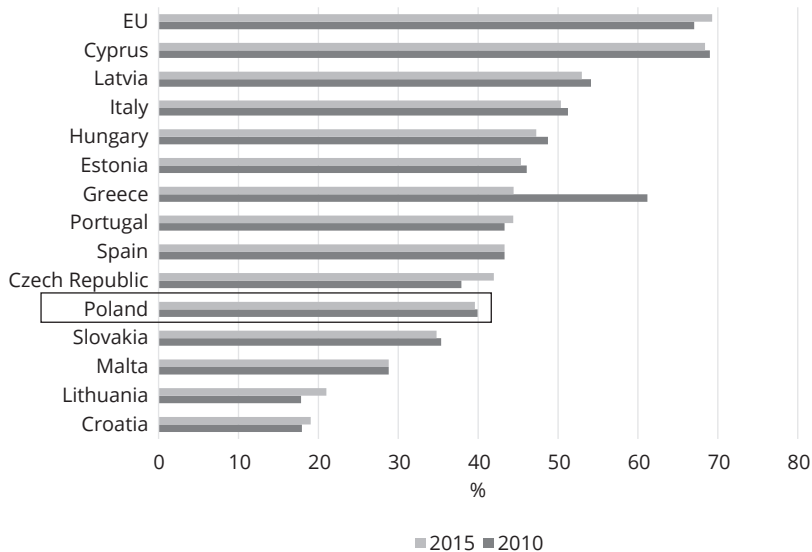
Figure 8.5. The share of export of high technology goods in total export of goods in 2010 and 2015: Poland compared to other “moderate innovators” (%)



Source: Own study based on Eurostat data.

Slightly different conclusions can be drawn from the analysis of data presented in Figure 8.6, which show the share of export of knowledge-intensive services in the total export of services in 2010 and 2015. In 2015, the Polish export of knowledge-intensive services accounted for 39.6% of total export of services, while the EU average was as high as 69.3%. Among the fourteen EU countries classified in the European Innovation Scoreboard [EC, 2017b] as “moderate innovators”, only four countries have a weaker position than Poland. These were: Slovakia, Malta, Lithuania and Croatia. In addition, there was a slight decrease in this ratio in Poland in 2010–2015, while an increase was noted in the Czech Republic and Hungary (Figure 8.6).

Figure 8.6. The share of export of knowledge-intensive services in total services export in 2010 and 2015: Poland compared to other “moderate innovators” (%)



Source: Own study based on Eurostat data.

The review of the literature conducted at the beginning of this chapter proved that innovation and competitiveness are interrelated. Therefore, the question arises to what extent competitive advantages in Polish export of high-tech goods changed in the period of 2010–2016. The comparative analysis for 2010 and 2016 focuses on five high technology industry groups: 1) aerospace industry products, 2) chemicals, 3) electronics – telecommunications, 4) electrical machinery, apparatus and appliances and 5) pharmaceuticals. The comparative advantage index is used to assess international competitiveness (Revealed Comparative Advantage, RCA). It is described by the following formula [Balassa, 1965; 1979; 1989]:

$$RCA = \ln \left(\frac{x_{ij}^K}{m_{ij}^K} + \frac{X_j^K}{M_j^K} \right),$$

in which:

x_{ij}^K – export of i group of goods from country K ,

m_{ij}^K – import of i group of goods to country K ,

X_j^K – total exports from country K ,

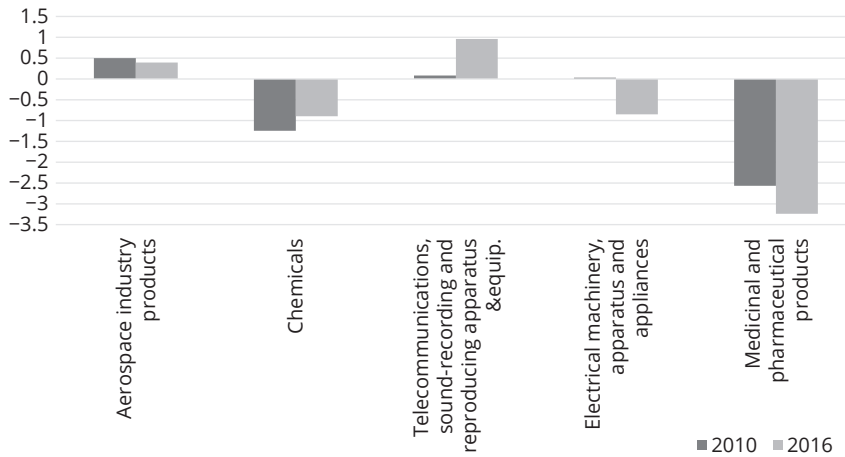
M_j^K – total imports to country K ,

i – industry/group of industries,

j – remaining countries in the world.

The value of RCA_i higher than zero ($RCA_i > 0$) indicates a comparative advantage in the i industry/group of industries, but RCA_i lower than zero ($RCA_i < 0$) indicates relative disadvantage in foreign trade. Due to the logarithmic form of the equation, the positive and negative values of RCA_i are symmetrically distributed around zero.

Figure 8.7. Changes in the RCA index in Polish foreign trade in selected groups of high-tech industry goods: 2010 and 2016 compared



Note: High technology product groups are selected for this analysis using the OECD list according to the International Standard Trade Classification (SITC Rev. 3).

Source: Own study based on the OECD database [2018].

Figure 8.7 presents the changes in the revealed comparative advantage in Polish foreign trade in selected groups of high-tech goods in the period of 2010–2016. Despite a relatively small share of high technology industry in Polish exports, two out of the five analyzed industry groups of the high-tech industry are competitive on international markets. These include: aerospace industry products and electronics & telecommunication equipment. What's more, Poland had comparative advantages in both these groups of goods as early as in 2010. However, their changes go in different directions. Aerospace industry products belong to Polish export specialization in 2016, but the comparative advantage in trade in this group of goods has slightly weakened since 2010 ($RCA_{2010} = 0.499$; $RCA_{2016} = 0.393$). The trade of electronics & telecommunications group of goods had a comparative advantage in 2010, with a strong growth noted since then ($RCA_{2010} = 0.0807$; $RCA_{2016} = 0.961$). A gradual improvement in relative advantages in Polish trade can also be seen for chemicals in 2010–2016, although Poland has no comparative advantage yet. However, a loss of a very small relative advantage occurred in 2016 in the case of trade in electrical machinery, with a further deepening comparative disadvantage noted in the trade of

goods in the pharmaceutical industry (Figure 8.7). In the light of the conclusions from literature concerning the link between innovation and competitiveness, these changes are probably a result of the low innovative position of Polish industry and the dominance of innovations that are new to the enterprise, but previously known in the industry, and not new to the market or country. This is, however, a preliminary hypothesis, the verification of which should be the subject of further research in this area.

Conclusions

The analyzes conducted in this chapter show that the Polish economy is not based on innovation and knowledge yet, even compared to the majority of economies classified as “moderate innovators”. The underfunding of research, development and innovation projects is one of the causes behind this situation. Insufficient R&D spending, in turn, is a limitation to advanced research and hinders the expansion of Polish companies to markets of technologically advanced goods and services. A tendency recently observed in Poland of reorienting expenses on innovative activities from the purchase of machinery and equipment towards development activities and purchasing software and knowledge from external sources can be a driver of a gradual upgrading of Poland’s innovation performance. A relatively high percentage of employees in enterprises with high growth dynamics compared to average in the EU could also help in this process. This is not, however, an argument sufficient enough to confirm that the role of innovation in shaping the competitive advantages of Polish enterprises has been growing. There is still a large gap between Poland and the EU average values of innovation indicators, such as the number of patent applications, revenue contribution from innovative production, and the share of export of high technology in total exports.

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Changes in Total Factor Productivity

Mariusz Próchniak

Introduction

The analysis of the total factor productivity will be carried out using growth accounting. Growth accounting is an empirical study based on determining to what extent economic growth results from changes in the inputs measurable production factors, and to what extent from changes in the level of technology, measured by the growth rate of total factor productivity (TFP). In the 2013 edition of the study, we have presented the estimates of total factor productivity in individual sectors of the economy for Poland and selected countries of Central and Eastern Europe as well as Western Europe (including 10 sectors according to NACE-2 classification) [Próchniak, 2013]. In turn, in the 2012 and 2014 study editions, in addition to the basic growth accounting model, we estimated the extended model, including human capital [Próchniak, 2012; 2014].

This analysis covers 11 countries of Central and Eastern Europe, namely the EU-11 group (Poland, Bulgaria, Croatia, the Czech Republic, Estonia, Lithuania, Latvia, Romania, Slovakia, Slovenia and Hungary) and the period 2008–2017. To assess the dynamics of changes in total factor productivity in the analyzed years, we also present the average TFP growth rates for the following sub-periods: 2008–2010, 2011–2013, 2014–2016 and for 2017.

Changes in Total Productivity – Theoretical Background

The beginnings of growth accounting can be found in the first half of the twentieth century. The concept of total productivity and the view that labor is not the only production factor and in the case of measuring wealth of nations and productivity one should take into account other factors such as capital and land were discussed in the economic literature in the 1930s [Griliches, 1996]. The first mentions of the input-output ratio appeared in Copeland's paper in 1937 [Griliches, 1996]. In the 1940s

and 1950s many studies were published independently – which included the results of empirical research on TFP measurement. The first such a study, conducted by the Dutch economist Jan Tinbergen, was published in 1942. In the following years, more works were published in which the authors investigated the relationship between the volume of output and the inputs [see, for example, Tintner, 1944; Barton, Cooper, 1948; Johnson, 1950; Schmookler, 1952; Abramovitz, 1956; Kendrick, 1956; Ruttan, 1956].

Robert Solow was the first economist who formalized the growth accounting [Solow, 1957]. Using the macroeconomic production function and differential calculus, he showed how the rate of economic growth can be divided into the part resulting from the increase in factors of production and the remaining part, the so-called Solow's residual. It shows what part of the economic growth cannot be attributed to individual factors. It is therefore a measure of technical progress, or TFP growth.

In the following years, further work in the field of growth accounting appeared, introducing new approaches and extensions of previously conducted research and containing new elements of empirical analysis [see, for example, Solow, 1962; Griliches, 1964; Jorgenson, Griliches, 1967].

The decomposition of economic growth initiated by Solow forms the basis of modern growth accounting. The starting point of such an analysis is the macroeconomic production function. Its general form is as follows:

$$Y(t) = F(A(t), Z_1(t), \dots, Z_n(t)), \quad (9.1)$$

where Y – output (GDP), A – the level of technology, Z_1, \dots, Z_n – measurable factors of production. In empirical research usually two or three measurable factors of production are taken into account, namely: labor, physical capital and possibly human capital.

The analysis in this edition of the report will be carried out for two measurable inputs: labor and physical capital. The production function (9.1) therefore takes the following form:

$$Y(t) = F(A(t), L(t), K(t)). \quad (9.2)$$

In order to decompose the rate of economic growth on individual components, the equation (9.2) should be transformed into a form representing the growth rate of Y . To do this, we differentiate (9.2) with respect to time and then divide by Y . As a result, we get:

$$\frac{\dot{Y}}{Y} = \frac{\partial F(A, L, K)}{\partial A} \frac{\dot{A}}{A} + \frac{\partial F(A, L, K)}{\partial L} \frac{\dot{L}}{L} + \frac{\partial F(A, L, K)}{\partial K} \frac{\dot{K}}{K}. \quad (9.3)$$

After multiplying the individual components on the right side of the equation (9.3) respectively by A/A , L/L and K/K , we obtain:

$$\frac{\dot{Y}}{Y} = \frac{\frac{\partial F(A,L,K)}{\partial A} A}{Y} \frac{\dot{A}}{A} + \frac{\frac{\partial F(A,L,K)}{\partial L} L}{Y} \frac{\dot{L}}{L} + \frac{\frac{\partial F(A,L,K)}{\partial K} K}{Y} \frac{\dot{K}}{K}. \quad (9.4)$$

The equation (9.4) shows that the GDP growth rate is the weighted average of growth rates of three factors: technology, labor and physical capital. The weights are the shares of individual factors in the gross domestic product (GDP), measured as the marginal product of the factor (at the level of the entire economy) multiplied by the amount of a given factor and divided by the volume of output.

Method

The research method in this chapter is the economic growth accounting. In order to be able to calculate the TFP growth rate in an empirical study, additional assumptions should be made to the equation (9.4) showing the essence of the economic growth accounting.

We assume firstly that the production function is characterized by Hicks-neutral technical progress. Therefore, this function can be described as follows:

$$F(A,L,K) = A \cdot f(L,K). \quad (9.5)$$

As one can see, the Hicks-neutral technical progress means that the variable A , representing the level of technology, occurs in the product with the production function f , making the production volume dependent on the measurable inputs. Technological progress supplies both production factors to the same extent, without changing the marginal rate of technological substitution between them. For the production function (9.5), the share of technology in income, i.e. the component $(\partial F / \partial A) A / Y$ in the equation (9.4), equals 1. The equation (9.4) can then be written as:

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + \frac{\frac{\partial F(A,L,K)}{\partial L} L}{Y} \frac{\dot{L}}{L} + \frac{\frac{\partial F(A,L,K)}{\partial K} K}{Y} \frac{\dot{K}}{K}. \quad (9.6)$$

The above equation shows that the rate of economic growth equals the sum of technological progress (increase in TFP) and the average growth rate of labor and physical capital, weighted by the factors' shares in income.

An additional assumption regarding the marginal products of both factors should also be made. The marginal product of labor and capital at the level of the entire economy is in fact unmeasurable. We therefore assume that all markets are perfectly competitive and that there are no externalities. In this case, the marginal product of capital $\partial F/\partial K$ equals the price of capital r , while the marginal product of labor $\partial F/\partial L$ equals the wage rate w . By describing by s_K the capital share in income (rK/Y), and by s_L share of labor (wL/Y), equation (9.6) can be written as:

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + s_K \frac{\dot{K}}{K} + s_L \frac{\dot{L}}{L}. \quad (9.7)$$

Let us make an additional assumption that all income can be assigned to one of two factors of production: labor or physical capital i.e.: $Y = wL + rK$. In this case, the shares of labor and physical capital in income add up to 1: $s_K + s_L = 1$. Thus, formula (9.7) takes the following form:

$$\frac{\dot{Y}}{Y} = \frac{\dot{A}}{A} + s_K \frac{\dot{K}}{K} + (1 - s_K) \frac{\dot{L}}{L}. \quad (9.8)$$

The equation (9.8)¹ is the basis for the standard growth accounting. From this equation, the TFP growth rate can be calculated as the difference between the GDP growth rate and the weighted average growth rate of both factors of production:

$$\text{TFP growth} \equiv \frac{\dot{A}}{A} = \frac{\dot{Y}}{Y} - \left[s_K \frac{\dot{K}}{K} + (1 - s_K) \frac{\dot{L}}{L} \right]. \quad (9.9)$$

Results of Empirical Research

For the purpose of the analysis, we have gathered data that form the following time series: (a) the rate of economic growth, (b) the rate of change in labor inputs, (c) the rate of change in physical capital stock. The rate of economic growth is the annual growth rate of total real GDP, derived from the IMF database [IMF, 2018]. The rate of change in labor inputs is measured by the employment dynamics provided by the International Labor Organization [ILO, 2018]. Data for 2017 cover the first three quarters (in order to avoid seasonality, the rate of change in labor inputs for 2017 is calculated by comparing the employment level in the first three quarters of 2017 with the employment level in the first three quarters of 2016). We calculated the time series of the physical

¹ This equation is in fact a Cobb-Douglas production function.

capital stock on the basis of the perpetual inventory method using the World Bank data [World Bank, 2018]. This method requires taking into account many assumptions. We decided that depreciation rate is 5%, and the initial capital/output ratio is 3. In the perpetual inventory method, the initial year should be a little earlier than the years for which TFP is being calculated; in our study, we start calculations in 2000 and we assume that this year is characterized by the relation of capital to production amounting to 3. As the investments, we use a variable measuring gross fixed capital formation. The shares of labor and physical capital in income equal 1/2.

In this edition of the study, we updated all-time series of the analyzed variables. All steps of the analysis have been recalculated. Therefore, the documentation of the results has been fully presented in the text of the study and it does not duplicate the information contained in the previous editions of *Report on Competitiveness* [Próchniak, 2017].

Interpretation of Results – Changes in Total Factor Productivity and Competitiveness

Table 9.1 presents detailed results of the economic growth decomposition, while Tables 9.2 and 9.3 summarize data from Table 9.1.

Over the entire period, the highest TFP growth rate was recorded in Poland, Romania, Slovakia, Bulgaria and Lithuania. The total factor productivity was increasing in the years 2008–2017 at an average rate of 1.1% annually in Poland, 0.4% in Romania and Slovakia, and 0.2% in Bulgaria and Lithuania. In the other EU-11 countries, the productivity growth dynamics was negative (mainly due to negative productivity growth rates during the global crisis). Over the entire 10-year period, Slovenia recorded an average decrease in TFP by 0.1%, the Czech Republic by 0.4%, Hungary and Latvia – 0.6%, Croatia – 1.0%, and Estonia – a fall by 1.1% on a yearly basis.

When interpreting TFP dynamics, it must be borne in mind that this part of the TFP, which results from increased labor productivity, should be partially treated as a contribution of human capital to economic growth. Due to the difficulties in calculating this type of capital for the analyzed group of countries, TFP in our approach also includes the impact of human capital on economic growth.

The best results of Poland in terms of changes in the total factor productivity compared with the EU-11 group undoubtedly mean the success of our country. Baltic states have been leaders of TFP dynamics in the analyzes prepared a few years ago. Before the global crisis, they showed very fast economic growth, which was difficult to explain by changes in labor and physical capital, which is why it was attributed to TFP.

Table 9.1. The contribution of labor, physical capital and TFP to economic growth in 2008–2017

		2008			2009			2010			2011			2012		
		growth (%)	contribution (p.p.)	contribution (%)	growth (%)	contribution (p.p.)	contribution (%)	growth (%)	contribution (p.p.)	contribution (%)	growth (%)	contribution (p.p.)	contribution (%)	growth (%)	contribution (p.p.)	contribution (%)
Bulgaria	L	3.3	1.7	28	-3.2	-1.6	44	-5.5	-2.8	-208	-3.6	-1.8	-93	-1.0	-0.5	-1686
	K	6.5	3.2	54	8.1	4.1	-114	5.0	2.5	189	2.8	1.4	74	2.3	1.1	3698
	TFP	1.1	1.1	19	-6.1	-6.1	169	1.6	1.6	119	2.3	2.3	119	-0.6	-0.6	-1912
	GDP	6.0	6.0	100	-3.6	-3.6	100	1.3	1.3	100	1.9	1.9	100	0.0	0.0	100
Croatia	L	2.1	1.1	52	-0.8	-0.4	5	-3.8	-1.9	112	-3.8	-1.9	684	-3.6	-1.8	83
	K	4.5	2.2	108	4.9	2.4	-33	3.1	1.5	-90	1.6	0.8	-292	1.4	0.7	-31
	TFP	-1.2	-1.2	-60	-9.4	-9.4	128	-1.3	-1.3	78	0.8	0.8	-293	-1.1	-1.1	48
	GDP	2.1	2.1	100	-7.4	-7.4	100	-1.7	-1.7	100	-0.3	-0.3	100	-2.2	-2.2	100
Czech Rep.	L	1.6	0.8	31	-1.4	-0.7	14	-1.0	-0.5	-22	-0.2	-0.1	-7	0.3	0.2	-22
	K	5.0	2.5	93	4.8	2.4	-49	3.4	1.7	74	3.2	1.6	90	3.0	1.5	-189
	TFP	-0.6	-0.6	-24	-6.5	-6.5	135	1.1	1.1	48	0.3	0.3	17	-2.5	-2.5	311
	GDP	2.7	2.7	100	-4.8	-4.8	100	2.3	2.3	100	1.8	1.8	100	-0.8	-0.8	100
Estonia	L	-0.3	-0.2	3	-9.5	-4.7	32	-4.4	-2.2	-97	6.2	3.1	41	2.0	1.0	23
	K	8.3	4.1	-76	5.6	2.8	-19	1.4	0.7	30	1.1	0.6	7	3.1	1.6	36
	TFP	-9.4	-9.4	173	-12.8	-12.8	87	3.8	3.8	166	4.0	4.0	52	1.7	1.7	41
	GDP	-5.4	-5.4	100	-14.7	-14.7	100	2.3	2.3	100	7.6	7.6	100	4.3	4.3	100
Hungary	L	-1.4	-0.7	-78	-2.6	-1.3	20	-0.4	-0.2	-32	0.7	0.4	21	1.8	0.9	-56
	K	3.1	1.5	173	2.9	1.5	-22	2.1	1.0	152	1.3	0.6	36	1.1	0.5	-34
	TFP	0.0	0.0	5	-6.7	-6.7	102	-0.1	-0.1	-20	0.7	0.7	43	-3.1	-3.1	191
	GDP	0.9	0.9	100	-6.6	-6.6	100	0.7	0.7	100	1.7	1.7	100	-1.6	-1.6	100
Latvia	L	-0.2	-0.1	3	-13.8	-6.9	48	-6.4	-3.2	84	1.3	0.6	10	1.6	0.8	20
	K	9.3	4.7	-129	6.9	3.5	-24	2.4	1.2	-32	0.8	0.4	6	2.2	1.1	27
	TFP	-8.2	-8.2	227	-10.9	-10.9	76	-1.8	-1.8	48	5.3	5.3	83	2.1	2.1	53
	GDP	-3.6	-3.6	100	-14.3	-14.3	100	-3.8	-3.8	100	6.4	6.4	100	4.0	4.0	100
Lithuania	L	-1.7	-0.9	-33	-7.7	-3.9	26	-5.2	-2.6	-160	0.5	0.2	4	1.8	0.9	23
	K	7.1	3.5	135	5.8	2.9	-20	1.3	0.6	38	1.3	0.6	10	2.4	1.2	32
	TFP	0.0	0.0	-2	-13.9	-13.9	94	3.6	3.6	222	5.2	5.2	86	1.7	1.7	45
	GDP	2.6	2.6	100	-14.8	-14.8	100	1.6	1.6	100	6.0	6.0	100	3.8	3.8	100
Poland	L	3.7	1.8	47	0.4	0.2	8	-2.5	-1.2	-34	0.6	0.3	6	0.2	0.1	6
	K	3.6	1.8	45	4.0	2.0	76	3.4	1.7	46	3.1	1.6	31	3.6	1.8	111
	TFP	0.3	0.3	8	0.4	0.4	16	3.2	3.2	87	3.2	3.2	63	-0.3	-0.3	-17
	GDP	3.9	3.9	100	2.6	2.6	100	3.7	3.7	100	5.0	5.0	100	1.6	1.6	100
Romania	L	0.2	0.1	1	-1.3	-0.7	10	-5.7	-2.9	359	-2.1	-1.1	-101	0.9	0.5	70
	K	10.0	5.0	59	11.0	5.5	-78	4.1	2.1	-259	3.6	1.8	169	3.5	1.8	273
	TFP	3.4	3.4	40	-11.9	-11.9	168	0.0	0.0	0	0.3	0.3	32	-1.6	-1.6	-244
	GDP	8.5	8.5	100	-7.1	-7.1	100	-0.8	-0.8	100	1.1	1.1	100	0.6	0.6	100
Slovakia	L	3.2	1.6	29	-2.8	-1.4	26	-2.1	-1.0	-21	-0.1	0.0	-2	0.6	0.3	18
	K	5.2	2.6	46	4.9	2.4	-45	2.7	1.3	26	3.0	1.5	53	3.7	1.9	113
	TFP	1.4	1.4	25	-6.5	-6.5	119	4.7	4.7	94	1.4	1.4	48	-0.5	-0.5	-31
	GDP	5.6	5.6	100	-5.4	-5.4	100	5.0	5.0	100	2.8	2.8	100	1.7	1.7	100
Slovenia	L	1.1	0.6	17	-1.5	-0.8	10	-1.5	-0.8	-62	-3.1	-1.6	-239	-1.3	-0.6	24
	K	4.9	2.5	74	5.1	2.6	-33	2.5	1.2	101	1.3	0.7	103	0.9	0.5	-18
	TFP	0.3	0.3	9	-9.6	-9.6	123	0.8	0.8	61	1.5	1.5	236	-2.5	-2.5	94
	GDP	3.3	3.3	100	-7.8	-7.8	100	1.2	1.2	100	0.6	0.6	100	-2.7	-2.7	100

		2013			2014			2015			2016			2017		
		growth (%)	contribution (p.p.)	contribution (%)	growth (%)	contribution (p.p.)	contribution (%)	growth (%)	contribution (p.p.)	contribution (%)	growth (%)	contribution (p.p.)	contribution (%)	growth (%)	contribution (p.p.)	contribution (%)
Bulgaria	L	0.0	0.0	2	1.6	0.8	59	1.7	0.9	24	-0.5	-0.2	-7	4.1	2.1	57
	K	2.3	1.1	131	2.1	1.1	80	2.2	1.1	31	2.2	1.1	33	1.6	0.8	22
	TFP	-0.3	-0.3	-33	-0.5	-0.5	-39	1.7	1.7	46	2.6	2.6	75	0.7	0.7	20
	GDP	0.9	0.9	100	1.3	1.3	100	3.6	3.6	100	3.4	3.4	100	3.6	3.6	100
Croatia	L	-2.7	-1.3	126	2.8	1.4	-280	1.2	0.6	27	0.3	0.2	5	1.7	0.8	29
	K	1.1	0.5	-50	1.1	0.5	-110	0.9	0.4	19	1.0	0.5	17	1.3	0.6	22
	TFP	-0.3	-0.3	24	-2.4	-2.4	491	1.2	1.2	54	2.3	2.3	77	1.5	1.5	50
	GDP	-1.1	-1.1	100	-0.5	-0.5	100	2.2	2.2	100	3.0	3.0	100	2.9	2.9	100
Czech Rep.	L	1.0	0.5	-99	0.7	0.4	14	1.4	0.7	13	1.9	1.0	37	1.7	0.8	24
	K	2.5	1.3	-263	2.2	1.1	40	2.3	1.1	22	2.9	1.4	55	2.5	1.2	35
	TFP	-2.2	-2.2	462	1.3	1.3	46	3.5	3.5	65	0.2	0.2	8	1.4	1.4	41
	GDP	-0.5	-0.5	100	2.7	2.7	100	5.3	5.3	100	2.6	2.6	100	3.5	3.5	100
Estonia	L	1.0	0.5	25	0.6	0.3	11	2.6	1.3	76	0.6	0.3	15	1.4	0.7	18
	K	3.9	1.9	100	3.7	1.8	64	2.6	1.3	79	2.2	1.1	54	2.0	1.0	25
	TFP	-0.5	-0.5	-26	0.7	0.7	25	-0.9	-0.9	-56	0.6	0.6	31	2.3	2.3	57
	GDP	1.9	1.9	100	2.9	2.9	100	1.7	1.7	100	2.1	2.1	100	4.0	4.0	100
Hungary	L	1.7	0.9	41	5.3	2.7	66	2.7	1.3	42	3.4	1.7	86	1.9	0.9	29
	K	0.9	0.4	20	1.4	0.7	17	2.1	1.0	33	2.1	1.0	53	1.2	0.6	18
	TFP	0.8	0.8	39	0.7	0.7	17	0.8	0.8	25	-0.8	-0.8	-39	1.7	1.7	52
	GDP	2.1	2.1	100	4.0	4.0	100	3.1	3.1	100	2.0	2.0	100	3.2	3.2	100
Latvia	L	2.1	1.0	39	-1.0	-0.5	-24	1.2	0.6	23	-0.3	-0.2	-9	-0.2	-0.1	-2
	K	3.0	1.5	57	2.3	1.2	54	2.1	1.1	40	2.0	1.0	50	0.8	0.4	11
	TFP	0.1	0.1	4	1.5	1.5	69	1.0	1.0	37	1.1	1.1	58	3.5	3.5	92
	GDP	2.6	2.6	100	2.1	2.1	100	2.7	2.7	100	2.0	2.0	100	3.8	3.8	100
Lithuania	L	1.3	0.7	19	2.0	1.0	29	1.2	0.6	34	1.9	1.0	42	-0.5	-0.3	-7
	K	2.1	1.1	30	2.6	1.3	37	2.8	1.4	79	2.9	1.5	64	2.7	1.3	38
	TFP	1.8	1.8	51	1.2	1.2	35	-0.2	-0.2	-13	-0.1	-0.1	-6	2.4	2.4	69
	GDP	3.5	3.5	100	3.5	3.5	100	1.8	1.8	100	2.3	2.3	100	3.5	3.5	100
Poland	L	-0.1	-0.1	-5	1.9	0.9	29	1.4	0.7	18	0.7	0.4	13	1.7	0.9	22
	K	3.1	1.6	113	2.8	1.4	43	3.4	1.7	43	3.6	1.8	68	2.6	1.3	34
	TFP	-0.1	-0.1	-7	0.9	0.9	29	1.5	1.5	39	0.5	0.5	19	1.7	1.7	44
	GDP	1.4	1.4	100	3.3	3.3	100	3.9	3.9	100	2.6	2.6	100	3.8	3.8	100
Romania	L	-0.7	-0.3	-9	0.8	0.4	12	-0.9	-0.5	-12	-1.0	-0.5	-10	2.9	1.5	26
	K	3.2	1.6	46	2.5	1.3	41	2.6	1.3	33	2.9	1.5	30	2.4	1.2	22
	TFP	2.2	2.2	64	1.4	1.4	46	3.1	3.1	79	3.9	3.9	80	2.8	2.8	51
	GDP	3.5	3.5	100	3.1	3.1	100	3.9	3.9	100	4.8	4.8	100	5.5	5.5	100
Slovakia	L	0.0	0.0	0	1.5	0.7	28	2.6	1.3	34	2.8	1.4	43	1.7	0.9	26
	K	2.7	1.3	90	2.4	1.2	47	2.5	1.2	32	3.7	1.9	57	2.7	1.4	41
	TFP	0.2	0.2	10	0.6	0.6	25	1.3	1.3	34	0.0	0.0	1	1.1	1.1	33
	GDP	1.5	1.5	100	2.6	2.6	100	3.8	3.8	100	3.3	3.3	100	3.3	3.3	100
Slovenia	L	-1.9	-1.0	86	1.2	0.6	20	0.0	0.0	0	-0.2	-0.1	-3	4.6	2.3	58
	K	0.4	0.2	-16	0.5	0.3	9	0.6	0.3	12	0.4	0.2	7	0.2	0.1	3
	TFP	-0.3	-0.3	30	2.1	2.1	71	2.0	2.0	88	3.0	3.0	97	1.6	1.6	39
	GDP	-1.1	-1.1	100	3.0	3.0	100	2.3	2.3	100	3.1	3.1	100	4.0	4.0	100

Source: Own calculations.

Poland's position in the above analyzes was moderate – not as good as the Baltic countries, but also we were not in the group's tail. The prolongation and shifting the time horizon have significantly changed the ranks of individual countries in favor of Poland, with a simultaneous relative deterioration of the situation of the Baltic states.

Table 9.2. TFP growth rates (%)

Country	Entire period 2008–2017			2008–2010	2011–2013	2014–2016	2017
	Average	Minimum	Maximum	Average	Average	Average	
Bulgaria	0.2	-6.1	2.6	-1.1	0.5	1.2	0.7
Croatia	-1.0	-9.4	2.3	-4.0	-0.2	0.4	1.5
Czech Republic	-0.4	-6.5	3.5	-2.0	-1.5	1.6	1.4
Estonia	-1.1	-12.8	4.0	-6.2	1.7	0.1	2.3
Hungary	-0.6	-6.7	1.7	-2.3	-0.5	0.2	1.7
Latvia	-0.6	-10.9	5.3	-7.0	2.5	1.2	3.5
Lithuania	0.2	-13.9	5.2	-3.4	2.9	0.3	2.4
Poland	1.1	-0.3	3.2	1.3	0.9	1.0	1.7
Romania	0.4	-11.9	3.9	-2.8	0.3	2.8	2.8
Slovakia	0.4	-6.5	4.7	-0.1	0.3	0.7	1.1
Slovenia	-0.1	-9.6	3.0	-2.9	-0.4	2.4	1.6

Source: Own calculations.

Table 9.3. Contribution of TFP to economic growth (%)

Country	Entire period 2008–2017		
	Average	Minimum	Maximum
Bulgaria	-142	-1912	169
Croatia	60	-293	491
Czech Republic	111	-24	462
Estonia	55	-56	173
Hungary	42	-39	191
Latvia	75	4	227
Lithuania	58	-13	222
Poland	28	-17	87
Romania	32	-244	168
Slovakia	36	-31	119
Slovenia	85	9	236

Source: Own calculations.

As indicated above, this part of TFP, which results from increased labor productivity, may be partially recognized as the contribution of human capital to economic growth. Poland's best results in terms of changes in the total factor productivity compared with the EU-11 group indicate a relatively good position of Poland compared with the analyzed group of countries in terms of human capital accumulation.

In earlier editions of the study, published in reports from several years ago and covering a longer time horizon before the crisis [e.g. Próchniak, 2012], the growth rates of the total factor productivity were on average higher. The global crisis negatively affected the TFP growth rate calculated using the residual method, and as a result, many countries recorded negative TFP growth rates in the entire 2008–2017 period. Lower TFP growth rates due to the global crisis will be visible when analyzing data for individual sub-periods.

Baltic states and Romania were characterized by the highest variance of TFP growth rates in the analyzed years. The differentiation of the dynamics of productivity changes in these countries results mainly from large spreads of GDP growth rates. Baltic states were most deeply affected by the global crisis, as in 2009 the decline in GDP reached a two-digit level. As a result, the differences in TFP growth rates in the Baltic states were the highest in the EU-11 – the difference between the largest and the lowest TFP growth rate was 19.1 percentage points in Lithuania (the lowest quotation was –13.9%, and the highest 5.2%) and 15.8–16.8 p.p. in the other two Baltic republics and Romania. In other countries of Central and Eastern Europe, except for Poland, the spread of TFP growth rates ranged from 11–13 p.p. in Slovenia, Croatia and Slovakia up to 8–9 p.p. in Bulgaria and Hungary. In turn, in Poland, which showed a fairly steady increase in production in 2008–2017 and was at the same time the only EU country that avoided the recession, the spread of TFP growth rates was the smallest and amounted to 3.5 p.p. The latter result is another reason why Poland's achievements in the field of changes in the total factor productivity should be positively assessed. In addition to the fact that our country recorded the fastest growth rate of productivity in the last 10 years, it was still the most stable in the whole group of Central and Eastern European countries. In Poland, the lowest TFP growth rate in the analyzed period occurred in 2012 (–0.3%), while the highest – in 2010 and 2011 (3.2%).

It is worth analyzing the dynamics of the total factor productivity in individual sub-periods. The previous edition of the study [Próchniak, 2017] shows that before the global crisis (in 2007), nine countries of Central and Eastern Europe (with the exception of Croatia and Hungary) recorded a positive TFP growth rate. It was the highest in Lithuania (7.6%), Slovakia (7.2%), Latvia (4.9%) as well as Poland and Romania (3.8%), which resulted from a very rapid GDP growth in these countries before the crisis.

The crisis period brought dramatic changes in the dynamics of the total factor productivity, which can be seen on the basis of aggregated data for the period 2008–2010. In the years 2008–2010, the countries of Central and Eastern Europe with the exception of Poland recorded negative TFP dynamics. Baltic states, in which before the crisis TFP growth rates were high, during the crisis achieved very poor outcomes in terms of productivity dynamics, and as a result for the period 2008–2010 TFP growth rates were negative in these countries and amounted to: –7.0% in Latvia, –6.2% in Estonia and –3.4% in Lithuania. Equally weak results in 2008–2010 were achieved by: Croatia (–4.0%), Slovenia (–2.9%), Romania (–2.8%), Hungary (–2.3%) and the Czech Republic (–2.0%). Poland was the only country with positive dynamics of total productivity of 1.3% in 2008–2010.

In 2011–2013, all the EU-11 countries except Poland improved their situation in relation to the years 2008–2010 in terms of TFP dynamics. In the Baltic countries, there were again positive TFP growth rates and, in addition, the highest in the EU-11 group, amounting to 2.9% in Lithuania, 2.5% in Latvia and 1.7% in Estonia. Poland maintained a positive (but slightly slower) growth rate of total factor productivity at 0.9% per annum, which gave it the fourth place in the EU-11 group in terms of TFP changes in the period 2011–2013. Bulgaria, Slovakia and Romania also recorded positive TFP growth rates: 0.5%, 0.3% and 0.3%, respectively. Croatia, Slovenia, Hungary and the Czech Republic during this period showed a negative growth rate of productivity ranging from –0.2% to –1.5% annually.

In the years 2014–2016, the EU-11 countries showed different TFP dynamics. Most of them improved their records in relation to 2011–2013, although some of them worsened their results. Nevertheless, in all countries the average TFP growth rate was positive in this period. The TFP growth rate in Poland in the years 2014–2016 amounted to 1.0% – almost the same as in the earlier period 2011–2013. Five EU-11 countries achieved higher TFP growth rates than Poland in 2014–2016: Romania (2.8%), Slovenia (2.4%), the Czech Republic (1.6%) and Latvia and Bulgaria (1.2%). Slovakia, Croatia, Lithuania, Hungary and Estonia recorded the pace of TFP changes between 0.7% and 0.1%.

In 2017, there was a further acceleration of the growth rate of total factor productivity in the EU-11 group (although some countries deteriorated their outcomes in TFP dynamics in comparison with the years 2014–2016). Baltic states and Poland were leaders again. Poland recorded the TFP growth rate of 1.7% in 2017 (the same as Hungary) and with this result, it reached the 5th place (ex aequo with Hungary). Baltic states and Romania achieved higher growth rates compared to Poland: Latvia (3.5%), Romania (2.8%), Lithuania (2.4%) and Estonia (2.3%). On the other hand, lower pace of change in TFP occurred in Slovenia (1.6%), Croatia (1.5%), the Czech Republic (1.4%), Slovakia (1.1%) and Bulgaria (0.7%).

As far as TFP contribution to economic growth is concerned, the numerical values for the analyzed period are highly disturbed, which results, *inter alia*, from the fact that the positive TFP dynamics in the period of recession means a negative TFP contribution to economic growth (example of Croatia in 2011), and on the other hand when there is a strong economic slowdown and GDP growth rate is close to 0%, a few percent change in the total factor productivity translates into several thousand TFP contribution to economic growth. Nevertheless, certain trends and regularities can be determined on the basis of aggregated results for the entire period.

According to the data presented in Table 9.3, the percentage contributions of TFP to economic growth were in the majority of countries (excluding the Czech Republic and Bulgaria) at the level of 28–85% in the period 2008–2017. This confirms the important role of TFP in the economic growth of the analyzed countries in the years of their membership in the European Union. In Poland, the TFP contribution to GDP growth amounted on average to 28% in 2008–2017.

It is worth adding that the research on the decomposition of economic growth and TFP estimates for Poland was also carried out by other Polish authors (apart from our research already quoted). For example, Florczak and Welfe [2000] and Welfe [2001] calculate TFP in Poland in 1982–2000 on the basis of a standard growth accounting, taking into account two factors of production: labor and physical capital (machinery and equipment or total fixed assets). In their study, the elasticity of production in relation to fixed assets *i.e.*, the physical capital share in income, is calibrated at 0.5 level or estimated on the basis of production function. In another study by Welfe [2003], the author estimates the TFP for Poland in 1986–2000 using various alternative values of the physical capital share in income (from 0.25 to 0.7). In turn, Florczak [2011] estimates, using the Wharton method, the TFP values cleared of short-term demand fluctuations for Poland in 1970–2008, and then examines the determinants of total factor productivity. TFP estimates for Poland were also conducted by, among others: Zienkowski [2001], Rapacki [2002], Piątkowski [2004] and Ptaszyńska [2006]. Roszkowska [2005] and Tokarski, Roszkowska and Gajewski [2005] conducted a growth accounting for voivodships in Poland. Zielińska-Głębocka [2004] estimated TFP for 100 industries in Poland, Ciołek and Umiński [2007] calculated TFP growth rate in Polish domestic and foreign enterprises, while Doebeli and Kolasa [2005] used the index number decomposition method in the growth accounting for Poland, the Czech Republic and Hungary.

Conclusions

The results indicate that changes in productivity played a significant role in the economic growth of Poland and the other EU-11 countries. In Poland, the average TFP growth rate amounted to 1.1% annually between 2008 and 2017, which was the best result in the EU-11 group. The global crisis negatively affected TFP growth, which caused many Central and Eastern European countries to record negative productivity growth rates in the entire 2008–2017 period. The pace of return to the pre-crisis path of economic growth will determine further changes in the dynamics of the total factor productivity.

TFP growth in Poland should be interpreted as an improvement of the competitiveness of the Polish economy. Higher efficiency of production factors means an increase in management efficiency and a better competitive position in the international environment. In particular, it should be emphasized that the highest TFP growth rate obtained by Poland in the entire EU-11 group in 2008–2017 implies that the competitive position of the Polish economy measured by the dynamics of total factor productivity increased the most among the new EU member states in the last 10 years.

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Part III

The Competitiveness of Polish Cities

The Competitiveness of Cities: Components, Meaning and Determinants

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Introduction

Competitiveness between regions and cities has not until recently been a component of fundamental research issues in economics or even in economic geography. The competitiveness of territorial units is a fairly new research category, which has grown alongside international economic dependencies. Analyses of the location processes and decisions in economies operating under changed conditions (e.g., cluster formation, urban sprawl, the construction of megacities and the emergence of a global network of cities) introduced these issues to an academic and political debate concerning the sources of competitiveness in regional and local dimensions. However, due to the relatively short span of the debate, no uniform definition or cohesive understanding of the competitiveness of a region or city has been established. This study aims to take into account the following issues concerning this matter:

- the definition of urban competitiveness;
- defining the determinants of city competitiveness, as well as their typology, based on specific features of urban competitiveness;
- defining specific features of competitiveness at the urban level, characterizing the competitiveness of the mezo-economic level.

The research carried out in these stages constitutes the basis for clarifying particular elements and trends of urban competitiveness (e.g., relations with urban tourism and the smart city model).

The Definition of City Competitiveness

Competitiveness is one of the most important research concepts in modern economics. Intuitively, this category is related to the level of economic development,

as well as its social structure. The concept of competitiveness is a theoretical term, which according to M. Goryni [2009, pp. 49–50] means that "it is not a sign of any particular thing or person, nor anything that reminds us of any entity or person, therefore it does not have any referents that can be directly identified". In addition, the concept of competitiveness is a multidimensional phenomenon, as evidenced by a large number of attempts to define this concept in literature, as well as micro, mezo, macro and mega economic analysis levels. While the term "competitiveness" is subject to many definitions, they usually refer to the level of the enterprise, or to regional/national economy. There are, however, very few written definitions directly referring to urban competitiveness. An overview of the most important definitions has been presented in Table 10.1.

Table 10.1. An overview of the definitions of urban competitiveness

Author	The definition of urban competitiveness	Key components
Storper, 1997, p. 264.	Urban competitiveness is the urban economy's ability to attract and maintain enterprises with stable or growing market shares, while maintaining or increasing the participants' standard of living. The competitiveness of cities is not based solely on the income of companies, but also on the income earned by the residents.	Attracting and maintaining companies, as well as high income and living standards of residents.
Webster, Muller, 2000, p. 1.	Urban competitiveness refers to the ability of the urban region to produce and market products (goods and services) that are characterized by high competitiveness (not necessarily the lowest price) compared to similar products from other urban regions. The production of goods and services characterized by high value in relation to prices supports the exports of the urban economy, makes it more competitive, and directly increases the quality of life of the inhabitants of the urban region.	Competitiveness of local products (goods and services), contributing to improving the quality of life of residents.
Kostiainen, 2002	The ability to attract information, technology, capital, culture, people and organizations that are important for the region and with it, the ability to maintain and improve the quality of life and a high standard of living, as well as the ability to create an innovative operating environment in which enterprises can develop their competitiveness.	The ability to attract factors of production and the creation of a local innovative environment (<i>innovative milieu</i>).
Pengfei, Qinghu, 2006, p. 1.	Urban competitiveness primarily refers to the city's ability to create wealth more quickly using less resources than other cities and to ensure prosperity in the process of competition and development.	Creating wealth, efficiently utilizing resources and ensuring well-being.
Sinkienė, 2009, p. 5.	The ability of the city's population to maintain a high competitive position in a specific area (of the market) among other cities of the same type and pursuing similar goals, by saving resources and improving the well-being of residents as a result of managing external and internal factors.	High management efficiency leading to competitiveness on a given market and to ensuring prosperity.
Kwon, Kim, Oh, 2012, p. 178.	Urban competitiveness refers to interrelations among causes (determinants), competition process (rivalry between economic units) and its consequences (effects at the micro- and macroeconomic level). A city's competitiveness is usually identified by a high level of its productivity, success on the external market and an increase in local revenues and employment.	High productivity and the ability to expand to external markets, leading to creating work places and an increase in wages.

Author	The definition of urban competitiveness	Key components
Ni, Kresl, 2014, p. 1.	Urban competitiveness is the ability to attract production factors, take advantage of the natural environment, develop industries, manufacture goods, provide services, conquer the market and create wealth in a quick and effective manner, as well as to provide well-being of citizens in the process of competition, co-operation and development, in comparison to other cities.	Attracting and efficiently utilizing production factors that lead to the wealth and well-being of the residents.

Source: Own study.

Most of the urban competitiveness definitions presented in Table 10.1 focus on two components:

- company operations located in the urban region and various factors that attract them, affect their productivity or competitive edge compared to external entities, which is reflected in growing market shares;
- ensuring a high standard of living for the population, which according to M.E. Porter [2008, p. 176] is the primary goal of competitiveness.

The logics behind competitiveness is the reason for putting an emphasis on the two key components of the definition of urban competitiveness identified above, because it maintains that *competitive ability* is distinguished from the *competitive position*. Competitive ability is also called factor competitiveness, as it is assessed on the basis of many factors describing the size, structure and use of production resources, the socio-economic system, economic policy and the economic environment. All of these elements determine the possibilities of achieving a competitive position by a given economy (urban, regional or national). A competitive position is in turn also called result competitiveness, because it indicates the level of achieved socio-economic development and is reflected primarily in the income level that determines the standard of living.

Most of the definitions of city competitiveness identified in Table 10.1 refer (both directly and indirectly) to productivity as a key element for achieving a high competitive position. For example, the definition given by Pengfei, Qinghu [2006] emphasizes the importance of a city's ability to create wealth more rapidly while using less resources than other cities. Kwon, Kim, Oh [2012] define city competitiveness as a high level of productiveness, while Ni, Kresl [2014] emphasize an effective utilization of production factors. Such an approach has a deep justification in the theoretical foundations of the concept of competitiveness, the central element of which is productivity, a key determinant of long-term prosperity [Porter, 2008, p. 176]. A competitive city is therefore not only an aggregate of competitive business entities that are able to maximize profits, but it is also a place in which the standard of living is maintained in a sustainable manner [Szczech-Pietkiewicz, 2013, p. 36].

An overview of the definition of urban competitiveness allows for an identification of features that differentiate the approaches of individual researchers to this concept. Some definitions take into account the investment attractiveness aspect of an urban region, indicating the ability to attract:

- enterprises with stable or growing market shares [Storper, 1997];
- information, technology, capital, culture, people and organizations [Kostiainen, 2002];
- production factors [Ni, Kresl, 2014].

It is worth mentioning that only Kostiainen's definition [2002] directly refers to the importance of technology in shaping urban competitiveness. It is also applied to the concept of *innovative milieu*, according to which innovative enterprises are not independent or isolated from the environment in which they operate, but are its product [Aydalot, Keeble, 1988]. An innovative environment is a platform for interactions between business, scientific and research entities located in a given area, which favors the processes of learning and implementing innovations [Maillat, 2002, p. 11].

Another element included in various definitions of urban economy competitiveness is the reference to its competitive position on the market. Webster and Muller [2000] describe this as the ability to produce and market products of high competitiveness, while stressing the importance of supporting exports of the urban economy. Sinkiené [2009] indicates maintaining a high competitive position in a given area (market) among other cities of the same type as an important aspect of urban competitiveness; Kim, Oh [2012] – attributes it to success on the external market, while Ni, Kresl [2014] – attains that the focal point is conquering the market.

An overview of the definitions of urban competitiveness found in books and an analysis of this phenomenon made it possible to formulate our own definition. In this study, urban competitiveness signifies the ability of the city's economy to attract production factors and achieve productivity growth in the process of their management, which results in a strong competitive position of local enterprises on the domestic and international market, contributing to a high level of income and the living standards of residents.

Determinants of City Competitiveness

Competitiveness is not limited to companies, contrary to Krugman's thesis [1994] – it also concerns territorial systems (states, regions, cities, municipalities), which have thus become increasingly competitive participants of the market. According to the President of the European Committee of the Regions, Luc Van den Brande, it is

"regions and cities that ensure Europe's development and strengthen its coherence and competitiveness" because "innovation and creativity are created in regions and cities, as is employment and growth, solidarity and social cohesion. Cities and regions are what strengthens Europe" [CEMR, 2009, p. 2]. Territorial systems "compete (...) for capital, especially innovative capital, which has significant multiplier effects, (...) creating new, high-skilled and highly-paid jobs" [Gorzela, Jałowiecki, 2000]. Unfortunately, the scarcity of research on the competitiveness of cities had led to the search for analogy in terms of competitiveness on a regional level. This approach is all the more justified since the definition of competitiveness in the urban dimension is usually similar in substance to the descriptions of regional competitiveness. Competitiveness factors are similar in both cases, although it is worth noting that in many studies the effects (results) i.e., the manifestations of competitiveness of cities/regions are identified with their determinants.

Numerous definitions of competitiveness in the dimension of territorial systems [Begg, 1999; Porter, 1990; Storper, 1997] emphasize two aspects of competitiveness of cities/regions: the activity of companies (economic dimension) and the standard of living of urban residents (social dimension). The connection between these dimensions is obvious: economic conditions translate directly into living conditions (including the quality of life), and the standard of living determines even the entrepreneurship and productivity of the inhabitants. This approach is also widespread in the analysis of competing cities' rankings, in which economic indicators and measures of the quality of life of residents are treated as equivalent elements of the assessment.

The authority of the central government given to local and regional self-governments enables them to conduct their own economic policy, which is largely autonomous with respect to national politics. Regions are much better adapted to establishing local ties between enterprises and research and development centers, and benefit from good practices, while identifying entities with which they can cooperate effectively [Borowiec, 2005, p. 42]. They are entities which, using the potential of their resources, develop independently and create a system of interregional relations that concerns the development of the whole country [Barcik, 2008, p. 87]. In addition, by shaping living conditions and social development, they determine the innovation and productivity of residents.

Regional competitiveness is a multi-faceted phenomenon, as various factors simultaneously affect different levels of development. In the most general sense, the creativity of spatial systems is defined as the ability to adapt to changing conditions, in terms of maintaining or improving their position in the competition between regions [Klasik, Kuźnik, 2001]. The general level of socio-economic development of a given region depends on the level of development of its partial potentials, including

economic, social, cultural, environmental, intellectual or innovative capabilities [Falkowski, 2006, p. 19].

This approach to the sources of a city's competitiveness is the result of the assumption that productivity is not the goal of competition policy, but a means to raise its standards. In order to assess the aspects of a competitive city, it is not enough to include work in the area of entrepreneurship, innovation and efficiency of market mechanisms, that serves to increase the productivity and profitability of business operations [Bossak, Bieńkowski, 2004, p. 20]. In order to identify the concept of a region's competitiveness, it is necessary to take into account such elements as: the level of socio-economic development, its dynamics and directions, as well as rational and effective use and development of endogenous factors. The basic factors that determine the level of competitiveness of the spatial layout, as indicated by Falkowski [2006, pp. 19–20] are: geographical location and environmental resources, the structure of the regional economy, human capital, the level of innovation of the economy, the state of technical and social infrastructure, the ability to create co-operation networks with domestic and foreign partners, as well as research and development work.

Similarly, Huggins and Davies [2006, p. 1] maintain that a region's competitiveness depends on its ability to anticipate and adapt effectively to both external and internal (social and economic) challenges, while being able to provide new economic opportunities (including the possibility of high-quality work). Kuciński [1998, p. 19] claims that regions are competitive when they maintain economic, social and technical conditions that enable and enforce a high quality of production, company efficiency, an implementation of new technologies, as well as an increase in work efficiency and adeptness in introducing products to the market.

In today's economy, according to Gorzelak and Jałowiecki [1998, p. 29], competitive advantage is obtained by regions that: 1) are easily accessible through fast, reliable and flexible means of transport; 2) have a rich scientific and research base; 3) have labor resources with high qualifications; 4) offer favorable living conditions (including a rich cultural environment); 5) have a well-developed background of business-related services. Important factors of regional competitiveness also include: modernity and diversity of the regional economy, quality of spatial development (expressed in broadly understood spatial order and developed infrastructure), institutions and social capital, the social organization of a given region [Sokołowicz, 2008, p. 11].

The dual (socio-economic) approach to the issue of competitiveness of territorial systems (cities, regions) has also been adopted by the European Commission [CEMR, 2009] and OECD [2006]. According to this concept, the collectivity of even highly competitive companies does not determine the competitive advantage of the city, unless it is accompanied by a maintained and upgraded standard of living. In line with

this approach, the factors recognized by the European Commission as significant for regional competitiveness are divided into three groups, each corresponding to the universally accepted benefits of the agglomeration. [Martin, 2003]:

- infrastructure and accessibility (both external and internal) of a city, including: car and railway road systems, air transport, technological infrastructure and knowledge infrastructure (educational units), the quality of the location i.e., housing, natural surroundings, cultural institutions, the level of security;
- resources and people, influenced by demographic trends (migrations of qualified employees, diversity) and the availability of highly qualified employees;
- business environment, including: organizational culture and business culture, entry barriers, risk approaching methods, the level of industry concentration, internationalization and innovation (measured e.g., by the number of patents, level of R&D expenditure, number of scientific research units, the level of research commercialization), the quality of the institutional environment, the availability of capital, the level of specialization and the nature of competition.

It is worth noting that these factors are linked: an efficient and extensive system of transport solutions can, for example, affect the reduction of social exclusion, innovativeness of enterprises is a derivative of the quality of human capital, and at the same time employment policy determines the quality of life and work.

According to the previous typology, in each of the three above-mentioned groups of factors, one can indicate those that favor the effective operation of companies and those that affect the raising of living standards. The first group will include labor costs and non-payroll costs of running a business as well as transport costs, tax policy, the quality of legal regulations related to running a business and a general climate for entrepreneurship. Life quality is shaped by the system of transport and communication solutions (geographic, economic, information availability), housing conditions, the level of every type of health care and education, the quality of the natural environment (including air purity, availability of good quality drinking water, the presence of land and greenery) and finally through the overall attractiveness of life, which includes the cultural, recreational beauty of the landscape (natural elements of the environment, city architecture) and other amenities.

Literature also provides a slightly different division of competitiveness factors, distinguishing aspects related to the activity of enterprises and – clearly identified – factors characterizing territorial systems (cities, regions). According to this division, the productivity of enterprises and their employment policy affecting the quality of life in the city constitute the first pillar of competitiveness (micro level), and city policies related to increasing their attractiveness – the second pillar (the mezo level). It seems, however, that this method of division (competition between companies operating

in the analyzed area and competition between the territorial units themselves) is currently too limited. On the one hand, it neglects the issue of synergy and connectivity, and on the other hand, it "relieves" entrepreneurs from the responsibility for the state of competitiveness of the city, and local authorities from the need to maintain an entrepreneurial attitude, which is nowadays rarely expected just from business units. Meanwhile, according to the OECD approach, cities – similarly to enterprises – compete to obtain and maintain mobile production factors, including high quality of work and capital by maintaining an optimal ratio of location factors (green areas, affordable residential areas, social infrastructure systems etc.). This means that city becomes a member of the economy, often even in opposition to local entrepreneurs, in the event that their expansion threatens preservation of the optimal proportion of location factors. Gorzelak and Jałowiecki directly state that cities have ceased to be subsidizing entities, but have rather become enterprise units [2000, p. 16].

The entrepreneurial function of cities is to some extent the result of the agglomeration process, which is mentioned, among others, by Porter [1990; 1996]. Expanded infrastructure, communication, access to production factors and markets favor the creation of a pool of benefits, defined as cluster benefits (a concentration of knowledge, institutions, stimulating the impact of direct competition, existence of specialized demand). Porter also points out that clusters with international successes are usually located in cities, which means that the significance of regional/local authorities may in some cases be greater than that of state authorities, especially in the area of creating qualifications and impacting development and innovation indicators, which remain regional – even in the era of globalization. [Porter, 1990, p. 622].

The role and importance of cities for the implementation of sustainable development policy (on a regional, national and international level) is also systematically increasing. This approach assumes a long-term and strategic view (including the perspective of demographic changes and changes in the natural environment, the issue of risk, benefits and scale threats, etc.). Cities are perceived as the main perpetrators of economic, social and ecological imbalances, but they can also influence their restoration. The so-called Leipzig Charter, adopted in 2007 together with the territorial agenda, devotes a lot of attention to this issue, indicating a multidimensional character of urban development activities, in accordance with the 3xP concept (*people, profit, planet*), including economic growth, social balance and environmental protection, whose preservation in turn requires a proper approach to the issue of cultural development, health protection and the effectiveness of institutions.

When considering the determinants of a city's competitiveness, it is necessary to mention the issues of creative industries and aesthetics of cities, which in recent years have effectively ceased to be strictly visual, becoming one of the main factors

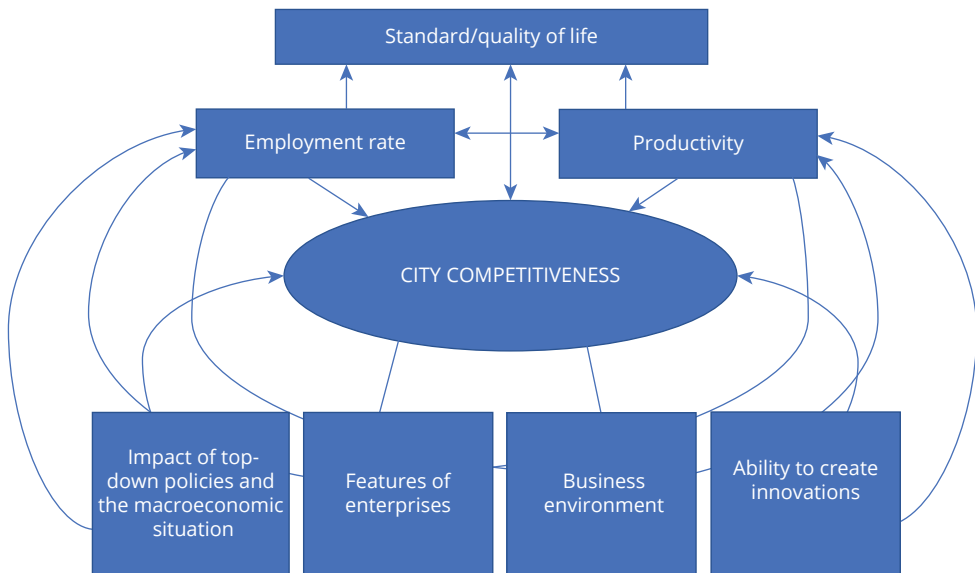
conditioning the stimulation of the competitiveness of territorial systems. Cultural values and art (including city architecture) have undoubtedly had a significant impact on the elements of social development (gentrification, social inclusion), and as a result indirectly shape the economic potential and support the competitiveness of the entire spatial layout. According to the innovative, though often criticized concept of the creative class of R. Florida [2002], a city's competitiveness is mainly the result of its ability to attract representatives of the creative class. Florida's concept is related to the concept of creative industries that have been developing since the end of the twentieth century, as well as all of the activities that stemmed from individual creativity and talent, and which have the potential to create wealth and employment through the production and use of intellectual property rights. Florida focuses mainly on people, representatives of the creative class (doctors, lawyers, high-level managers, politicians, artists, representatives of the new technologies industry and officials responsible for developing strategic models that aim to design changes in the future) assuming that, despite diverse employment types, creative people need similar incentives that stimulate this factor in their daily work. This includes aesthetic experiences, contact with art and culture, exchanging ideas with other people, the ability to move freely and express their observations. This is the reason for such a concept of the development of cities and local communities, according to which the location or infrastructure does not determine the long-term and effective development of a given place to the extent that its social profile does. For the development of creativity understood in this way, it is necessary to follow the so-called 3xT rule (talent, technology, tolerance).

Florida's concept, although impressive, did not stand the test of time. It overlooked the existence and needs of a less creative part of society. In addition, Florida focused exclusively on affecting and indulging an economic nature, and ignored the fact that only a few "creative" people will benefit from urban development. The need for favorable living conditions for families and older people were not taken into consideration, even though they are becoming increasingly important in the silvering economy. Practice has also shown that Sohoization (a phrase that originates from the poor Soho district in New York, which has become the iconic district of models and luxury lofts) results in deepening social inequality and the exclusion of those who are poor or are immigrants, just as improperly run gentrification forces less prosperous and less educated residents into remote city periphery, increasing their social and economic isolation. Time has shown that Florida's concept, while open to diversity (including cultural and national), may paradoxically lead to an increased isolation of certain social groups. The aforementioned Leipzig Chart refers to the complexity of these issues, presenting threats resulting from demographic changes, increasing social exclusion and housing problems. Florida's concept of a creative city has, however, made

an important contribution to the development of the science of the city competitiveness (also present in the Leipzig Charter) favoring the creation of centers of knowledge and innovation.

There is also no doubt that a creative city is a center that attracts economic activity, especially in the case of enterprises whose development requires the availability of highly qualified managerial staff and representatives of new professions. The conditions that cities create for running a business are an important factor determining the competitiveness of companies. If the conditions are unfavorable, they lead to the collapse of the company or to its relocation to more attractive places – in both cases, the given territorial system/city suffers a certain physical loss (available jobs): economic and on its image. On the other hand, companies with a significant freedom of location settle in places where they can find optimal conditions, and companies with particularly high innovation potential – creating high-quality jobs and generating significant income resulting from "new rent" – have particularly high requirements in this respect [Gorzelał, Jałowiecki, 2000].

Figure 10.1. I. Begg's city competitiveness model



Source: I. Begg [1999, p. 802].

The need to take advantage of opportunities while reducing hazards is also emphasized by Begg [1999] who analyzes factors affecting the competitiveness of the city. Unlike most studies devoted to regions, the Begg's model refers directly to urban areas, and also indicates the complexity of mutual relations between the mentioned

factors (Table 10.1). Begg accentuates the fact that big cities remain the strongest links in the spatial layout, as centers of scientific and academic life, the headquarters of financial institutions and specialized services.

The dynamic nature of the Begg's model is the result of numerous interdependencies between individual determinants of competitiveness. What is more, this dynamic means that some factors can be mutually contradictory, and the relationships between them are subject to changes over time. It is important to remember that a city's competitiveness while retaining the mezo-economic character is strongly dependent on the macro-level conditions (legal regulations, political and social environment, some economic aspects e.g., monetary policy) and micro (organizations' activities, including of business entities).

The model draws attention to the equal treatment of the level of employment and productivity for the city's competitiveness. In this respect, Begg has a very European approach (in contrast to the American stance stressing the importance of productivity), which indicates the linking of economic issues and quality of life, often emphasized in the EU's documents [e.g., the pyramid of competitiveness, European Commission, 1997]. As has been reiterated several times, these indicators (employment and productivity) are inextricably linked, because cities with the most favorable living conditions (characterized by the natural environment, social infrastructure, or the broadly-understood attractiveness of life) are a magnet for potential residents, and thus increase and improve the quality of labor supply. As a result, companies starting operations in such cities gain access to better labor markets, which influences their effectiveness.

A more developed model of the city's competitiveness has also been developed on the basis of the Begg model (Figure 10.2). Sinkienė [2009] used it to assess the competitiveness of Lithuanian cities, taking as a starting point the concept of an open city. The proposed value of the model is the accentuation of endogenous factors (outlays), which as a result of participation in internal processes allow to achieve a certain level of results, supplying the next cycle of the city structure similarly to primary expenditures. The Sinkienė model, to a certain extent, resolves doubts about the strict division into determinants and results of urban processes in the assumption that each subsequent process cycle takes place at a higher level than the previous one (not just the circular system, but also the spiral system).

The matter of diseconomies of scale remains unresolved, as it may lead in large metropolises to the breakdown of such a defined cycle through a significant reduction in the quality of life (congestion, air pollution, noise, excessive pace of life) and even economic problems (too low absorption of the internal market, strong price increase, rising labor costs, etc.). A division into internal and external factors is

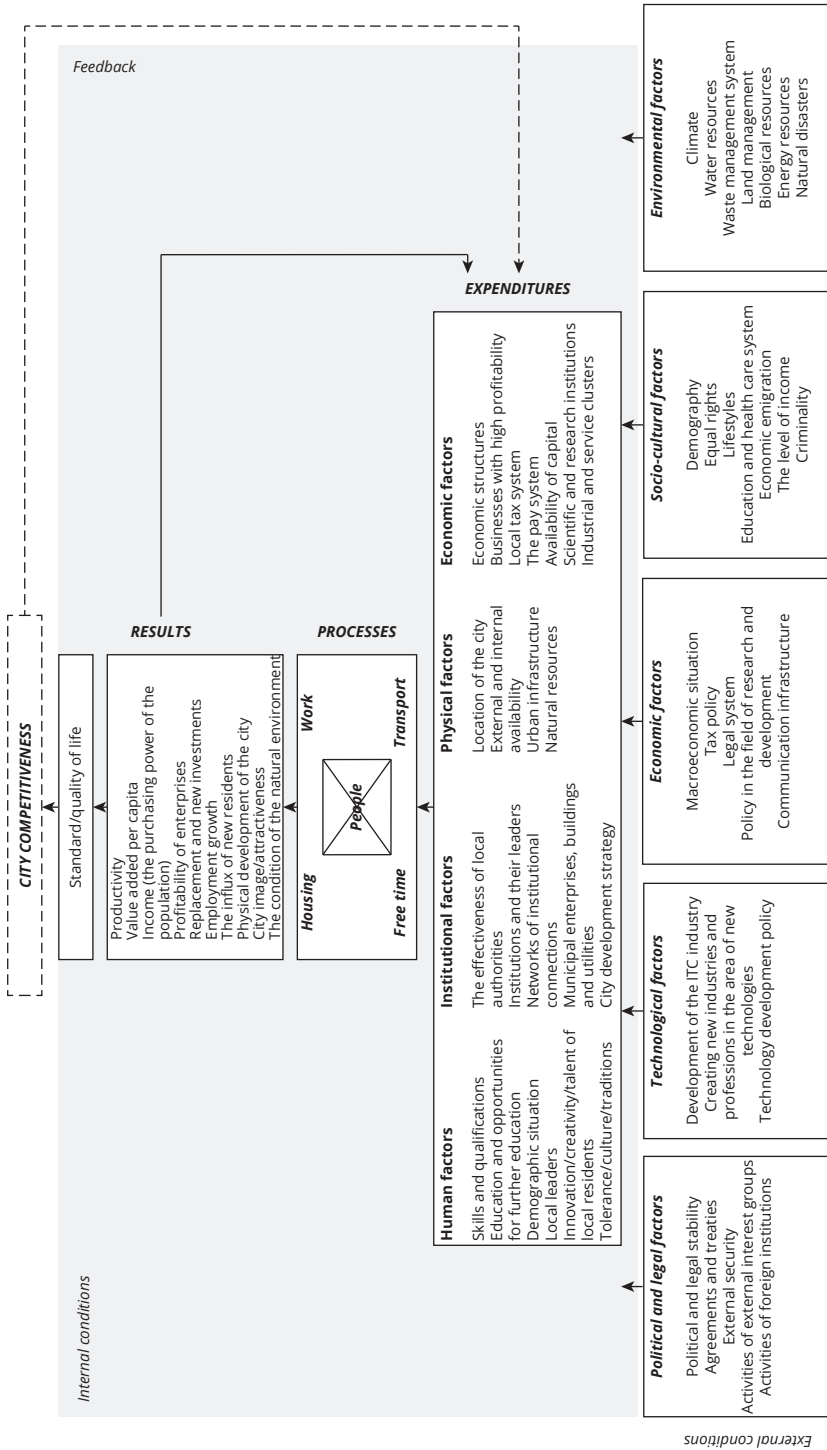
not entirely convincing. Many of the latter (e.g., technological or environmental factors) may arise or develop as a result of internal processes. Ecological dysfunctions are, to a large extent, attributed to urban organisms and it is difficult to recognize them as an external factor.

Despite the aforementioned doubts, the open city model should be considered an interesting attempt to analyze the factors of urban competitiveness – even if the assignment of particular determinants to a group of factors seems to be debatable, it is important to diagnose them and consider their role in creating a city's competitive potential.

When analyzing the factors of city competitiveness, it is also worth noting how politics (at the macro level) influences the issue of creating conditions that favor the development potential of cities. Competitive strategies used by cities in Poland are not coordinated at the central level, nor is there any urban policy that allows a holistic view of urban development in Poland or the creation of development programs linking the entire national network. The few analyses of the competitiveness of Polish cities (it is worth mentioning the PwC Report on major Polish cities from 2006) take into account the competitive advantages of individual cities. Only the national strategy of regional development had minimal results in finding a solution, but it remains quite hypothetical. The catalogue of competitiveness factors of the region, elaborated for its needs, is, to some extent, applicable in urban conditions. It covers three basic groups of factors (economic, social and ecological) and defines sources of regional competitiveness factors at the endogenous, regional, state and community levels (structural policy and the EU's cohesion policy). Some of the factors listed in this catalogue, however, raise some controversies e.g., to what extent is a favorable demographic structure of the regional community a determinant, and to what an effect of a city/region's competitiveness, if we assume that territorial systems are just competing for young, creative, qualified and educated inhabitants?

It is worth mentioning the factors that have not been successful in Poland, but which have become part of the EU's structural policy. These include: active support for bottom-up civic initiatives; investments in training systems and development of human capital; direct investments and consultancy for enterprises in the SME sector; financing innovative activity, innovation transfers between research centers and business; investments in communication infrastructure and development of the information society. This catalogue, unfortunately, omits the microeconomic aspect and factors related to the operations of enterprises. Meanwhile, without an active policy of local authorities in terms of labor costs, renting premises for business activities and transport costs, or the general business climate, it is difficult to attract investors.

Figure 10.2. The city's competitiveness model according to the open city concept



Source: Sinkienė [2009, pp. 1–12].

The lack of a microeconomic view is also a disadvantage of competitiveness rankings, which are based almost exclusively on data illustrating the urban system as a whole, without a more detailed analysis of the contribution of individual enterprises. While such an approach has its justification in the case of small business units (their effects result from a certain synergy and if the location of the company changes they may not be repeated, in addition, the relocation of a small unit may remain unnoticed in the city's scale), large companies and corporate headquarters can decide about the city's success/failure on a regional, national or even global scale. The social dimension of business activity is also crucial. The standard of living depends on the employment and payroll policies of individual entrepreneurs. In addition, as cities (municipalities) are increasingly forced to represent an entrepreneurial attitude, entrepreneurs, as strictly business-oriented entities, are increasingly involved (even for image-related reasons) in activities reflecting the level of their social responsibility. Finally, it should be noted that such factors as transport, construction (including housing), education systems, cultural and recreational opportunities – are also increasingly the result of entrepreneurship and business activity, although their full cession to the commercial sector could entail social consequences and decline city's competitiveness.

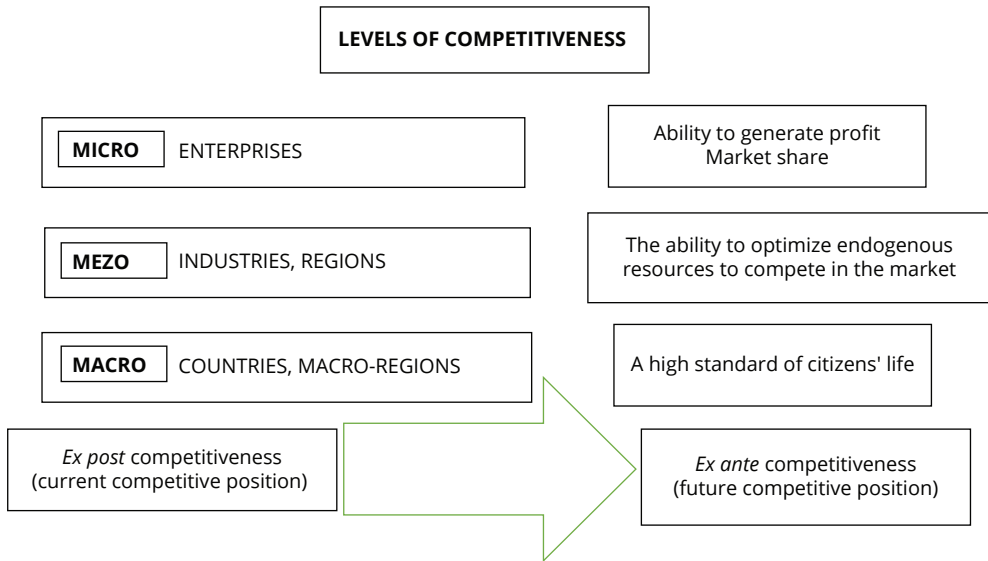
The Specificity of Urban Competitiveness

Utilizing the definitions indicated in the chapter above allows us to consider the specificity of city competition. Along with the assumption that the economies are in fact competing entities, it can be concluded that the competitiveness of cities is a competitiveness of the mezo-economic level, and thus lies between enterprises (microeconomic level) and national economies (macroeconomic level). Such a level can and should be distinguished not only due to the growing importance of cities in the global economy, but also due to the transfer of competition instruments in the territorial dimension to the level of cities and regions.

A conceptual approach to the competitiveness of the mezo-economic level has been proposed by E. Łaźniewska and M. Gorynia [2012]. In this model (Figure 10.3), regions, similarly to industries, use competitive strategy to change (increase) their competitive position by optimizing the use of their own endogenous resources, while also competing in the market. However, by adopting a more institutional approach to competitiveness analysis, it can be concluded that urban competition has more in common with the objective indicated in this concept for countries and macro-regions i.e., that cities apply a competitiveness strategy in order to achieve high prosperity and living standards of residents. On the other hand, cities do not compete exactly as

national economies do. They are distinguished not only by the size of the economy but, above all, by the instruments and by the possibility of direct competition between them, which is greater than in the case of countries. It seems, therefore, that in the competitiveness analysis it is worth distinguishing the mezeconomic level that will correspond to cities or regions.

Figure 10.3. Competitiveness in terms of scale, time and effect



Source: Łaźniewska, Gorynia [2012, p. 27].

The specificity of cities' competitiveness results mainly from their position in the economy. On the one hand, they are not completely independent entities, subject to many policies and activities planned and implemented from a central level. On the other hand, the economic strength of cities increases not only in a result of population growth in urban areas. The Gross Domestic Product (GDP) of Tokyo is already comparable to the GDP of Canada, New York – to Spain's GDP, and the GDP produced in the area of London is larger than the entire Switzerland's or Sweden's. It is forecasted that by 2025, six hundred of the world's largest cities will generate 60% of global GDP growth [Dobbs et al., 2011].

In the analyses carried out in this chapter, the assumption was made that competitive city is not only those whose economic units are able to maximize profit. Productivity is not the goal of competition policy and but a means to raise the standard of living. However, competition between cities exists, although it concerns investment, human capital, tourism, and cultural and sporting events. Sometimes this competition takes

a very public form e.g., when competing for the hosting of events or infrastructural investments, sometimes it is subtler, for example in the case of creating a high quality of life for residents. This combination of forms of influence – including those that are explicit, clearly testifying about competition, the need to cooperate in city networks and long-term, related to prosperity and quality factors – also affects the specificity of the competitiveness of the mezo-economic level, understood as the level of cities and regions.

Distinguishing features of urban competitiveness are also associated with the inability to use traditional instruments, such as trade policy or monetary policy, as they are reserved for national economies and supranational groups. In addition, the economic policy instruments that a city can actually use also take a different form. And so, the greater efficiency in the use of labor resources cannot be obtained by reducing employment, because it is contrary to the objectives of the city's competitiveness. Competitive strategy i.e., the transformation of endogenous resources into competitive ability, takes on a form of development policy, rather than a form of growth policy. At the same time, urban competitiveness is still relative and is therefore determined in relation to other units.

Another specific feature of city competitiveness is the dual nature of stakeholders. Activities aimed at increasing competitiveness are simultaneously directed towards residents and companies located on the territory of the city, as well as towards potential residents, tourists and companies from outside the city. Therefore, all policies aimed at increasing the attractiveness of the city must take into account these two separate and often quite different groups with different needs and expectations.

Conclusions

One of the reasons for city competitiveness is the growing economic importance of cities and the increasing population living in urban areas. In addition, the increasing impact of cities on the global economy (e.g., as part of a global network of cities) creates new opportunities for the competitiveness of these territorial units. At the same time, cities compete with one another by utilizing different methods in order to achieve specific goals. The features that make it possible to conceptually distinguish urban competitiveness from other types of competitiveness are:

- a lack of bankruptcy as a mechanism for selecting the most effective units; although individual cases of bankruptcy of a city are known (e.g., Detroit), in general there are mechanisms securing territorial units against such a situation (e.g., the introduction of a receivership);

- the goal of the activity is not to maximize profits: cities improve their competitiveness in order to increase the level of well-being of inhabitants and improve the conditions of enterprises;
- city competitiveness is a relative term, as the level of competitiveness is determined in relation to other cities. Relativity is a characteristic feature of competitiveness in general, but at the level of cities, the result of competition is often seen better than at the level of national economies, due to the greater freedom of movement of production factors within one country. On the other hand, the competitiveness of one city does not mean the failure of another, because cities operate within a network, and their relationship is more cooperative than competitive;
- a stable number of competitors: new urban centers are relatively rarely formed;
- city management does not affect all activities and phenomena implemented in the city: it is also subject to actions and policies planned and implemented from the national level, which limits the possibility of implementing its own competitive strategy;
- competition between cities has a national and international dimension: they compete with each other regardless of the administrative boundaries of countries;
- the range of means available as instruments to strengthen competitiveness is smaller at the local level (e.g., there is no monetary policy);
- the need to harmoniously combine the interests of residents and entrepreneurs as well as public and private interest is typical for urban competitiveness. A large number of stakeholders, different (conflicting) needs and a diversity of objectives complicates the city management process and its relationship with the environment.

City competitiveness is an issue that is gaining the interest of an increasing number of researchers. The specific features of the phenomenon indicated in this chapter allow to present it as a research problem with great potential – not only because it is a current topic, but also because of the immensely interesting nature of the dependencies that we observe. Despite an extensive amount of literature on the development of cities, the uniqueness of each of the concerned areas makes it almost impossible to apply practices verified in another city to a given city. This also affects a city's competitiveness strategy, which must be adapted not only to resources and conditions, but also to the expectations of its main stakeholders i.e., residents and enterprises.

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Competitiveness and Dynamics of Urban Development in Poland

Arkadiusz Michał Kowalski

Introduction

The competitiveness of cities in Poland is a multi-dimensional feature, which consists of a network of related economic, social, geographical, political and legal factors. Competitiveness itself is also a very complex concept, as evidenced by the large number of attempts to define this term in the literature. While the traditional definitions of competitiveness primarily referred to changes in the efficiency with which the economy uses its resources, the new approach goes beyond the economic dimension. It responds to the need to include social aspects and certain elements of continuous development in the notion of competitiveness, such as striving for social balance and sustainable use of the natural environment [Aiginger, Vogel, 2015; Weresa, 2015; 2016]. Similarly, the scope of research in broadly understood social geography of cities in Poland – as in the other countries – is characterized by a great thematic and methodological variety, which results from the tradition of an interdisciplinary approach generating flows of explanatory concepts and methodologies between different disciplines of science [Węclawowicz, 2017, p. 535].

Taking into consideration the diversity and multiplicity of available definitions and research approaches, the aim of the chapter is to present selected aspects related to the competitiveness of cities in Poland. The starting point of the analysis is a discussion taking place in recent decades regarding the dynamics of urbanization processes, which are one of the most important determinants of long-term socio-economic development. The key variable that determined the choice of cities for the competitiveness analysis carried out in the chapter is the total number of city residents, as it defines the importance of a given center for the competitiveness of the country's economy. On this basis, sixteen largest cities were identified, whose population in 2015 exceeded 200,000 people. Next, a competitive analysis of sixteen selected cities was carried out in terms of such aspects as: development of human capital (using a measure on

the share of people aged 25–64 with the ISCED 5–8¹ level of education in the total population) and entrepreneurship (using such indicators as: the number of newly registered units in the REGON registry in the population of 10,000 people and the number of entities per 1,000 inhabitants of working age). The chapter also analyzes the income competitiveness of the seven largest urban agglomerations in Poland, as well as the manner of managing the cities with the highest budget incomes per capita. At the same time, it is important to state the fact that it is difficult to obtain statistical data on the urban level, which for many indicators used in the analyzes of the competitiveness of countries and regions at the NUTS2 level are not available for cities, including the large ones.

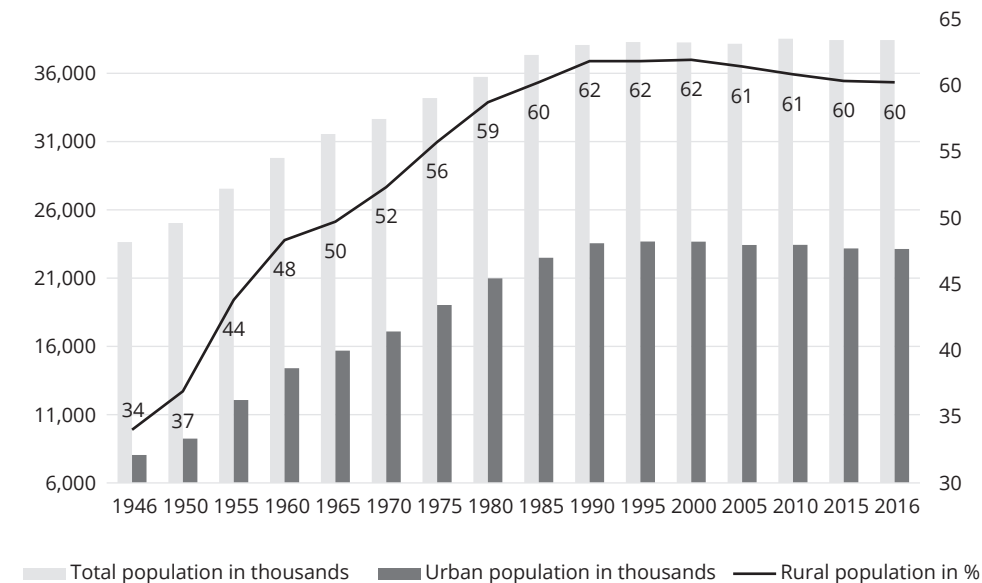
Urbanization Processes and Division of Cities in Poland

The changes taking place in the modern world economy are increasingly reflected in the spatial structure of countries and regions as well as urban layouts. Urban centers, especially big and large ones, are the main hubs of the economic structure of regions and countries. The processes of urbanization are inseparably connected with socio-economic development and technological progress, mutually conditioning one another. Urbanization can be defined as a complex civilization process manifested in the development of cities – in the increase of their number and size, and the increasing share of urban population [Budner, 2008, p. 5]. Therefore, one of the most important variables indicating the socio-economic development and competitiveness of the economy is the urbanization rate, which determines the share of urban residents in the total population of the country. Since urbanization is a process that should be considered in a long-term perspective, Figure 11.1 presents statistical data for the urbanization rate in Poland since 1946.

After the Second World War, until the mid-1990s, Poland has gradually increased the number of city dwellers and their share in the total population, from about eight million in 1946 (34% of the country's population) to over twenty-three million in 1995 (62% of the country's population). After 1995, the number of population living in rural areas increased slightly, but gradually. This phenomenon results mainly from the direction of people relocating from urban to rural areas, which has been progressing since 2000, most often to suburban municipalities concentrated around large cities.

¹ There are eight levels of education distinguished in the International Standard Classification of Education (ISCED), of which ISCED 5 is a short studies cycle, ISCED 6 is a Bachelor or its equivalents, ISCED 7 is a Master's degree or equivalents, and ISCED 8 is doctoral studies or their equivalents.

Figure 11.1. Population and urbanization rate in Poland between 1946–2016



Source: GUS [2017].

In accordance with the National Spatial Development Concept 2030 [Council of Ministers, 2011], the following division of cities was accepted:

- centers of primary importance for the country's settlement system and its economy: Warsaw, Cracow, Gdańsk, Gdynia, Wrocław, Poznań, Katowice (Upper Silesian agglomeration), Łódź, Szczecin, Bydgoszcz with Toruń and Lublin. These cities, with the exception of Bydgoszcz, Toruń and Lublin, are mentioned in studies on European spatial policy as so-called MEGA, among the 72 largest urban centers of the European Union;
- other voivodeship centers performing, apart from regional functions, also many functions of national importance: Białystok, Gorzów Wielkopolski, Kielce, Olsztyn, Opole, Rzeszów, Zielona Góra;
- regional centers (which are not the capitals of voivodships and usually have between 100,000 to 300,000 inhabitants): Częstochowa, Radom, Bielsko-Biała, Rybnik, Płock, Elbląg, Wałbrzych, Włocławek, Tarnów, Kalisz with Ostrów Wielkopolski, Koszalin, Legnica, Grudziądz, Słupsk;
- sub-regional centers, among which stand out the sub-groups that constitute former provincial cities and industrial centers; these cities show significant differences in terms of economy and infrastructure conditions, but their position in the settlement system is stable;

- remaining local centers (including county towns) that are of a great significance in terms of public sector functions at the local level, stimulate the development of services and production, and stabilize local communities.

Data on the number of cities in Poland in the categories listed above are presented in Table 11.1.

Table 11.1. Comparison of individual functional categories of cities in terms of selected variables

		Cities - category				In total
		Voivodships	Regional	Sub-regional	Local	
The number of analyzed cities		18	30	56	809	913
Share of a given category of cities in:	total population of cities	19.2	10.7	9.5	60.6	100
	total number of employees in cities	22	10	8	60	100
	total number of companies in cities	43	14	11	32	100
	number of high-tech entities in cities	54.1	12.6	9.2	24.1	100

Source: Dej [2016, p. 18].

The analysis of the indicators presented in Table 11.1 shows the existence of significant differences between cities of particular categories. The smallest numerical group of voivodeship cities, inhabited by 19.2% of the country's population, concentrates the greatest potential development, which is expressed, among others, by share in the total number of enterprises in cities (42.8%), including business entities with a high level of technological advancement (54.1%). These data confirm the observations on the spatial concentration of economic development in the modern economy, which favors cities as growth poles. The concept of growth poles, formulated by the French economist F. Perroux [1964], distinguishes the sectoral and territorial growth poles in which the concentration of economic activity takes place. As a result, economic development is polarized, which means that some locations show faster development rate in comparison to the entire economy. The attribute of the pole of growth is that it becomes a source of development impulses to other areas, which is done by the so-called spread effects/trickling down effects, the most important of which concerns the proliferation of knowledge and innovation [Kowalski, 2013, p. 61]. Therefore, Poland's competitiveness is to a large extent determined by whether large urban centers, including metropolises, are able to achieve self-sustaining growth based on endogenous and exogenous factors, and then on whether they affect wider regions, and thus whether they become centers for diffusion of knowledge to the environment

[Domański, 2006, p. 204]. Such a view on development processes fits into the phenomenon of metropolization, defined by B. Jałowicki [1999] as a process of taking over, by some of the big cities, managerial functions in post-industrial management on a supranational scale.

Demographics of Polish Cities

One of the main internal factors affecting the city's competitiveness potential is its demographic structure and related trends. Among them, a general number of city residents deserves special attention, as it determines the size of the market for enterprises operating in the city, also demographic potential, and it indicates the degree of infrastructure development in the city. Large cities, particularly metropolises, not only function as growth poles and centers of economic life, but also are cultural centers and places of the greatest scientific, educational and artistic activity. The juxtaposition of the sixteen largest Polish cities, whose population in 2015 exceeded 200,000 people, along with changes in the size of population of individual cities in 1990–2015, are presented below in Table 11.2.

In Poland, the largest in terms of population is the capital city of Warsaw, where in 2015 there were 1,744,351 inhabitants. The top ten of the most populous cities in Poland also includes, in descending order: Cracow, Łódź, Wrocław, Poznań, Gdańsk, Szczecin, Bydgoszcz, Lublin and Katowice. Among the cities inhabited by over 200 000 people, three are located in the Silesian voivodeship (Katowice, Częstochowa and Sosnowiec) and two in the following provinces: Mazowieckie (Warsaw and Radom), Pomorskie (Gdańsk and Gdynia), Kujawsko-Pomorskie (Bydgoszcz and Toruń) and one in the following voivodeships: Małopolskie (Cracow), Łódzkie (Łódź), Dolnośląskie (Wrocław), Wielkopolskie (Poznań), Zachodniopomorskie (Szczecin), Lubelskie (Lublin) and Podlaskie (Białystok). The upward trend is visible in Warsaw, where the population increased from 1,656,000 in 1990 to 1,744,000 in 2015 (5.3%), as well as in Cracow, Białystok and Toruń. So, the influx of people was biggest in the largest and most attractive cities from the point of view of the labor market (Warsaw and Cracow) or in the capitals relatively young demographically, with no competitive urban centers nearby (Białystok). In other cities inhabited by more than 200,000 people, there was a decrease in the number of people between 1990 and 2015. This trend was reversed after 2000 in case of Wrocław and Gdańsk.

The process of population's shrinking mainly affected cities that before the 1990s constituted typical industrial monocultures, specializing in heavy industry (e.g., urban centers in the Śląskie voivodship) or textile industry (Łódź). Cities and regions with

declining industries once played a leading role in economic development but they experience structural difficulties after a change of global trends and production conditions. This type of cities is usually characterized by inadequate infrastructure and serious problems occurring in the old industrial districts, unsuitable for modern requirements and technological solutions.

Table 11.2. The largest cities in terms of population (in thousands), along with the dynamics of changes in 1990–2015

No.	City	1990	2000	2010	2015	Changes between individual years and 2015 (in percent)		
						1990	2000	2010
1	Warsaw	1,656	1,610	1,720	1,744	5.3	8.3	1.4
2	Cracow	751	742	757	761	1.3	2.6	0.5
3	Łódź	848	793	737	700	-17.5	-11.7	-5
4	Wrocław	643	634	633	636	-1.1	0.3	0.5
5	Poznań	590	575	552	542	-8.1	-5.7	-1.8
6	Gdańsk	465	457	457	462	-0.6	1.1	1.1
7	Szczecin	413	416	406	406	-1.7	-2.4	0
8	Bydgoszcz	382	384	356	356	-6.8	-7.3	0
9	Lublin	351	356	348	341	-2.8	-4.2	-2
10	Katowice	367	340	307	300	-18.3	-11.8	-2.3
11	Białystok	271	286	295	296	9.2	3.5	0.3
12	Gdynia	252	255	247	247	-2.0	-3.1	0
13	Częstochowa	258	256	238	228	-11.6	-10.9	-4.2
14	Radom	229	231	223	216	-5.7	-6.5	-3.1
15	Sosnowiec	259	241	218	207	-20.1	-14.1	-5
16	Toruń	202	204	205	203	0.5	-0.5	-1

Source: Own study based on data from GUS [1994; 2002; 2011], and GUS, Regional Statistics [<https://stat.gov.pl/statystyka-regionalna>].

Human Capital in Polish Cities

Skillful policy on education and shaping the curriculum brings positive results in terms of increased productivity and economic activity of the urban population, and indirectly affect the structure of local demand. In the face of the development of modern industries, such as the electronics, IT or pharmaceutical industries, there is a special need for a highly qualified workforce and an efficient business environment. Table 11.3 presents data on the share of people aged 25–64 with ISCED 5–8 level of

education in the total population of cities (in which in 2015 lived more than 200,000 people).

Table 11.3. Data on the share of people aged 25–64 with ISCED 5–8 level of education in the total population of cities

No.	City	The share of population ISCED 5–8 (in %)
1	Warsaw	45.5
2	Cracow	39.3
3	Lublin	38.1
4	Poznań	37.3
5	Wrocław	36.8
6	Białystok	33.8
7	Gdańsk	33.4
8	Gdynia	33.3
9	Szczecin	32.3
10	Katowice	29.4
11	Łódź	28.2
12	Radom	28.1
13	Toruń	28.1
14	Częstochowa	27.7
15	Bydgoszcz	27.6
16	Sosnowiec	22.6

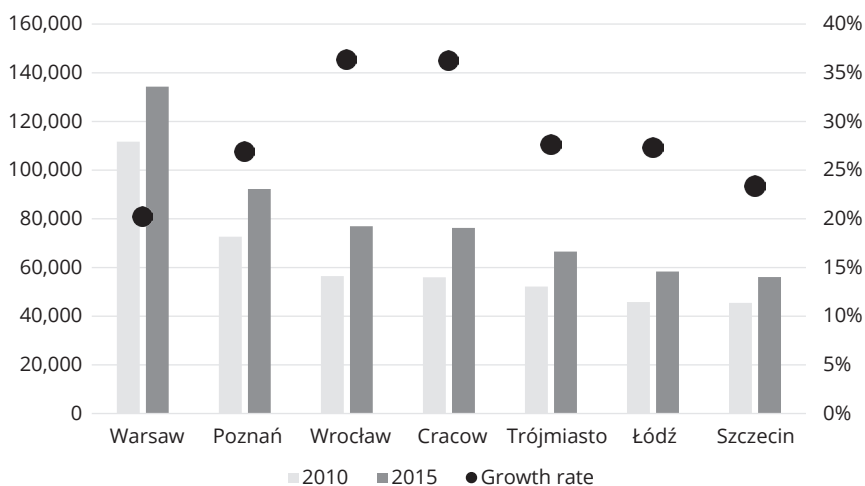
Source: Eurostat Statistics Database.

According to the data from Table 11.3, cities with the largest share of people aged 25–64 with ISCED 5–8 level of education in the total population of cities were: Warsaw (45.5%) and Cracow (39.3%). They are also the largest cities in Poland and the most attractive from the point of view of the labor market. The importance of high quality human capital for the competitiveness of cities is related to the demand for skilled workers in relation to unskilled workers, which has been growing for several decades. This trend is one of the most important reasons for the relative increase in wages of skilled workers in relation to the wages of employees with low professional skills. One of the ways to explain this phenomenon is the skill-biased technological change hypothesis (SBTC), according to which the technological revolution, and in particular the development of ICT, cause the increase in productivity differences between skilled and unskilled workers [Chusseau et al., 2008].

Income Competitiveness of Cities in Poland

One of the most important dimensions of the competitive position of the economy is income competitiveness, which can be measured using GDP per capita. The values of this indicator for the seven largest cities in Poland in 2010 and 2015 are shown in the Figure 11.2.

Figure 11.2. GDP per capita in seven largest cities in Poland in the years 2010–2015



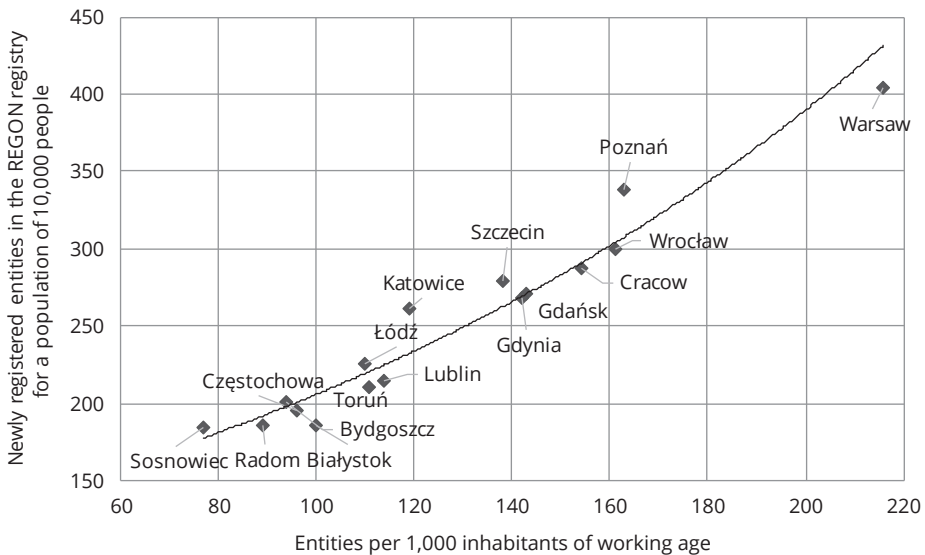
Source: Own study based on the data of the GUS [2012; 2017b].

According to the data presented in Figure 11.2, among the largest cities in Poland, the highest GDP per capita is reached in Warsaw (134,302 PLN in 2015). Other big cities, such as: Poznań (92,232 PLN), Wrocław (76,975 PLN), Cracow (76,283 PLN) and the Trójmiasto (66,564 PLN, data for Gdańsk itself are not available) are definitely lagging behind. The remaining analyzed cities maintained the level of GDP per capita in 2015 below 60,000 PLN – in Łódź it amounted to 58,374 PLN, while in Szczecin – to 56,091 PLN. The highest dynamics of GDP growth per capita was noted in Wrocław, in which the growth rate of this measure between 2010 and 2015 amounted to 36.33%. The next places were taken by Cracow (36.29%), Trójmiasto (27.61%), Łódź (27.35%), Poznań (26.93%) and Szczecin (23.37%). Despite the fact that the growth rate of GDP per capita in Warsaw in 2010–2015 was the lowest in the analyzed group, the capital city maintained a huge advantage over other urban centers, although the distance decreased slightly.

Entrepreneurship in Cities in Poland

Entrepreneurship is an important determinant of the dynamics of the city's economic development and, at the same time, its competitiveness, [Matoga, 2013, p. 144]. As in the case of competitiveness, it is difficult to clearly define entrepreneurship. It has been assumed that one measure of urban entrepreneurship may be the number of enterprises registered in the city per one specific group of residents in the productive age [Dej, 2016, pp. 18–19]. Data on the relations between newly registered entities in 16 largest cities in Poland and entities per 1000 residents of working age in 2016 are presented in Figure 11.3.

Figure 11.3. Newly registered entities in the REGON registry for a population of 10 000 people in relation to the number of entities per 1,000 inhabitants of working age (2016)



Source: Own study based on data from the Local Data Bank (BDL) of the GUS.

Figure 11.3 shows that there is a positive correlation, among others, between the indicators of the entrepreneurship's level and the dynamics of new enterprises emergence. Among cities inhabited by over 200,000 people, the highest number of newly registered units in the REGON registry for 10,000 population (216 units), as well as the largest number of entities per 1,000 inhabitants of working age (404 entities) were recorded in Warsaw. In terms of these both variables, Wrocław took the second

place (161 and 300 entities respectively), followed by Poznań (163 and 339 units). One should pay attention to a similar place, on the discussed list, of cities located close to:

- Gdańsk (143 units newly registered in the REGON registry for 10,000 population and 271 entities per 1,000 inhabitants of working age) and Gdynia (respectively 142 and 268 entities);
- Toruń (111 units newly registered in the REGON registry for 10,000 population and 210 entities per 1,000 inhabitants of working age) and Bydgoszcz (94 and 201 entities respectively).

The observation indicates the integration tendency of neighboring urban centers, which in some cases are transformed into bipolar or multi-center spatial systems of supra-regional importance, and sometimes even into metropolitan areas. This trend is part of the processes of strong polarization and diversity of development opportunities for a large collection of cities and the creation of more or less complex urban complexes. It should be noted, however, that the bipolarity of the agglomeration system is not always developed in the case of two urban centers with a similar level of competitiveness.

An example is the so-called central zone in Poland, including Łódź and Warsaw agglomerations [Kudłacz, Markowski, 2001]. Data from Figure 11.3 confirm the significantly different level of entrepreneurship in these cities, expressed in the number of newly registered units in the REGON registry for 10,000 population (216 units in Warsaw and 110 in Łódź), as well as the number of entities per 1,000 inhabitants of the productive age (404 entities in Warsaw and 226 in Łódź).

Administration and City Management

Local administration and the way of managing the city, as well as the public finance situation of the territorial unit resulting from the pursued policy, are yet another important element of the city's competitive advantage [Szczech-Pietkiewicz, 2010, p. 129]. The effective and efficient implementation of plans and investments by local authorities is related to the proper development and expansion of infrastructure, used by both residents and entrepreneurs. Local administration, which operates on the long-term development plan basis, also affects the formation of business-friendly and innovation-friendly conditions and those affecting the development of a network of connections between scientific institutions and enterprises. Such activities may be of direct character, in the form of subsidizing selected industries at the level of a territorial unit, as well as indirect, consisting of facilitating administrative procedures or supporting scientific institutions. The efficient operation of public authorities may

be testified by the level of income obtained by the city budget, which is also important for the implementation of city development plans. A list of twenty-five cities with the highest budget incomes per capita, together with the expenditure from this budget and the size of the created surplus or deficit, is presented in the Table 11.4.

Table 11.4. Cities with the highest budget incomes (in PLN) per capita (2015)

No.	City	Voivodship	Revenues	Expenses	Surplus/ Deficit (-)
1	Warsaw	Mazowieckie	8,228.21	7,412.28	815.93
2	Sopot	Pomorskie	7,933.82	7,254.49	679.33
3	Gliwice	Śląskie	7,693.99	7,399.54	294.45
4	Olsztyn	Warmińsko-Mazurskie	6,932.95	7,736.10	-803.15
5	Krosno	Podkarpackie	6,390.43	6,924.75	-534.32
6	Płock	Mazowieckie	6,288.12	6,467.26	-179.14
7	Poznań	Wielkopolskie	6,099.13	5,703.56	395.57
8	Świnoujście	Zachodniopomorskie	5,884.20	5,620.89	263.31
9	Gdańsk	Pomorskie	5,882.89	5,488.28	394.61
10	Toruń	Kujawsko-Pomorskie	5,717.40	5,205.21	512.19
11	Wrocław	Dolnośląskie	5,696.68	6,128.20	-431.52
12	Katowice	Śląskie	5,516.66	5,373.11	143.55
13	Kielce	Świętokrzyskie	5,497.20	6,067.43	-570.23
14	Nowy Sącz	Małopolskie	5,493.35	5,598.40	-105.05
15	Konin	Wielkopolskie	5,490.92	5,443.07	47.85
16	Rzeszów	Podkarpackie	5,473.38	6,222.71	-749.33
17	Łódź	Łódzkie	5,462.86	5,684.77	-221.91
18	Cracow	Małopolskie	5,424.19	5,526.42	-102.23
19	Opole	Opolskie	5,423.05	5,359.25	63.80
20	Słupsk	Pomorskie	5,421.00	5,309.85	111.15
21	Tarnów	Małopolskie	5,294.79	5,410.58	-115.79
22	Przemyśl	Podkarpackie	5,292.00	5,398.21	-106.21
23	Szczecin	Zachodniopomorskie	5,283.54	5,461.21	-177.67
24	Dąbrowa Górnicza	Śląskie	5,260.80	5,394.28	-133.48
25	Ostrołęka	Mazowieckie	5,260.32	5,212.82	47.50

Source: Own calculations based on the data of GUS, Regional Statistics [<https://stat.gov.pl/statystyka-regionalna>].

Warsaw had the highest income per capita in 2015, and it amounted to 8,228.21 PLN. The visible tendency of many cities is to balance the budget. In the analyzed group almost half (12) of urban centers reached a budget surplus

in 2015, the highest level of which was recorded in Warsaw (815.93 PLN per capita) and in Sopot (679.33 PLN), therefore in cities with high standard of living of the inhabitants in comparison to the whole country. In turn, the cities with the largest budget deficits were: Olsztyn (803.15 PLN per capita), Rzeszów (749.33 PLN) and Kielce (570.23 PLN). It is worth noting that all these cities are located in the less developed voivodships of Eastern Poland. The reasons for the budget deficit in cities may be as follows [Sekuła, 2010, p. 628]:

- no possibility to lower the so-called fixed expenditure;
- occurrence of an infrastructural gap in Polish cities, in comparison to the other EU countries, which is conducive to increasing investment projects;
- additional costs of interrupting the implementation of investments already started, as a result of which local governments decided to complete projects even if this was accompanied by an increase in debt;
- the need of having funds constituting the so-called own contribution in the case of projects co-financed from the EU structural funds.

Conclusions

Competitiveness investigated at the city level is complex. Although some cities are leaders in case of some indicators (e.g., Siechnice has the highest birth rate), their small population, geographical location and small share in the creation of the national GDP cause the competitiveness in relation to other urban centers to be relatively low. Small cities, which stand out positively only in selected aspects, are not able to compete with large urban centers, which are characterized by greater economic potential and more developed infrastructure and industry structure. This regularity is confirmed by the analysis carried out in this chapter, according to which the least numerical group of voivodship cities, inhabited by 19.2% of the country's population, concentrates the greatest development potential, expressed, among others, by the share in the total number of enterprises in cities (42.8%), including: business entities with a high level of technological advancement (54.1%).

In terms of population, the largest city in Poland is Warsaw, where in 2015 lived 1,744,351 people. The first seven of the most populated cities, in descending order, are: Cracow, Łódź, Wrocław, Poznań, Gdańsk and Szczecin. It should be noted that in the 1990s, Poland reversed the urbanization process, expressed by a change in the movement direction of population that to a greater extent began to migrate from cities to rural areas. The most frequent settlements were suburban municipalities concentrated around large cities, which indicates an increase in the importance of

urban functional areas, which are settlement systems, spatially continuous, composed of separate administrative units, including rural municipalities.

When analyzing income competitiveness, among cities inhabited by more than 200,000 inhabitants, the lowest GDP growth rate per capita in 2010–2015 was recorded in Warsaw. Despite the reduction of the income gap in relation to other urban centers, the capital city maintained a huge advantage. In 2015, GDP per capita in Warsaw reached 134,302 PLN, while in Poznań it amounted to 92,232 PLN, in Wrocław to 76,975 PLN, in Cracow to 76,283 PLN, in Trójmiasto to 66,564 PLN, in Łódź to 58,374 PLN, and in Szczecin to 56,091 PLN. The city with the highest growth rate of GDP per capita in 2010–2015 was Wrocław, followed by: Cracow, Trójmiasto, Łódź, Poznań and Szczecin. It is worth noting that although Warsaw in some categories is not among the top cities, the special status of the capital city plays a huge role in determining its competitiveness. The size of the metropolitan area, the proximity of offices, including central ones, and well-developed transport and infrastructure, decide on the Warsaw's unattainable competitive position in Poland. However, one can find some inaccuracies between statistical data and reality, because there are many enterprises in the capital city which transfer production to other regions of the country, nevertheless, it is statistically assigned to Warsaw. This phenomenon may disrupt the objective assessment of urban entrepreneurship, in the context of which Warsaw has the highest position in terms of such indicators as the number of newly registered units in the REGON registry for the population of 10,000 people or number of entities per 1,000 inhabitants of working age. The analysis of these measures indicates a similar profile of entrepreneurship of cities located in close proximity, such as Gdańsk and Gdynia, as well as Toruń and Bydgoszcz. This may indicate the development in the Polish space of bipolar or multi-centered spatial layouts and more or less multi-faced urban complexes, which also create development opportunities for satellite cities.

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Financing Urban Development Projects for the Purpose of Increasing Competitiveness

Katarzyna Sum

Introduction

An essential factor of shaping economic competitiveness is urbanization, a process which has significantly progressed in Poland during recent years. Procuring funds for increasingly complex and expensive urbanization projects often poses a challenge for cities. Such projects may include the development and modernization of transport infrastructure, noise reduction, decreasing city emissivity and improving overall access to social and municipal services. The development of the financial system of a given country undoubtedly plays an important role in financing cities. While the financial system in Poland is well developed compared to that of other countries in its proximity, various instruments needed for the financing of urbanization projects may not be readily available.

The subject of financing cities is widespread in studies around the world [among others by Inman, 2005; World Bank, 2013; Slack 2014; Kim, 2016]. The studies mainly focus on such aspects as: the improvement of internal city financing, creating smart cities, or increasing the attractiveness of urbanization projects for external investors. Much has been said about urban development financing in developing countries and in the so-called emerging markets. The financing of cities is, however, a topic that is seldom analyzed in Polish studies, as existing works focus exclusively on the financing of urban regeneration projects [among others Gralak, 2010, Farelńnik, 2012]. Studies on financing other development projects at the local level relate to local government units (LGUs) and to traditional forms of financing [among others Główwka, 2010, Pszczółka, 2011].

An analysis of the possibilities of financing urban development projects in Poland is all the more necessary considering the viewpoint shared by the economic press, indicating that there are limitations in this area. The limitations mainly reference excessive urban debt or high costs of traditional forms of financing. The depopulation of certain cities, along with a decrease in internal sources of financing are also a problem

that needs to be issued. Due to the high dynamics of urbanization processes in Poland, more attention should be given to the issue of funding, and it is especially important to compare the costs and benefits of individual financing methods in order to consider their applicability in our country.

The purpose of this chapter is to identify the methods of financing urban development projects in Poland in 2010–2017. It begins with a review of applicable studies and the methods of funding cities around the world. Next, the possibilities of using the discussed instruments in Poland are presented, along with the costs and benefits of particular solutions. The availability of specific instruments in the context of the development of the financial system in Poland is featured at length. The chapter ends with a conclusion concerning the desired directions of development of the financing methods for urban projects in Poland.

Methods of Financing Cities Around the World

Studies indicate a selection of potential instruments that may be used to finance cities. A detailed review of the variants above has been made in a study published by Kim [2016]. Public sources of financing include instruments devised by cities (internal sources) and those coming from public external sources. Public sources include:

- taxes,
- rents,
- municipal bonds,
- loans from public institutions,
- loans from regional/local investment banks,
- funds from international institutions often awarded as part of urban programs,
- grants,
- target funds.

Funds from private sources include:

- bank loans,
- syndicated loans,
- leasing,
- privatization,
- funds from international financial institutions,
- loan and leverage support instruments,
- crowdfunding,
- projects such as built-operate-transfers,
- securitization.

The public-private partnership (PPP) is a mixed form of financing.

Each of the listed financing sources may contribute to a city's development, while also increasing its competitiveness. Competitiveness is impacted by various individual sources of financing and depends primarily on the resources that can be obtained from them. Estimating their full impact is beyond the scope of this study, as its aim is to characterize potential sources of financing for cities.

A city's effectiveness in accumulating resources from internal sources considerably influences its financial situation and largely determines the possibility of obtaining external sources of financing and private investors. Cities should therefore properly manage financial sources and care about the attractiveness of urbanization projects.

Studies show that the effectiveness of urban development projects is not determined by the source itself (whether public or private), but rather by the management of urbanization projects. There are three main tasks that cities should complete in order to ensure effective financing [CDIA, 2010]. These include: an assessment and increase in the credibility and creditworthiness of cities, the coordination of public and private financing, as well as the use of existing assets in order to increase them, including the use of financial leverage.

When focusing on the first task, cities should ensure the inflow of funds from fees and taxes as well as profits from their assets. City authorities can increase credibility by creating transparent project accounting rules, establishing an efficient financial management system, conducting self-government's finance audit by independent institutions and requiring an assessment of the effectiveness of the created infrastructure [Abhay, Ghodke, 2005]. Cities can also become more valuable to investors by operating on financial markets, issuing bonds or acquiring loans. When completing the second task, city authorities should focus on optimizing the financing structure, reducing the costs of raising capital, including the fiscal burden of urbanization projects. The third task is to use the proceeds from owned lands, profits from developers, as well as compensatory payments to finance urban projects. The rate of return on the undertaken investments and the manner in which the projects are taken up is also important. It should be noted that in order to ensure a satisfactory rate of return on projects, it is necessary to set the prices of services offered within the infrastructure at an optimum level.

Upon considering the management of financing from public sources, one can find studies maintaining the view that cities should have more fiscal autonomy, supported by the fact that economic development is centered around cities. Autonomy can be enhanced with the help of many instruments, and in addition to taxes, cities may set fees for use of roads, transit, parking and municipal fees [Slack, 2014]. In order to ensure investment efficiency, the city should only provide services that the inhabitants deem

to be imperative [Inman, 2005]. A partial solution could be the use of a participatory budget, which has been used and analyzed in Europe [Sintomer et al., 2010]. This is, however, a solution that extends to only a limited part of the budget.

The process of obtaining individual public sources may vary from city to city, as it is dependent on the country's level of economic development and, most of all, on the financial system. Tax and rental income are influenced by a population's level of affluence, as well as the extent of profitable, existing infrastructure. Municipal bonds are issued in correlation with the availability of the financial market for local governments, as well as its liquidity. The USA in particular boasts a large and diverse offer of municipal bonds [Kim, 2016]. This market is also well developed in countries in which debt instruments are bought by regional banks (e.g., Germany). Functioning of these types of banks also facilitates access to loans.

The use of socially responsible financing is a current trend in city development (*Socially Responsible Financing*, SRF) [Kim, 2016]. It may take the form of green bonds that are used to implement ecological projects. One of the advantages of using SRF is having access to a larger group of investors, especially institutional investors interested in environmental projects e.g., as part of a corporate social responsibility strategy. However, due to the increased requirements of monitoring and ecological investment reports, this type of financing may become more expensive than the issuance of ordinary bonds.

The process of obtaining funds from private sources is in turn largely dependent on the creditworthiness of cities, as well as on the development level of the banking system. In order to finance long-term projects (e.g., transport infrastructure), cities may obtain syndicated loans offered by regional development banks in co-operation with commercial banks.

Various loan-supporting instruments may be used by cities in order to reduce the cost of financing urban projects. Such instruments may include low-interest loans offered by local authorities, regional funds or instruments offered by international financial institutions. This type of instrument also allows to reduce the risk for potential investors, while lowering the costs of raising capital in future projects.

Cities can also take advantage of many innovative forms of financing at once. This solution is beneficial especially in the case of high dynamic urbanization processes, as well as when there is a need to quickly obtain funds. Collective credit acquisition can be used by cities in less developed economies i.e., by consortiums of several, usually small cities with creditworthiness that is too low to allow them to attain individual loans. Local governments with a better creditworthiness may, however, be reluctant to give loans to those that are financially inferior to them. Collective loans can be a good solution for joint infrastructure projects. Another innovative form of financing

is crowdfunding, which finances a specific project by grouping scattered funds offered by many investors on an online platform. In practice, this form may be used in small projects, such as the construction of bicycle paths or parks, so it is currently of minor importance in financing urban development [Kim, 2016].

Countries with the most developed financial systems may have their urbanization projects financed as part of a securitization of assets. Cities can create additional liquidities based on their assets by using asset-backed-securities (ABS). Such solutions may prove to be especially useful for long-term assets with low liquidity. Loans taken to obtain assets are sold to third parties, usually to special-purpose-vehicles (SPV), which issue transferable instruments. The payment amount depends on the cash flows generated by the securitized assets, due to the issuance of these instruments and their interest rates [Kim, 2016].

PPP is a form of financing that is especially important. This solution not only allows to obtain additional funds for the implementation of urbanization projects, but also improves the project selection process. Project verifications planned by the private sector serve as a guarantee that the infrastructure will be effective and will be utilized by the city for a long time. PPP can also contribute to an optimal use of the resulting assets and can use new infrastructure to improve the rate of return on investments by creating prices for services offered by the private sector. Studies maintain that PPP effectiveness is determined by proper financial management and accurate project valuation. Business practice indicates a failure of the PPP model, as it underestimates investment risk. One of the most popular varieties of PPP, used especially in developing countries, is a built-operate-transfer project. Infrastructure is constructed by a private investor who becomes its operator after finalizing the construction, and brings services that were previously unavailable to a given city. This type of project is primarily used in road, transmission or telecommunications infrastructure [Bishop, 2004].

Methods of Financing Urban Projects in Poland

The development of the financial system in Poland has been enabled by an increasing availability of financing instruments for urbanization projects. A significant number of the financing methods mentioned in the previous subsection can be applied in Polish cities. In spite of this, traditional instruments for financing urban projects dominate in our country. The cause can be a relatively low degree of development of some segments of the financial market, as well as the lack of regional institutions enabling the use of non-traditional instruments. The development of the banking sector is of significant importance when supporting urbanization processes in Poland,

as banks offer loan funds, provide warranties, and formally monitor numerous types of transactions. They are also essential instrument buyers on the financial market. The development of the leasing market is becoming increasingly relevant for the financing of urbanization projects.

One of the methods of financing Polish cities development is using internal resources created by local governments e.g., local taxes, rents and bonds. Their scope and size is varied throughout cities in Poland. Cities also greatly benefit from external resources, both from public and private sources. The first group includes bonds, domestic and foreign funds, in particular funds from the EU. The second group mainly consists of loans from private institutions and leasing. Public-private partnership is a mixed form of financing.

The option of issuing bonds should be taken into account when considering the prospects for financing urban development. Due to the lack of data on municipal bonds, this study has characterized the market of municipal bonds issued by LGUs. Urban development can be partially financed from debt instruments issued by local government units; the conducted analysis is to clarify the possibility of using this type of city financing. The main advantage of issuing bonds is the fact that, unlike obtaining a loan, it is not subject to public procurement procedures, therefore making it a relatively quick way to obtain financing. The process of issuing bonds does not require establishing collateral, which reduces the cost of raising funds. Another advantage is that LGUs provide the option of issuing many series of low-value bonds and spreading debt over time [NBP, 2016].

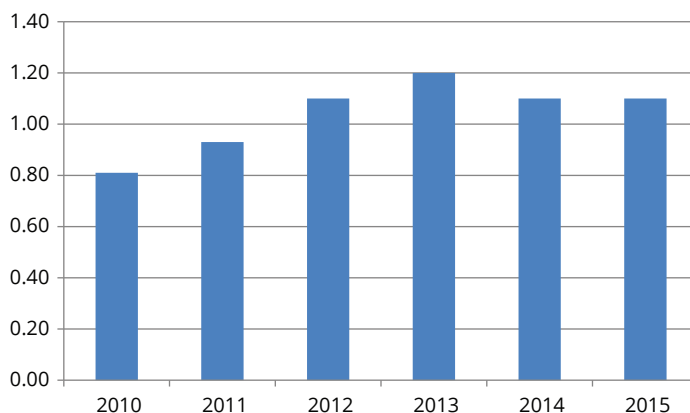
The development of the financial market is a crucial element of municipal financing through issuing municipal bonds, due to the need to ensure a sufficient number of potential buyers, as well as maintaining liquidity of this market segment. The fact that municipal bonds are mainly issued by large banks is also critical¹. The banking system's degree of development is significant, as 84% of the value of municipal bonds is traded on the over-the-counter market.

Figure 12.1 shows that the value of issued municipal bonds in Poland in 2010–2015 ranged from 0.8 to 1.2% of GDP. This value is quite low compared to Western European countries where it reaches even 13%, but it is comparable with the countries of Eastern Europe where it is below 1% [NBP, 2016]. In Poland, the low value of issued bonds was a result of legal restrictions. According to the statutory provisions, the maximum amount of expenses related to the purchase and servicing of LGUs liabilities is related to their revenues. According to the new act that came in force on the 1st of July 2015, revenue bonds are excluded from LGU debt limits. Therefore,

¹ According to the data of NBP: PKO BP, Pekao SA/CDM, ING Bank Śląski, BGK.

this is an incentive for local government units to use this source of funding and it is likely that there will be an increase in the value of issuing this debt instrument in the following years.

Figure 12.1. The value of municipal bonds issued in 2010–2015 (percentage of GDP)



Source: Own study based on NBP data.

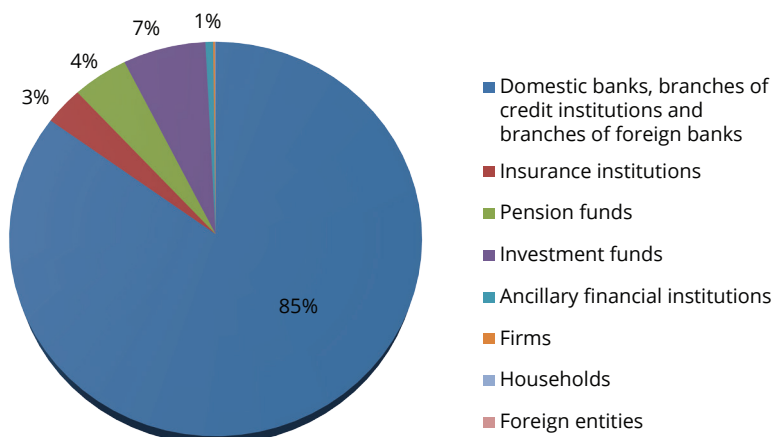
Cities are the most important issuers of municipal bonds and use them mainly for financing infrastructure projects or servicing existing liabilities². The bonds are traded mainly on the OTC market (over-the-counter), as the stock market has very low liquidity [NBP, 2016]. Figure 12.2 illustrates that most banks are buyers of municipal bonds (85%). Large banks constitute the vast majority of buyers, due to their access to information on the financial standing of individual issuers. Investment funds (7%), pension funds (4%) and insurance institutions (3%) contain much smaller groups of buyers.

The EU funds are another potential source of city public financing. As part of LGU funds, they can be used in operational programs for development. LGUs may use various programs offered by the EU institutions, depending on the purpose of the development project. JESSICA (Joint European Support for Sustainable Investment in City Areas) is an initiative of the European Commission and the EIB, a program enabling sustainable investments in urban areas. The program allows LGUs to obtain loans and guarantees on more favorable terms than banks, and they can implement projects under the PPP model. As part of the first JESSICA initiative from 2007–2013, the program operated in five regions in Poland and was used to grant loans [Osiecki, 2014]. The budget of the project in 2007–2013 was 1.11 billion PLN. Funds under the initiative are used for the purposes set out by the Regional Operational Programs (RPOs), including the

² The biggest issuers include: Warsaw, Cracow and Łódź.

development of urban and metropolitan regions, transport systems, environmental protection, as well as the development and innovation of SMEs.

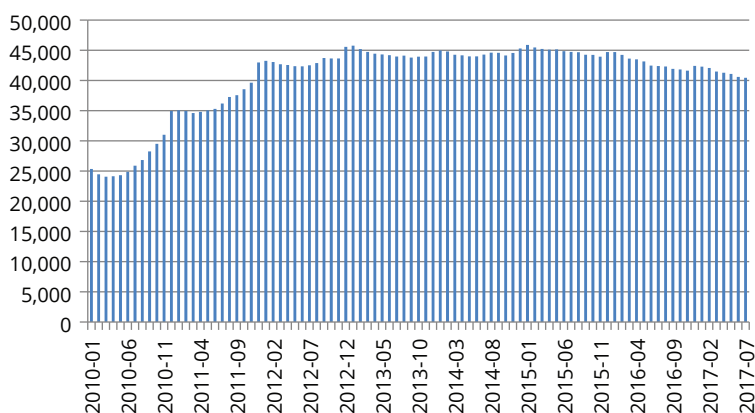
Figure 12.2. Municipal bond buyers in 2015



Source: Own study based on NBP data.

Another source of the EU funds from which urbanization projects can be financed is the Infrastructure and Environment Program, under which one finances mainly development of road infrastructure, investments in transport, energy, environmental protection, culture and health protection. The budget of the 2014–2020 program is equal to 242 billion PLN [UE, 2018].

Figure 12.3. Bank receivables from local government institutions in 2010–2017 (million PLN)



Source: Own study based on NBP data.

The role of bank loans is especially important when considering the private sources of financing urban development. Fig. 12.3 presents bank receivables from local government institutions in 2010–2017. During 2010–2012, the value of 25 billion PLN increased to over 45 billion PLN. In 2012–2017, the LGUs bank claims were relatively stable and fluctuated around 45 billion PLN.

City development projects predicted to extend over several years can be financed from syndicated loans. Cities use this source of financing primarily when the investment cannot be financed by a single bank. An increasing number of infrastructural projects is financed from syndicated loans, especially investments in transport infrastructure³. Although this market segment is continuing to develop in Poland, it is still small in comparison to Western European countries. In 2010–2017, it represented approx. 0.82–2.91% GDP⁴. Urban projects co-financed by the regional development banks EIB and EBRD constitute only a small part of this percentage⁵. Loans from regional development banks such as the European Investment Bank (EIB), the European Bank for Reconstruction and Development (EBRD) or Bank Gospodarstwa Krajowego (BGK) are as a whole more lucrative to LGU than commercial bank offers. Public development banks are able to offer enterprises more favorable financing than sources of commercial financing, due to the mission of these banks. Specialist banks are able to offer loans that are adapted to the specifics of financing investment projects. Loans granted by mortgage banks are also potential alternatives to traditional financing instruments for urban development projects.

Another available source of financing urbanization projects is leasing, which is currently gaining popularity in Poland. LGUs use this type of financing due to its lower cost compared to loans. Leasing costs are spread over time and unlike loans do not require additional collateral, because the assets used are not purchased by the lessee. Favorable tax regulations are an additional incentive to use leasing, and it is a beneficial financing option for LGUs with high debt ratios that prevent them from getting loans. By attaining leases, LGUs can diversify their financing methods, as well as their liability structures. Leasing companies claim that an increasing number of local government companies include this form of financing in public procurement. The growing interest of local self-service providers in leasing is also confirmed by the escalating number of tenders announced by institutions operating under the Public Procurement Law, which leasing companies take part in. The objects that are most

³ Bloomberg database, access date September 2017.

⁴ International Monetary Fund database, access date January 2018.

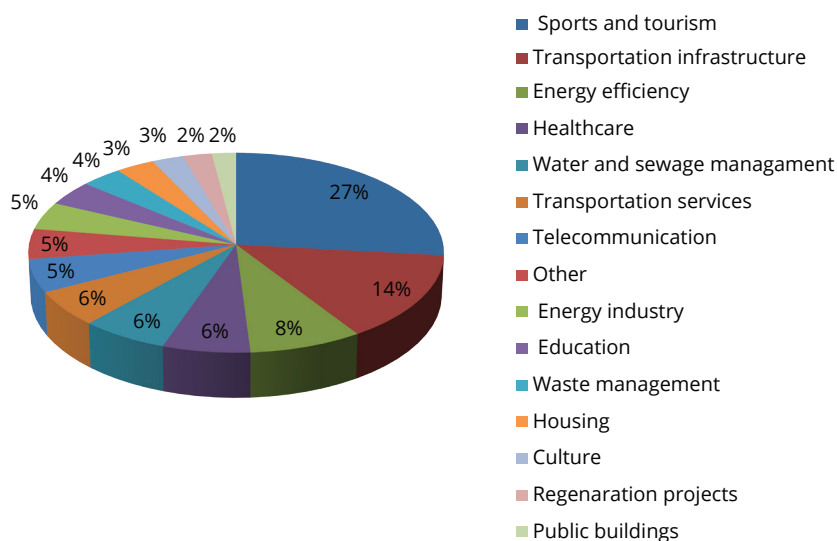
⁵ Bloomberg database, access date September 2017.

often leased are vehicles, municipal equipment and specialist equipment for healthcare facilities. [Ostrowska, 2012].

The PPP model is a way to finance city development in Poland. In 2009–2017, local governments concluded 105 out of 116 completed PPP contracts. The contracts were concluded directly or through related entities. Most of the contracts were signed by urban (35), rural (24) and urban-rural (15) municipalities [Korbus, 2017]. However, 75.5% of contracts at the investment stage were financed exclusively by private partners, 20% of contracts were financed partly from the EU and Treasury funds, and 6% was partly financed from the State Treasury as part of government programs [Korbus, 2017]. The importance of banking sector development for servicing this type of financing should be emphasized in the PPP model. The private entities included in contracts largely finance PPP from bank loans, similarly to other investments.

Figure 12.4 shows the sectoral structure of initiated PPP projects in 2009–2017. The data shows that sports and tourism projects (27%), transport infrastructure (14%) and energy efficiency (8%) attracted the most attention from private investors.

Figure 12.4. The sectoral structure of initiated PPP projects in 2009–2017



Source: Personal study based on data from the PPP Institute.

Finally, it is worth noting that the amendment to the implementation act came into force in September 2017, enabling local governments to create regional development funds and to utilize refinancing from the EU funds. These types of funds have so far functioned outside the legal framework. The act may enable creating new instruments

for financing urban projects, considering niches in financing regional projects e.g., difficulties in obtaining funds for long-term financing of investments or initial phases of innovation in the region.

Conclusions

In Poland, urbanization projects are financed mainly through traditional instruments from public funds: bank loans and PPP. The EU funds are also an important source. Cities do not use many innovative forms of financing, despite the development of the financial system and the potential availability of alternative instruments. This may be partly due to the fact that these instruments are relatively unknown in our country. It should be noted that there are certain limitations in the use of alternative instruments, such as the relatively low degree of development of some segments of the financial market and the lack of regional institutions enabling the use of non-traditional instruments. From the perspective of supporting urbanization processes, the development of the banking sector in Poland is essential. Leasing is a less expensive alternative to bank loans, and due to the development of this market in Poland and the interest of leasing companies in the projects of LGUs, it is a valid option of obtaining additional sources of financing.

The costs and benefits of individual solutions should be taken into consideration when choosing financing methods. Commercial bank loans are usually the most expensive instrument, with specialized development banks offering more favorable conditions. The reduction of loan costs is also possible through the use of the EU funds, programs and participation in PPPs. Financing costs can also be reduced by issuing bonds; this form also uses simpler procedures than obtaining a loan. For some projects, leasing may be a satisfactory option. The aforementioned new legal conditions lead us to expect that the creation of regional development funds, as well as the use of refinancing from the EU funds within them may prove to be additional, beneficial instruments for financing urban projects.

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Smart City as a Form of Increasing Competitiveness of Cities

Ewelina Szczech-Pietkiewicz

Introduction

The city's development strategy in line with the smart city concept is currently being intensively exploited. In part, this can be attributed to the size of the market created by smart cities [Frost, Sullivan, 2014]¹, and partly to the usefulness of this type of initiatives in the promotion of places (city branding). Despite the lack of a common understanding of the term and the generally accepted operationalization of the concept, smart city is a popular idea both for the promotion of the city and for its actual development [Hollands, 2008]. This text will briefly discuss the understanding of the smart city term, approaches to the implementation of such a city development strategy and its usefulness for increasing the competitiveness of the urban area.

Analysis of the Smart City Definition

The smart city concept, although popular and not new (it has been used since the 90s of the twentieth century), is still a subject to a great conceptual blur. This is facilitated by the fact that smart city programs are constantly evolving with the development of technology and the fact that they are used in at least two, quite different areas: "hard" – related to technology, communication, infrastructure, and "soft" – connected, among others, with the creation of the social capital, communities, governance, education.

¹ The study estimates that the global market for smart cities in 2020 will be worth 1.57 trillion USD, considering the entire network of solutions in the fields of energy, infrastructure, transport, construction, security, governance, education and health.

First definitions of smart cities, created in the 1990s, stressed the role of communication and information technologies (ICT) and modern infrastructure in the city. Also, now this trend is visible due to two reasons:

- 1) very fast development of technologies that enable the digitization of many aspects of the city's impact (e.g., big data, Internet of Things – IoT, intelligent buildings), favors the perception of smart cities only as the territory of networked systems;
- 2) the approach of companies offering smart city solutions (e.g., IBM, Cisco Systems, Siemens AG) emphasizes technologies with little consideration of “soft” factors.

Understanding smart city as a city where the central role is attributed to technology is the effect of the possibility of using wireless sensors, miniaturization of technology, the creation of intelligent wireless networks, systems for comprehensive acquisition and processing information, including large databases (big data). These innovations cause the city to be perceived as an extension or sum of individual, separate spaces e.g., a smart building, on a larger scale.

Company-driven smart city understanding is criticized for the lack of comprehensive coverage of all city functions. As a result, one designs cities such as Songdo (South Korea) or Masdar City (United Arab Emirates), which do not allow the diverse use of urban space, their bottom-up development and consequently remain empty and undeveloped.

In the contemporary literature, however, a more comprehensive definition of smart city is indicated more often i.e., taking into account the quality of life, social capital, social innovations, culture and education. Therefore, it is emphasized that the use of technology is not an end in itself, but rather is supposed to lead to a higher standard of living, increased prosperity, balanced growth or even happiness [Batty et al., 2012; Ballas, 2013]. Examples of such an approach to smart city are represented by the following definitions:

Caragliu et al. [2011]: *"The city is smart when investments in human and social capital as well as in traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and high quality of life, with a wise management of natural resources, through participatory governance"*.

Bakici et al. [2013]: *"Smart cities can be briefly described as those cities that utilize information and communication technologies with the aim to increase the life quality of their inhabitants while providing sustainable development"*.

The definition blur of the smart city concept is further complicated by the fact that there are other similar terms in the literature, such as: intelligent cities, knowledge-based cities, technological cities, digital cities, virtual cities. Usually, these concepts are less capacious than a smart city because they do not contain a social component and references to the development of residents and improvement of the standard of

living as the proper goal of a smart city strategy [Caragliu et al., 2011; Deakin, Wear, 2011; Townsend, 2013].

Smart City Dimensions – Operationalization of the Concept

The method described in one of the first comprehensive studies on the subject, report prepared by a team of prof. R. Giffinger [Giffinger et al., 2007], can be considered as an introduction to the operationalization of the smart city concept. According to this concept, smart city consists of six areas, further divided into determinants (see Table 13.1).

Table 13.1. Operationalization of the smart city concept

SMART ECONOMY (competitiveness)	SMART PEOPLE (social and human capital)
The spirit of innovativeness Entrepreneurship Economic image and trademarks Productivity Flexibility of the labor market International rooting Ability to change	Level of qualification Level of use of lifelong learning Social and ethnic diversity Flexibility Creativity Openness, cosmopolitan character Participation in public life
SMART GOVERNANCE (participation)	SMART MOBILITY (transport and ICT)
Participation in making decisions Public and social services Transparency of governance Political strategies	Local transport accessibility International availability Availability of ICT infrastructure Sustainable, innovative and safe transport systems
SMART ENVIRONMENT (natural resources)	SMART LIVING (quality of living)
The attractiveness of natural conditions Contamination Environmental protection Sustainable management of resources	Cultural facilities Health conditions Personal safety Quality of housing Educational facilities Tourist attractiveness Social cohesion

Source: Giffinger et al. [2007, p. 12].

Operationalization of the smart city concept, presented in Table 13.1 is one of the first comprehensive approaches to the issue and the proposal for its measurement. During the course of the discussion there were other proposals, where more spheres of influence of the smart city were added and their character was changed [Eger, 2009; Barrionuevo et al., 2012; Chourabi et al., 2012]. An interesting topic in these considerations is the criticism of including the quality of life as an element of smart city assessment [Shapiro, 2006]. It results from the conviction that all activities undertaken

in the spirit of smart city programs should aim at raising the standard of living of residents, so it is a goal rather than another element of strategy.

A slightly different approach to the dimensions of the smart city can be found in the publication by Nam and Pardo [2011]. Authors share the spheres of the smart city impact not in accordance with the functions and elements of the city (e.g., economy, transport, education, built environment etc.), but rather taking into account the city-forming and community-forming mechanisms. These are therefore: economic-social-political issues of the city, economic-technical-social issues of the environment, connections, instrumentalization, integration, use and innovations. This approach allows one to identify channels in which it is possible to use technology to improve prosperity in the city, while placing residents at the center of the process.

The methods of assessing the implementation of the smart city concept differ significantly, not only in terms of the evaluated dimensions, but also in the nature of the assessment itself (qualitative – quantitative). The most popular methods take the form of rankings, which can be explained by their usefulness in the promotion of cities. It is possible to indicate here, for example, the ranking created on the basis of the previously mentioned operationalization of the smart city concept (see Table 13.1). A more advanced version of the quantitative comparison was proposed by Lombardi et al. [2012] in a study that used the extended triple helix model (the fourth element of the helix is civil society). Such lists allow easy comparisons between cities, but they have their limitations. First of all, they do not take into account the individual conditions of the city and the expectations of its stakeholders. In addition, the data used in the rankings are not always comparable². The challenge was addressed by Lazariou and Roscia [2012] who created a smart city index, where indicators have assigned weights, according to expert knowledge. However, the subjectivity of the weights reduces the possibility of comparing results between cities.

An interesting approach to assessing city involvement in the implementation of the smart city concept is proposed by Angelidou [2016]. The author assumes that smart city strategies can be divided into four groups, depending on the factor that determines the city's position to a large extent. These are: 1) technology, 2) human and social capital, 3) development of the enterprise sector, 4) participation in city networks. The analysis and evaluation of the city's development is carried out in each of the four groups, based on the indicators characterizing them. In this study, four cities were analyzed: Amsterdam, Barcelona, London and Stockholm, pointing to the

² These reservations apply to all comparative studies conducted on cities – their complexity and uniqueness cause that the majority of research takes the form of case studies, which is the specificity of urban studies.

advantages of each city in specific areas (London – education, Barcelona – participation in networks, technologies – all cities).

Generations of Smart City Programs

Along with the development of knowledge about smart cities, one can speak – mainly on the basis of observations of effectively implemented development strategies – about the evolution or types of smart city programs. These programs can be divided into three generations:

Smart city 1.0 – smart solutions are offered by suppliers of goods and services. Usually, these solutions concern the digitization of existing products. An important feature of this type of programs is that they are implemented due to the impulse not so much from the market as directly from the supplier (seller) of technology. The solutions are also responsive i.e., they address the already existing problem. As a result of the mainly first feature, the 1.0 generation programs have a limited impact on the quality of life of the city residents – they can affect it (but in a random way) e.g., by improving the standard of living through the availability of information on the frequency of public transport courses. The first generation of smart city was characteristic of early programs and was usually the result of attempts to increase the city's competitiveness. An example of such a trial is also the creation of the entire smart city i.e., Songdo in Korea (Songdo International Business District). Unfortunately, it has been designed to maximize the use of modern technologies and their network connections, but while planning one did not take into account more "soft" factors, such as social capital and the role of space in its formation. The result of this approach is a model, although almost empty, city.

Smart city 2.0 – in the second generation of smart city programs, the initiative is taken by city management. Suppliers of services or goods in this case respond to the demand directed by the city itself. This has the advantage over 1.0 programs that one can take into account other goals than digitalization itself, for example related to quality of life, infrastructure other than transport one or cleaning the city. In addition, the perspective of the entire city, which is at the disposal of the policy-makers, allows one to see connections and mechanisms linking individual elements of the urban system. Barcelona is an example of a city where the city management is the initiator of smart city programs. It implements more than 20 programs and over 100 projects as part of the "Smart cities 2.0 Barcelona" campaign. The projects concern, for example, access to wireless Internet in public spaces, access to city data by companies and citizens, public transport, lighting and promotion of electric vehicles. In addition,

city authorities are actively involved in popularizing smart city concept for improving quality of life, through the organization of Smart City Expo and the City Protocol initiative.

Smart city 3.0 – third generation of smart city uses the most currently observed trends in the economy. These are programs "from resident to resident". The fundamental assumption behind this type of action concerns the central role of people in the development of the city – the city is not only created for people, but also by people. Therefore, this generation includes initiatives such as participatory budget, where the residents decide on the type of projects financed from the city budget. And often they are investors in the smart city of the third generation. The concept of the Internet of Things (IoT) is also strongly used in the third-generation smart city. It consists of the use of everyday devices (existing physically) equipped with elements enabling the collection of data, connected in a network, thanks to which these data are used cross-sectionally. An example of the implementation of the third generation of smart city programs are initiatives taken in Medellin, Colombia (in addition, it is a reminder that smart city is not a concept reserved for developed economies only). The initiatives implemented in Medellin mainly concern the revitalization of the most demanding areas in the city using the bottom-up approach i.e., involving residents in transport projects (queue, electric stairs) and new technologies (schools and libraries). Currently, these random projects are being expanded and the entire district is being created, which is to be the center of innovation and entrepreneurship (Ruta N), where the residents take an active part in the creation of this project.

Despite the fact that the types of smart city strategies in the above classification are presented in an evolutionary form, it should be noted that they do not have to be implemented in cities in this order or even follow one another. This model – like all – is a simplification of reality and specific generations of smart city concepts do not always happen in an evolutionary way. Observation of smart city projects in Poland results in such a conclusion, as the vast majority of initiatives meets the requirements of smart city 1.0. The most popular intelligent solution in Polish cities is the ITS (intelligent transportation system). According to the definition of the European Union³, ITS is a system in which information and communication technologies are used in the field of road transport, including infrastructure, vehicles and users, and in traffic management, as well as for combining road traffic with other forms of transport. ITS system is also used to improve the efficiency of transport e.g., in collective transport. In 2013, this market was worth over 1 billion EUR with the forecast of doubling by 2020 [Think

³ Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on a framework for the deployment of intelligent transport systems in the field of road transport and interfaces with other modes of transport.

Tank, 2013]. An additional incentive to implement ITS solutions is the possibility of its co-financing from the European Union funds. ITS systems, although very useful in cities, fully meet the requirements of the first-generation solutions. They are usually created on the initiative of suppliers and are a rather random answer to the challenges of urban transport.

Smart meters are another popular smart solution used in Polish cities. Currently, about 1 million of them are installed, which accounts for around 7% of the total number of meters. The important thing is that they are only a part of the smart grid, so they do not constitute the whole system. It is one of the reasons why smart meters are also a good example of solutions typical of the first generation of smart cities.

The cited examples indicate the prevalence of smart city 1.0 solutions in Polish cities. Nevertheless, one may also note initiatives corresponding to the smart city features of the second generation, where local administrations engage in projects that use advanced technologies to improve the quality of life in the city. These are, for example, start-up initiatives arranged by cities (e.g., Startup HUB Warsaw – urban acceleration program), clusters (Gamedev cluster in Lodz, Creativro cluster in Wroclaw), opening of municipal data collections.

The civic urban budgets can be classified mainly as third generation smart city initiatives on the Polish market. Due to the legal structure of local self-government in Poland, it is difficult to find such areas of governing the city, where the residents' initiative could be fully utilized.

Conclusions

The city's competitiveness is its ability to transform social, economic, environmental and institutional potential into higher than other cities attractiveness for residents and entrepreneurs. In the analysis of competitiveness at the city level, it is essential that at least two groups are involved in the process: residents and the private sector (public sector and research units can also be added, in line with the four-helix concept). This is reflected in the operationalization of the definition of urban competitiveness, where objectives are expressed as productivity and quality of life.

Therefore, it seems that the implementation of the smart city concept may contribute to increasing city's competitiveness. Nevertheless, with some reservations. The basic risk of basing the city's competitiveness on the smart city model is connected to limiting the programs to the technological dimension. It is difficult then to get an improvement in the field of living standards or the improvement is short-lived. Excessive attachment to technology as a basic competitive advantage also causes the

threat of digital divide, where some of the city's residents are technologically excluded. Implementing the smart city concept in such a situation can only increase this gap. Moreover, even if smart city programs are prepared and implemented in accordance with more advanced knowledge i.e., they use the potential of residents' participation, appreciate the role of social capital, take into account changing social expectations, then also the high competitiveness of the city is not unconditional. The risk is associated with the temptation to use effective strategies in other cities. One-size-fits-all programs or the transfer of good practices in the case of cities should be implemented in a very cautious manner due to the uniqueness of the conditions of each city and the complexity of the urban system. In the case of strategy of raising competitiveness, this process is additionally complicated by the need to confront the strategy with the expectations of the city's stakeholders – mainly residents and enterprises.

It is worth noting, however, that despite these reservations, cities that hold leading positions in smart city rankings often achieve high scores in compilations evaluating competitiveness at the same time⁴. However, these are mainly cities where smart city programs of the second and third generation are implemented, with a broad definition of smart economy and smart society.

Competitiveness and smart city strategies can therefore be complementary, especially due to convergent goals. Nevertheless, to achieve this, smart city should be understood broadly and in conjunction with the development expectations of the city's stakeholders.

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⁴ Comparison of the Global Power City Index (competitiveness) and IESE Cities in Motion Index (smart city) rankings brings the following results: London has reached 1st and 2nd place respectively, Amsterdam – 8th and 10th, Toronto – 18th and 11th.

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The Role of Urban Spaces in Creating Innovations

Marta Mackiewicz

Introduction

Urban spaces are a favorable environment for creating innovations because they concentrate human, financial and organizational resources [Castells, 2007]. Schumpeter [1939] has already drawn attention to better conditions for the development of innovations in growth centers, such as cities. He noticed that economic progress depends to a large extent on population centers and on facilitations for business activities organized by public policy.

The ability to create innovations and influence technical progress is the basis for the emergence of a metropolis [Castells, 1982]. As Olechnicka and Płoszaj note, in the case of metropolis and innovativeness, we are dealing with interdependence. On the one hand, the city could not be transformed into a metropolis without transport innovations (such as subway), telecommunications (e.g. Internet), in the construction industry (high-rise buildings), and on the other hand – innovations could not arise without a specific environment that is produced by metropolis, thanks to the fact that it concentrates human and scientific potential and production and service companies connected with high technologies [Olechnicka, Płoszaj, 2009 after: Olechnicka et al., 2010].

In Poland, as in other countries, the development potential measured, for example, by the share of companies with the highest level of technological advancement in the total number of business entities, is concentrated in the largest cities (mainly centers of voivodships). Over half of high technology enterprises is located in these centers [Dej, 2016]. Also, the vast majority of technology parks operates in cities with a population above 100,000. This corresponds to the location of research centers in Poland, and above all – the universities.

This chapter attempts to answer the question what the role of urban spaces in creating innovation is and whether Polish cities create conditions for their development. To this end, an analysis (based on the literature) of factors influencing the development

of innovation in cities was carried out. Next, examples of how changes in the urban space of Polish cities can affect the development of innovation (individual in-depth interviews in selected city offices) were presented. An analysis of projects supported by the EU funds implemented in the largest cities was also conducted. The aim was to assess the extent to which cities can attract innovative ideas and activities, which are reflected in projects belonging to the categories of undertakings supporting innovativeness and entrepreneurship (carried out by various entities and institutions – public and private). We also used the results of the survey conducted among project promoters – entities implementing projects supported by the EU funds as part of operational programs for the years 2007–2013¹.

An important limitation for the study is the lack of statistical data from the area of innovativeness on the city level (data are published at NUTS 2 level), which makes it impossible to trace indicators showing the level of innovativeness in Polish cities.

Functions of the Cities and Their Role in Creating Innovations

It is worth mentioning that cities have many functions that are subject to changes resulting from global trends. They are classified into groups; one of the frequently quoted classifications of metropolitan functions [Llewelyn-Davies, 1996] distinguishes control and regulatory functions, services: financial and for business, creative and cultural as well as tourism. In recent years, classifications have included more and more references to the functions of knowledge and innovation. For example, among the metropolitan functions developed in two projects of the ESPON 1.1.1 [2004] and ESPON 1.4.3 [2006] programs, one distinguished knowledge-related functions, including the locations of important universities and research institutes. Also, Korcelli-Olejniczak [2004] distinguishes knowledge and innovation among the five key functions of metropolitan cities.

The presence of infrastructure – an appropriate climate for entrepreneurship, knowledge environment – favors the influx of residents, which leads to spatial and social polarization. According to Sassen [1992], metropolises have become key points of global economy management; they are not only places where production is located and large sales markets, but also the main places where high-tech enterprises and innovative fields are created. Castells [2007] noted that the innovative environment is characterized

¹ The database was collected for the purposes of the study “The impact of cohesion policy on urban development in the 2007–2013 perspective” (“Wpływ polityki spójności na rozwój miast w perspektywie 2007–2013”) carried out by Ecorys Polska on behalf of the Ministry of Development.

by the ability to create synergies i.e., the added value resulting not from the cumulative effect of elements present in the environment, but from their interactions.

Creative City as the Environment for the Development of Innovations

It is important to point out that creative people whose concentration in one place turns cities into talent clusters, are the driving force of economic growth. Such cities are growing faster than other areas because they attract qualified professionals, people capable of creating new values and whose knowledge is used by companies in creative processes.

The creative cities term describes urban complexes in which cultural activities are an integral part of social and economic life. Cities of this type are characterized not only by extensive cultural infrastructure, but also by a high percentage of employed in the creative industries. Creative cities are places of experimentation and innovativeness, where new ideas are born.

What is more, a creative atmosphere is necessary for the enrichment of the city, which attracts human capital, which in turn is followed by financial capital. Knowledge and creativity displace the location factors described in the literature, such as: natural resources and physical labor [Landry, 2000]. These processes are the result of changes that occurred in the 20th century in the global economy. First, they have reduced the role of industry in favor of the services sector. Second, the technologies used have changed. The obvious consequence was the decline in the importance of the proximity of natural resources as a factor considered when choosing the location of companies. Until relatively recently, empirical research, conducted among companies operating on the European market, showed that the most important location factors considered by the entrepreneurs were: proximity to the market, infrastructure – roads and rail links, proximity of airports, availability and quality of workforce and financial infrastructure.

Economies of scale and externalities related to the development of agglomerations are currently of the greatest importance in gathering knowledge and technologies. The desired factor of production is knowledge – centers with large research and scientific facilities develop best. The culture industry is increasingly being indicated as a significant factor determining the development of cities. It is a self-propelling mechanism – the creative potential is the largest in the vicinity of large urban centers, which are characterized by a high level of technological development, and companies choosing these areas as their headquarters increase their activity, further stimulating development.

Urban areas are also centers of diffusion of innovation, mainly due to the fact that they were able to create appropriate infrastructural and organizational conditions for these processes [Węclawowicz et al., 2010]. The dissemination of knowledge stimulates the development of cities – there is a constant improvement of the possessed technology, thanks to the gathered knowledge and the accumulation of human capital in agglomerations. This accumulation of high-quality human capital is typical of creative cities. The areas more privileged due to their existing resources, which have already achieved a high level of income, can invest more in research and technological development. Such places also attract professionals who are able to create innovations.

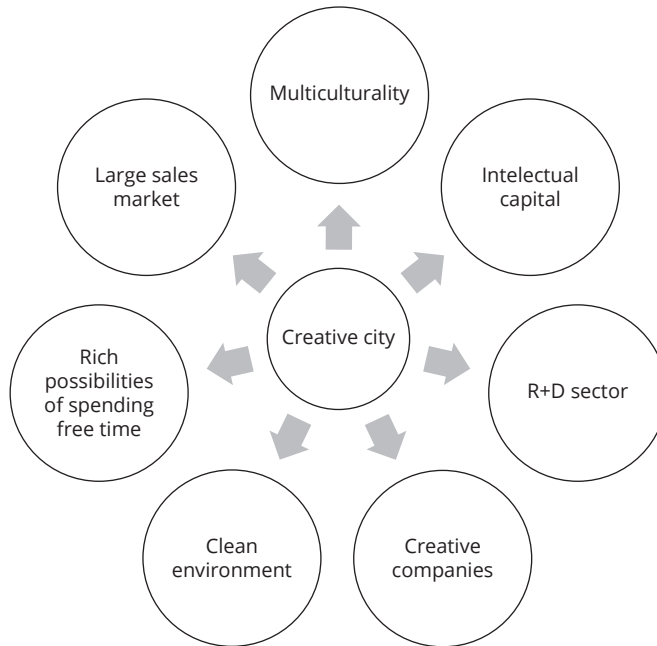
In addition to economic factors, social norms and habits, which can positively or negatively affect development, are also important. It is not only Landry who invokes in this context such features of society as tolerance, openness or trust. Their importance has been already emphasized by Putnam [1993], Storper [1997], Cooke and Morgan [1998] and Florida [2005], who have looked at the creative class (although Florida presented it in a slightly different context). Florida pays special attention to the role of cities and metropolises. They are the key clusters of the creative class from the perspective of creative sector development. Geographic proximity, access to infrastructure, the possibility of establishing contacts and building clusters stimulate the creation of creative districts and the development of the creative sector in large cities. According to Florida, successful cities have a set of three traits, referred to as 3T: technology, talent and tolerance². Tolerance is a factor that allows the mixing of cultures and lifestyles – there is a field for mutual inspiration. Each of them is a necessary condition to attract creative people. Florida also recognizes the state of natural environment as an important feature of the city. Pollution-free environment is a source of competitive advantage and a higher quality of life of the city's residents

A characteristic feature of creative industries is that they need people – educated and constantly improving their skills. In turn, the features of creative cities include uniqueness and authenticity, coexistence of history and modernity. An important feature is the creative atmosphere created when the city offers many opportunities to participate in artistic and sport events and in those combining various areas of social life. The city is perceived then as the center of events – a place to be, to experience new things, meet interesting people and, above all, draw inspiration. Creative cities offer the opportunity to develop and learn in many areas.

² Tolerance is understood as openness, diversity and a friendly attitude towards people of different nationalities, religions and lifestyles. Places considered to be the most creative occupy a high position in the author's tolerance indicators (Bohemian Index and Gay Index). Talent is measured by the number of residents with a bachelor's degree and higher, while technology as a feature of the city is a function of innovation and concentration in the region of high-tech enterprises.

Thus, the level of development of the creative industry and its significance for the city's economic development is the result of the occurrence of many factors that are presented in Figure 14.1. They decide to a large extent on the quality of urban spaces.

Figure 14.1. Features of the creative city



Source: Own study.

Functions of the Creative City for the Development of Innovations

The potential of cities in the field of innovation development often depends on the possibility of generating synergy between knowledge and innovation functions and political and economic functions, cultural center functions as well as openness and social diversity [Kovacs et al., 2007]. University centers characterized by a variety of functions and local communities are a good place for the development of innovation [Florida, 2003].

Innovation in the creative sector has its source in the search for innovative solutions, not necessarily within a specific industry, but at the interface between various sectors. It is the interaction between employees of various industries (e.g. entertainment and IT, industrial design and art), departments (e.g. marketing and production), professions

or social groups, which is the main assumption for the development of innovative attitudes in the creative sector [Wilson, 2010]. Research shows that companies from the creative sector are among the most innovative, both thanks to original products and the ability to integrate various industries and sectors [Mueller et al., 2008]. Innovation in the creative sector is based on an interdisciplinary approach, dynamic exchange of experience, interpenetration of many approaches and strategies, and the search for innovative solutions is the main mechanism explaining both the development of the sector and the creation of networks and clusters [Stam et al., 2008].

The basic functions of a creative city include creating conditions for attracting and retaining creative people, creating conditions for the functioning of enterprises, and generating demand for creative sector's services. Another feature involves creating conditions for the spread of new ideas, mutual inspiration. Space creation concerns two dimensions: creating a space that is friendly to residents, and thus attractive for business investments and the formation of a social space influenced by local communities and their diversity.

An additional benefit of creating a tolerant social space is the activation of excluded communities and creating a sense of satisfaction with the local environment. Co-creation is a noticeable trend – an approach requiring co-operation, effective communication, exchange of ideas and experiences as key factors determining success in business. That is why more and more clusters of companies from the creative sector are emerging. The co-operation between companies, aimed at developing new solutions, is blurring the boundaries between them and contributes to the interpenetration of individual industries [Searle, 2011].

However, a spatial proximity alone is not a sufficient factor to organize interactive learning networks. The experience shows that they must be actively built through the conscious efforts of companies and public institutions. The examples of such activities are presented in the further part of the study.

The Influence of Urban Spaces on the Development of Innovations in Polish Cities

The examples described in the following section demonstrate how improving urban space affects creativity and innovation. It was based on qualitative data gathered from interviews³ and analysis of documents and websites.

³ The interviews were conducted in July 2017 with city officials for the purpose of the study “The impact of cohesion policy on urban development in the 2007–2013 perspective” (“Wpływ polityki spójności na rozwój miast w perspektywie 2007–2013”).

The way to improve the quality of urban spaces is primarily their revitalization. In many Polish cities, one has revitalized parts of districts or urban spaces that were accumulating social and economic problems, or those that required change in order to improve the attractiveness of the city. Based on the interviews, it can be stated that regardless of the causes or needs underlying the revitalization, changes in the urban space usually yield effects exceeding expectations. An example could be the revitalization of post-industrial areas, such as the areas of the Gliwice coal mines (in Gliwice) or Guido in Zabrze. The restoration of spatial order and the use of the potential of the unused excavations of the historic Guido Coal Mine contributed to the improvement of the tourist attractiveness of the city. Tourists have the option of going down (with a typical mining elevator) to points located deepest below the surface of the earth, made available for sightseeing. The 320-meter below the surface zone houses a pub, a concert hall and multimedia conference rooms, where many world-class events take place every year. On the closer to the surface levels, cultural events take place and temporary exhibitions are also organized. Around the mine emerged restaurants, museum, hotels, places where the workshops are run. Also in Gliwice, new functions have been given to the buildings of the mine; an entrepreneurship incubator was established, where the Gliwice School of Entrepreneurship and the Language College are located, which are part of the Silesian University of Technology. This promotes the transfer of knowledge and stimulates innovativeness. Investment plots for innovative companies from the IT sector have been marked out in the revitalized area. The project was successful because the land has been developed, the created space is used by companies that attract further investments⁴. The zone of Nowe Gliwice was initially financed from public funds, which were intended mainly for the preparation of investment areas; however, further development was already financed from private funds. In new companies there is an innovative approach to management and care for employees is visible – e.g. through the construction of kindergartens and playgrounds for children. Perceptible changes include the improvement of the attractiveness of the place, which concentrates the residents, offers many opportunities to spend free time, such as workshops for children and adults, sports activities, etc.

An example of revitalization that contributes to the improvement of innovation in the city is the renewal of the Hala Koszyki in Warsaw, where a coworking space has been designed, intended especially for technological start-up companies. Mindspace is responsible for organizing this center in the Hala Koszyki. It also creates network

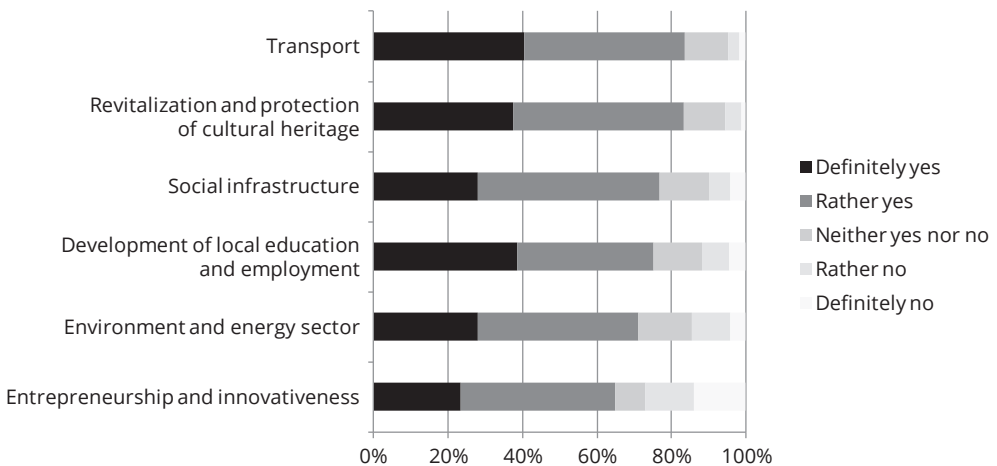
⁴ For example, Future Processing company, which works with the largest global companies; Cama Soft, which prepares software for the Ministry of Foreign Affairs and many more.

of such spaces in Berlin, Hamburg, Munich and Tel Aviv, which gives access to the international business community.

Hala Koszyki is an example of a place that thanks to the involvement of architects and interior designers gained the reputation of a space characterized by sophisticated design and conducive to creative activities. It is a space that connects business with art and new technologies with artistic, social and culinary life. The hall's revitalization was supported by the JESSICA initiative, implemented under the Regional Operational Program of the Mazowieckie Voivodeship for the years 2007–2013.

A lot of investments have also been made in Warsaw, which have had a comprehensive impact on the urban space and have contributed to the development of innovation. One of the examples given by representatives of the city office is the impact of the construction of the subway on the revitalization of Praga city district: "If it was not for the subway, it would not be possible to break the stereotype of the lack of attractiveness of the Praga district. CD Projekt, one of the few global Polish companies, is located in Praga. If it were not for the two things, namely the subway and CD Projekt, Google Campus would have not been created".

Figure 14.2. The distribution of answers to the question whether the project has contributed to the increase of the competitiveness of the city (according to the areas covered by the projects)



$N = 1,803$.

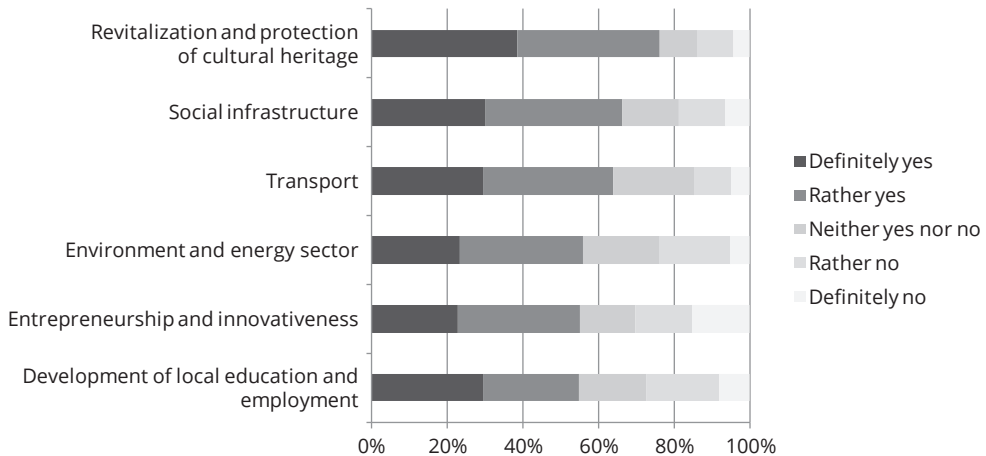
Answers are given in %.

Source: Own study based on a survey conducted among project promoters implementing projects supported under operational programs in 2007–2013.

The fact that revitalization activities (i.e. those that have the greatest impact on urban space) have an impact on the city's competitiveness is evidenced by the results

of a quantitative study (Figures 14.2; 14.3) carried out among entities implementing projects supported under operational programs in 2007–2013 in the cities with population above 100,000⁵.

Figure 14.3. The distribution of answers to the question whether the project has contributed to the increase of the attractiveness of the city (according to the areas covered by the projects)



N = 1,803.

Answers are given in %.

Source: Own study based on a survey conducted among project promoters implementing projects supported under operational programs in 2007–2013.

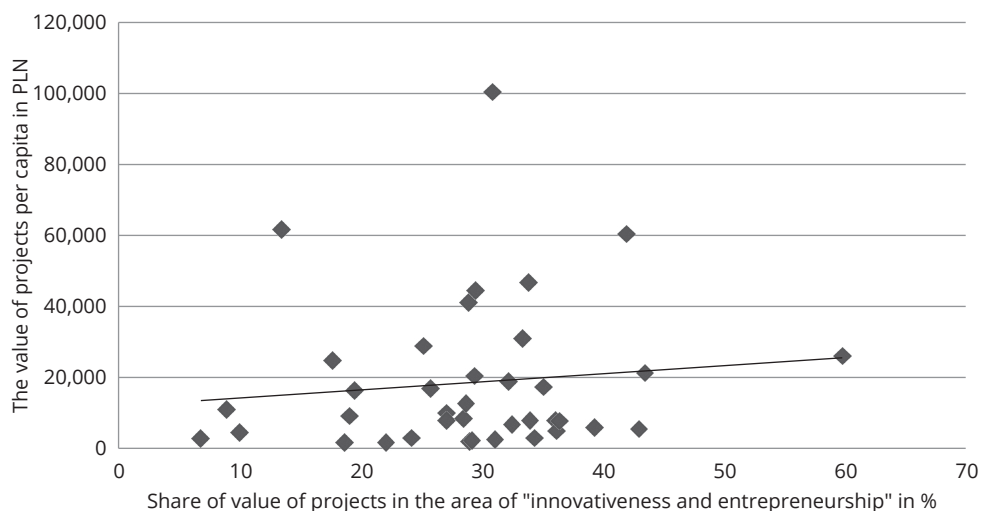
A certain picture of how cities affect innovation is given by the number of projects that can be classified into the area of innovation and entrepreneurship, implemented in the largest cities in Poland (with a population over 100,000). In the years 2007–2013, i.e. in the previous programming horizon of the EU funds, over 18.2 thousand projects were completed with a total value of approximately 45,340.7 million PLN, which accounted for 29% of the value of all projects implemented in the largest cities⁶. This is the second group in terms of value after transport projects (which are particularly capital-intensive – they accounted for 43% of the value of projects) and the first – in terms of the number of projects. The share of expenditures incurred for projects in the area of innovation and entrepreneurship to a small extent depends on the amount of expenditures per capita that were made in cities. However, apart from

⁵ The study was conducted in July 2017 under the project *The impact of cohesion policy on urban development in the 2007–2013 perspective (Wpływ polityki spójności na rozwój miast w perspektywie 2007–2013)*. The database has been made available for the purposes of this study by the Ministry of Development.

⁶ Own calculations based on the KSI SIMIK 2007–2013 database as of April 30, 2017.

Warsaw, which distorts the results, it can be seen that the higher the value of projects is, the higher the share of expenditures on innovativeness and entrepreneurship is (Figure 14.4). It varies from 6.8% in Wałbrzych to 59.8% in Bielsko Biała.

Figure 14.4. Share of value of projects in the area of innovativeness and entrepreneurship and the value of projects per capita



Source: Own study based on KSI SIMIK 2007–2013 as of September 30, 2017.

Conclusions

The conducted analysis shows that cities play an important role in creating innovation. The agglomeration benefits are conducive to economic links between companies and on the producer-client line, which improves efficiency in enterprises and increases their innovativeness. Cities concentrate financial and organizational resources, companies with the highest level of technological advancement and scientific units. Due to the existing resources, cities also attract qualified human capital, capable of creating innovation. As a result, there are clusters of talent and creative potential. Access to infrastructure, the ability to make contacts and create networks stimulate the emergence of creative neighborhoods in cities, which are a convenient environment for developing ideas and for experimenting.

The level of development of the creative industry and its significance for innovation in cities is a resultant of many factors described in this chapter. With regard to Polish cities, it is difficult to apply the indicators adopted by Florida, describing the characteristics of a creative city and relating to 3T: technology, talent and tolerance. As it was mentioned

at the beginning of the chapter, the limit of the research is an insufficient availability of comparable indicators for all cities in Poland, in particular with regard to: technology (statistical data are available at NUTS level 2), and tolerance (understood as openness to different attitudes, cultures, denominational diversity, etc.).

However, it is difficult to expect a large cultural diversity in Polish cities – even the largest cities have a homogeneous character, which is not conducive to the development of the creative sector. For this reason, the local government should play a greater role (for example by placing orders with the creative sector). Cities are the organizers or sponsors of festivals, concerts and events. They also order architectural projects and advertisements. It is also necessary to pay more attention by local government authorities to create an attractive space for residents, increase their participation in cultural events as well as create links between various types of institutions and individuals with research and education institutions.

The mentioned homogeneity concerns the society and cultural conditions, and not urban spaces – because the cities are strongly diverse inside. Unattractive districts (both for business and residents) co-exist in them with creative or potentially creative districts. The factors determining this condition could be the subject of future research. Within its framework, it would also be worth paying attention to what conditions must be met in order to make the districts, perceived as worse, develop their potential (i.e. to increase the settlement attractiveness for residents and investors and improve the image).

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Financing Smart Cities Projects from the European Union Framework Programs FP7 and H2020

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Introduction

Cities should be perceived as centers providing conditions for the implementation of innovative solutions within the framework of various subsystems, which are the factors of sustainable development. One of the concepts that achieves the objectives of sustainable development of urban centers is the concept of a smart city adopting an innovative, systemic approach in solving the complex issues of such development and supporting the expectations of stakeholders.

The use of the smart city concept requires, among others, raising funds, both from private and public sources. One of the significant sources of financing projects are European Union programs.

In this context, the purpose of this chapter is to present the concept of a smart city based on literature review. Another objective is to present the operationalization of this concept in the following European Union programs: FP7 and H2020 (Horizon 2020 [EC, 2016]), along with an analysis of financing smart city projects in both programs, including major subjects/funding areas in completed projects and in cross-section of beneficiary countries.

The empirical part, concerning the level of financing of smart cities projects from the funds of FP7 program and H2020, was developed on the basis of primary data obtained from the National Contact Point for Research Programs of the European Union.

Smart City Concept

In accordance with the concept, smart city is a creative, sustainable city in which the quality of life is improved, the environment becomes more friendly and the prospects of economic development are better [Lee et al., 2014, quoted in Czupich et al., 2016]. Its distinguishing feature is intelligence, which can be understood as the sum of various improvements regarding the functioning of city's infrastructure and resources, as well as public services [cf. Czupich et al., 2016].

Within the framework of the smart city concept, six main areas characterizing the intelligent and sustainable development of the city were identified in the literature. These are:

1. An efficient (smart) economy, which is described by the following features: entrepreneurship, innovation, technological advancement, introduction of new business models, flexibility of labor market and economic processes conducive to the growth of competitiveness; solutions obtained, among others, thanks to the use of modern information and communications technologies (ICT); solutions conducive to shaping interorganizational relations on a local and international scale, resulting in an efficient exchange of goods, services and knowledge.
2. Efficient communication/high mobility (smart mobility) as a result of high availability of modern information and communications technologies and integrated intermodal transport systems (and more broadly – logistic systems) that are environmentally friendly (use clean energy sources), which is conducive to shortening the time of transport, commute/travel and lowering costs and energy.
3. Smart environment: applying the principles of sustainable development in the use of natural resources; innovations aimed at reducing the consumption of materials and energy, increasing the use of renewable, low-emission energy sources; system solutions for reducing environmental damage; the use of ICT for monitoring and control of energy networks, water supply networks, street lighting and public service facilities as well as architectural solutions.
4. The city's community (smart people): the level of education and qualifications and the ability to expand, creativity, openness to change, the quality of interpersonal relations in the conditions of cultural diversity, involvement and participation in social life. The ability to use ICT in solving, among others, educational problems and shaping high quality of social capital.
5. The standard of living (smart living): high quality of life defined by housing conditions, level of security, health care system, accessibility of educational, cultural, sporting/recreational services and other public services; wide access to

ICT infrastructure that facilitates everyday life, changes in attitudes and behaviors conducive to social integration.

6. The efficiency of administration (smart governance): urban development strategy, management transparency, social participation in making investment decisions, development of public services and other solutions that ensure the integration of various stakeholders and stimulate sustainable development of the city; scope and quality of relations with other urban centers. Similarly to previous areas, it is important to use ICT in the undertaken activities. The efficiency of public administration/management facilitates the integration of the other areas of intelligent/sustainable development of the city mentioned above.

More on the concept of a smart city and the operationalization of this concept for analytical purposes, including the development of smart city rankings, can be found in the following: [*Smart cities...*, 2007; Giffinger et al., 2007; Caragliu et al., 2011; Castelnovo et al., 2015; EP, 2014; Czupich et al., 2016; Sobol, 2017].

It is worth noting the important role of modern information and telecommunications technologies, exposed in the context of interpretation of the smart city concept. This is also reflected in the scope of the projects implemented under the programs in this field (see below).

The smart city concept assumes introducing innovations in various areas of city's functioning –coordinated innovations that generate synergy effects. In this context, it is worth mentioning the concept of open innovation 2.0 (OI2) for cities, which implies co-operation between various stakeholders, necessary to ensure sustainable development, for the social inclusion of residents. The characteristic features of OI2 are primarily: strong networking; intensive co-operation in which are involved firms (supply chain partners, competitors), universities, and research and development units, state administration and municipal authorities, as well as residents. Other features of OI2 are entrepreneurship (expressed in the promotion of start-ups and spin-off firms); active management of intellectual property (thanks to which markets for new technologies are created) and intensification of R&D activities (thanks to which it is possible to create and sustain a competitive advantage) [Salmelin, 2015].

Smart Cities Projects in FP7 and H2020 Programs

In the EU Framework Program, in the field of research and technological development (FP7), which was financed in the years 2007–2013, one of its parts was devoted to smart city projects. Calls for submitting projects were named *Smart*

Cities and Communities and were published as *FP7-ENERGY-SMARTCITIES-2012* and *FP7-SMARTCITIES-2013*.

The rationale for financing activities under smart cities in the FP7 program was to indicate that urban areas are important centers of economic, social and cultural life. Innovation in energy sector, transport, information and communication technologies is essential to transform urban areas into smart, sustainable and low-carbon environments that are also resilient to the effects of climate change. Advances in ICT management should improve the quality, safety, reliability and efficiency of services offered by these industries. However, in these areas there are large unexploited possibilities for closer co-operation to jointly solve problems in Europe. Co-operation will allow not only to meet these challenges, but also to create new business opportunities.

Horizon 2020 (Framework Program for Research and Innovation for the years of 2014–2020), established by a regulation of the European Parliament and the Council (EU) No 1291/2013 of December 11, 2013 – the successor of the FP7 program – is by far the largest European Union program in this area. The aim of H2020 is to develop European innovations of global importance and to develop a competitive advantage of European economy based on innovations in line with the Europe 2020 strategy as well as initiatives – Innovation Union [EC, 2014, p. 7].

Until now, in the H2020 program, as part of projects concerned with financing smart cities, there were eight calls for submitting projects¹. One of the last calls within *The Smart Cities and Communities 2016–2017 Program* (H2020-SCC-2016-2017) is entitled *Smart and Sustainable Cities*. It is of a cross-section nature, taking into account various initiatives and activities of many stakeholders: municipal authorities, business entities and residents. The aim is to identify and provide solutions to significantly increase energy efficiency and the use of urban resources, increase mobility, improve water and air quality, and bring other environmental benefits. The scope of projects will include the creation of urban spaces powered by safe and clean energy (with socially accepted prices), intelligent electromobility, intelligent services, innovative pro-ecological solutions returning to solutions occurring in nature and economically justified. Therefore, such activities should bring significant social, environmental and economic benefits, leading to improvement of residents' quality of life, increasing the attractiveness of the city as an environment conducive to creating knowledge and learning, introducing innovations, running a business activity and creating jobs as factors improving the city's competitiveness and economic growth.

¹ Before May 30, 2017 the projects were resolved within the framework of eight calls concerning Smart Cities: SCC-01-2014; SCC-01-2015; SCC-02-2014; SCC-02–2016–2017; SCC-03-2015; SCC-03-2016; SCC-04-2016; SCC-1-2016–2017 (data on financing projects from H2020 were obtained from the National Contact Point for Research Programs of the European Union).

In the discussed call it was assumed that a great emphasis will be placed on creating a framework for innovation on (large) urban scale, including the development and testing of new business models, financing methods and management that could be quickly replicated in a wide range.

The call *Smart and Sustainable Cities* includes two complementary parts.

1. *Smart Cities and Communities (SCC1)* focuses on showing sustainable, cost-effective solutions that can be applied on a regional scale. This call concerns solutions in the area of energy and transport, using information and communication technologies. These should include smart buildings, solutions that increase energy efficiency, ensuring a high share of energy from renewable sources, smart energy grids, energy storage, electric vehicles and intelligent infrastructure for charging their batteries. This call is a continuation of the pilot notifications from smart cities, initiated in 2014. The 2020 target assumes a significant increase in the number of cities of different sizes, in a large number of EU Member States that undertook the actions specified in the call – model cities that inspire further centers.
2. *Sustainable Cities Through Nature-Based Solutions (SCG2-4)*. This call refers to solutions indicating that returning to nature through the implementation of innovative, locally adapted system solutions – inspired and supported by natural factors – can be economically viable and, at the same time, makes cities more sustainable, more ecological (green) and healthier (see EN Horizon 2020 [EC, 2014; 2016]).

Analysis of Financing Smart Cities Projects in FP7 and H2020 Programs

As part of the FP7 program, smart cities projects were financed in several thematic groups: topic 3 – *Information and Communication Technologies*, into which 95 million EUR has been allocated, and topic 5 – *Energy*² – with a budget of 113 million EUR.

² It is worth mentioning that in the FP7 budget six other financial lines were foreseen, the topics of which were similar to Smart Cities, but the following were not included in this budget line: Call FP7-ICT-2013-GC, GC-ICT-2013.6.7: Electro-mobility, Theme 3 (ICT), part of PPP Green Cars; Call FP7-2013-NMP-ENV-EeB, EeB.NMP.2013-3: Integration of technologies for energy-efficient solutions in the renovation of public buildings, Theme 4 (NMP), part of PPP EeB; Call FP7-2013-NMP-ENV-EeB, EeB.NMP.2013-4: Integrated control systems and methodologies to monitor and improve building energy performance Theme 4 (NMP), part of PPP EeB; Call FP7-2013-NMP-ENV-EeB, EeB.NMP.2013-5: Optimized design methodologies for energy-efficient buildings integrated in the neighborhood energy systems Theme 4 (NMP), part of PPP EeB; Call FP7-2013-NMP-ENV-EeB, EeB.NMP.2013-6: Achieving high efficiency by deep retrofitting in the case of commercial buildings Theme 4 (NMP), part of PPP EeB; Call FP7-2013-NMP-ENV-EeB, EeB.ENV.2013.6.3-4: Energy efficient retrofitting and renewal of existing buildings for

An additional 116 million EUR was allocated to projects under the call *Public-Private Partnership on Energy-Efficient Buildings* and 40 million EUR in the call *ICT Public-Private Partnership on Green Cars*.

The goals that were to be achieved through funding are primarily as follows:

- Creating integrated on a large-scale, innovative and replicable solutions for buildings with increased energy efficiency, electricity distribution networks and heating/cooling systems, including local ones;
- Creating intelligent internet, energy-efficient data centers, which are environmentally friendly;
- Creating integrated personal mobility systems for smart cities, to organize new industrial markets and to deliver new or improved services for institutional users and citizens.

Finally, in the years 2007–2013, 261,1 million EUR was spent on the part devoted to the smart cities financing, of which 165,9 million EUR (63%) – for the Energy thematic projects and 95,2 million EUR (37%) – for projects of the ICT thematic area. Financing 590 participations³ of entities from the European Union and other European countries accounted for about 99% of the total funds spent (see Table 15.1). The main beneficiaries of the FP7 program, in the call the part concerning smart cities, were the following countries: Spain (85 participations for 33 million EUR), Italy (respectively 82/35 million EUR), Sweden (35/25,5 million EUR), Germany (61/23,5 million EUR), the Netherlands (47/20,5 million EUR), Austria (29/20,2 million EUR), France (37/17,8 million EUR), Denmark (25/16 million EUR), the United Kingdom (46/15,8 million EUR) and Belgium (16/ 10,3 million EUR). Countries from Central and Eastern Europe participated to a much lesser extent in the financing *Smart Cities and Communities* projects under FP7: Poland (5/1,17 million EUR) and Slovenia (5/0,96 million EUR) were among the largest beneficiaries (see Table 15.1).

sustainable urban districts, Theme 6 (ENV), part of PPP EeB (https://ec.europa.eu/research/participants/portal/doc/call/fp7/fp7-smartcities-2013/32801-call_fiche_fp7-smartcities-2013_en.pdf).

³ The project financing proposal is sent to the EC by one or several applicant institutions. If the proposal is accepted, it becomes a project, which is implemented by one or several participants. The participant may be involved in more than one project [EC, 2014]. Thus, the number of participations, i.e. the number of grants awarded, should not be directly transferred into the number of organizations receiving co-financing, as one organization may apply for co-financing more than once. The number of participations cannot be directly transferred into the number of projects, as there may be several participants from the same country in one project or one participant may be involved in several projects.

Table 15.1. The level of financing total entities and public entities from the part of H2020 and FP7 budgets allocated to *Smart Cities and Communities* projects

Country	Financing from FP7			Financing from H2020				
	Participation in total	Financing from EC in total (in EUR)	Participation of public entities in total	Financing from EC for public entities (in EUR)	Participation in total	Financing from EC in total (in EUR)	Participation of public entities in total	Financing from the EC for public entities (in EUR)
Spain	85	33,504,819	15	2,703,198	103	63,711,577	19	18,737,673
United Kingdom	46	15,791,513	9	3,306,456	60	45,322,816	13	22,395,054
Germany	61	23,540,518	4	750,933	59	37,239,546	8	10,375,235
Italy	82	35,339,116	13	8,076,148	55	30,767,032	12	12,826,996
Holland	47	20,577,918	7	3,291,738	40	25,962,494	8	7,555,923
France	37	17,856,876	5	3,705,855	36	20,554,299	10	7,551,097
Sweden	35	25,465,357	6	2,526,475	33	20,021,088	7	7,195,124
Finland	17	5,924,148	5	904,751	24	13,893,445	5	5,173,519
Turkey	7	8,404,917	3	618,580	23	14,592,927	6	9,282,942
Austria	29	20,238,848	4	1,039,551	15	10,374,852	5	4,098,048
Belgium	16	10,290,050	1	341,679	15	6,425,803	2	1,012,202
Poland	5	1,171,980	0	0	12	3,706,250	6	2,965,298
Portugal	15	3,708,206	1	115,828	11	7,199,845	2	2,766,517
Denmark	25	16,197,155	4	3,248,050	10	7,128,390	0	0
Estonia	1	107,543	1	107,543	10	8,254,383	1	5,408,375
Romania	6	896,452	0	0	7	1,065,958	2	150,115
Norway	4	1,758,784			7	8,299,222	4	5,211,076
Hungary	0	0			7	1,323,548	2	174,021

Country	Financing from FP7			Financing from H2020		
	Participation in total	Financing from EC in total (in EUR)	Participation of public entities in total	Financing from EC for public entities (in EUR)	Participation in total	Financing from the EC for public entities (in EUR)
Czech Republic	2	510,280			6	1,168,690
Bulgaria	2	791,966	0	0	6	957,125
Greece	25	6,587,081	1	122,400	6	2,278,449
Ireland	16	5,604,374	2	393,284	4	2,574,436
Croatia	3	583,916	2	375,116	3	291,995
Slovenia	5	957,937			2	256,976
Cyprus	1	136,908	1	136,908	2	355,635
Malta					1	99,364
Bosnia Herzegovina					1	190,000
Armenia					1	190,000
Macedonia					1	71,750
Latvia	3	482,592	1	251,804	1	106,976
Luxembourg					1	348,825
Montenegro					1	190,000
Switzerland	8	2,726,872				
Lithuania	3	223,455	0	0		
Serbia	3	702,866	1	39,240		
Slovakia	1	109,656				
In total	590	260,192,104	86	32,055,537	563	334,923,694
					132	126,026,652

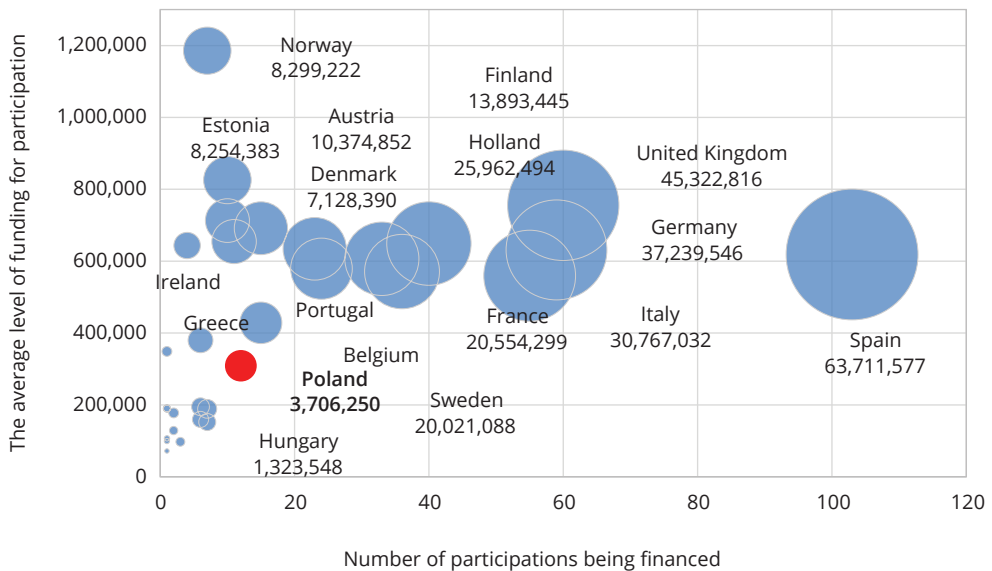
Source: Own study based on primary data obtained from the National Contact Point for Research Programs of the European Union.

It is worth noting that the share of public entities (in this group of beneficiaries there are cities and municipalities) in the total number of participants was low and amounted only to 12%. The main beneficiaries were public entities from the following countries: Italy (13 participants for a total funding of 8 million EUR), Denmark (respectively: 4/3,2 million EUR), France (5/3,7 million EUR), Spain (15/2,7 million EUR), the Netherlands (7/3,2 million EUR), Sweden (6/2,5 million EUR) and Austria (4/1 million EUR). From the countries of Central and Eastern Europe, public entities from Croatia received funding for two participations for a total amount of 0,4 million EUR). Participants received financing for Latvia, Serbia and Estonia.

Within the H2020 project of part of *Smart Cities and Communities*, 574 participations were financed until May 31, 2017 (including 563 beneficiaries from European countries), and the total co-financing of European and third countries amounted to 335,5 million EUR, of which 265,9 million EUR was allocated to the *Energy* thematic area, and 69,7 million EUR to the *Environment* thematic area.

Table 15.1 and Figure 15.1 show the level of co-financing from the H2020 budget for the participation of beneficiaries from European Union countries and other European countries in general, as well as for public entities.

Figure 15.1. Budget allocation for H20120 (theme: smart cities and communities, data: 2014 – May 2017) (in EUR)



Source: Own study based on primary data obtained from the National Contact Point for Research Programs of the European Union.

The largest beneficiaries of the *Smart Cities and Communities* projects in the H2020 program are the following countries: Spain (103 participations for a total funding of 63,7 million EUR), the United Kingdom (respectively 60/45,3 million EUR), Germany (59/37,2 million EUR), Italy (55/30,8 million EUR), the Netherlands (40/25,9 million EUR), France (36/20,6 million EUR), Sweden (33/20,0 million EUR), Turkey (23/14,6 million EUR), Finland (24/13,9 million EUR), Austria (15/10,4 million EUR).

The share of public entities' participation in the total number of participants is slightly higher than in the FP7 program – it is 23% (132 participations). The main beneficiaries were public entities from the following countries: the United Kingdom (13 participations for a total funding of 22,4 million EUR), Spain (respectively: 19/18,7 million EUR), Italy (12/12,8 million EUR), Germany (8/10,4 million EUR), Turkey (6/9,3 million EUR), the Netherlands (8/7,5 million EUR), France (10/7,5 million EUR), Sweden (7/7,2 million EUR), Estonia (1/5,4 million EUR), Norway (4/5,2 million EUR). From the countries of Central and Eastern Europe, apart from Estonia, Poland participated in six projects for a total amount of 3,0 million EUR, and the Czech Republic – in five projects for a total amount of 1,1 million EUR. Public entities from other countries of the region were less involved (below 1 million EUR).

By May 31, 2017, six projects from Polish public entities were accepted for financing, including cities: Bydgoszcz, Gdańsk, Poznań, Warsaw, Wrocław and the National Science Center. Four participations from six (in projects *CONNECTING Nature*, *GROW GREEN*, *mySMARTLife*, *Ruggedized*) are financed from the call SCC-2016–2017, whose main objective is to increase the role of environmental protection in the development of cities and to promote co-operation, including international co-operation. The general financing of all six projects amounted to 2,965,298 EUR, the largest amount of which went to Wrocław (1,651,125 EUR). Detailed data is provided in Table 15.2.

At this point, it is worth emphasizing that in the case of support from the H2020 budget, it is difficult to measure its real effects, because, firstly, they occur with a long delay, and secondly, the projects themselves are planned for implementation for many years.

The already mentioned projects: *CONNECTING Nature*, gathering 29 participants from 19 countries, is planned for implementation in the years 2016–2022; *GROW GREEN* project, gathering 21 participants from EU and China, is planned for implementation in the years 2017–2022; *mySMARTLife* project, gathering 28 participants, and the *Ruggedized* program, consisting of 34 participants, mainly from the old EU countries, are planned for implementation for the years 2016–2021 (data: Cordis database).

Table 15.2. Polish public entities financed from the H2020 program of *Smart Cities and Communities* part, participation accepted for financing until May 31, 2017

Project acronym	Full title of the project	Public entity financed from the H2020 of <i>Smart Cities and Communities</i> part	Co-financing of the project from the EC (in EUR)
CONNECTING Nature	Co-production with Nature for City Transitioning, Innovation and Governance	City of Poznań	410,375
EN-SUGI	Eranet Sustainable Urbanization Global Initiative	National Science Centre	178,293
GROW GREEN	Green Cities for Climate and Water Resilience, Sustainable Economic Growth, Healthy Citizens and Environments	City of Wrocław	1,651,125
mySMARTLife	Smart Transition of EU cities towards a new concept of smart Life and Economy	City of Bydgoszcz	123,125
Ruggedized	Rotterdam, Umea and Glasgow: Generating Exemplar Districts In Sustainable Energy Deployment	Gdańsk City Council	279,346
SHAR-LLM	Sharing Cities	Capital City of Warsaw	323,034
Sum			2,965,298

Source: Own study based on primary data obtained from the National Contact Point for Research Programs of the European Union.

Conclusions

The participation of Polish entities applying for funding from the H2020 budget, as part of smart city projects after more than three years of project operation (until May 31, 2017), is at a relatively low level. By all means, taking into account absolute numbers, it can be said that in this group of projects, Poland has currently a four times higher funding level than from the FP7 budget (nowadays it is twelve participations for the amount of 3,706,250 EUR in comparison to four participations for 944,940 EUR). However, when referring these numbers to the financing levels of 10 countries – ranking leaders, Polish entities account for less than 3% of all entities – beneficiaries with financing barely exceeding 1% of the total sum of financing for smart cities projects in the H2020 budget. It is worth considering the reasons for this condition.

The main reasons identified by EU experts, being mainly on the side of potential beneficiaries of the program, in the part concerning financing of innovative projects in cities, include:

- a) high level of perceived investment risk in innovative solutions and energy efficiency measures;
- b) unstable policy on energy prices and uncertainty with regards to the prices of fossil fuels;
- c) high capital expenditures required;
- d) long-lasting delays before reaching the project's maturity/profitability;
- e) limited possibilities of financing from public funds: high public deficits in communes and inability to raise funds from capital markets [*Financing models for Smart Cities*, 2013].

An opportunity to increase the share of entities from Poland in financing from the H2020 budget is undoubtedly the submission of applications in both domestic and international consortia – gathering more public entities, including cities, but also universities, enterprises, research institutes.

However, the barrier, in addition to those identified above, is the low level of co-operation [Nowak, 2010] and trust [Sztompka, 2007; Danik, 2009], as well as the relatively low activity of Polish entities in organizing the brokerage events, which are to help in finding co-operation partners [Lewandowska, 2017].

The intensification of co-operation is, nevertheless, a prerequisite for raising funds, as in most cases projects must be implemented in 2–3 light house cities or communities, engage the industry, planning authorities, social organizations, research institutions, SMEs (Small and medium-sized enterprises) and cooperate with 2–3 city observers – having access to project results and planning replication solutions. These activities must be supported from other sources of funding (other parts of the H2020 program, structural funds, national or regional funds). Moreover, these activities should be included into integrated urban plans, accepted by municipal authorities, that comprise plans for replication of solutions in own or other cities [Sobótka-Demianowska, 2015].

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Impact of Tourism on Competitiveness and Internationalization of Cities

Magdalena Kachniewska

Introduction

Over half of world's population lives in the cities and they attract the largest part of the world's tourist traffic: in Europe, at the beginning of the first decade of the 21st century, urban tourism accounted for 30% of travels and 20% of tourist trips [Law, 2002; UNWTO, 2011]. Tourism function, the most exogenous of all city functions, determines the degree of its openness, while the size and quality of tourism development is a determinant of city's reception possibilities. Urbanized areas are struggling with various negative phenomena affecting their balance and development potential, while tourism has, on the one hand, a significant share in it, and on the other – it can be a buffer, used to revitalize and regenerate the strained function and physical tissue of the city.

When analyzing the tourism function development of urban centers, researchers lack the studies devoted to this subject¹. This is partly due to the difficulty of measuring the effects of tourism development, or more precisely – identifying and estimating the effects that can be attributed to tourism, among many others, caused by various forms of human activity in the multi-dimensional functional space of the city. The second source is of methodical nature: a large number of entities and the complexity of relationships and institutional ties between the actors of the economic, social and cultural scene of the city make it a challenge to both identify stakeholders of urban tourism development and to indicate their role in shaping the sustainable development strategy of this industry.

¹ This direction of research develops in principle in the 1990s, but it is believed that urbanized areas are "lost" for sustainable development [see, e.g., Hinch, 1996; Barke, Newton, 1995; Ashworth, 1992].

The aim of this study is to explain the basic concepts of tourism function of the city and to determine its impact on the internationalization process and the level of city's competitiveness.

The Concept of City's Tourism Function

The statistical definitions of the United Nations World Tourism Organization (UNWTO), also adopted by the UN Statistics Commission and Eurostat [UNWTO, 1993], are commonly used in the analysis of tourist traffic and the economic consequences of its development. They treat economic criterion as the basic one for distinguishing tourist trips². According to the organizations, the concept of tourism means "general activities of persons traveling and staying constantly in places outside their usual environment for a period not exceeding 12 months for recreational, business or other purposes" [UNWTO, 1993]. Detailed calculation and strict classification of forms of this movement would exclude new forms of tourism from the research perspective. On the other hand, general calculation of tourism purposes allows to maintain flexibility in the conditions of constantly changing market in this sector, where we observe development of the offer and extraordinary dynamics of needs reported by participants of the tourist traffic.

Tourists are visitors who need to be distinguished from other travelers by using the same three criteria (place, time and purpose) that appeared in the definition of tourism. Therefore, visitor is a person traveling to a place outside its everyday surrounding for a period not longer than 12 consecutive months, if the primary purpose of the trip is not to be employed and paid from the funds coming from the visited place³ [Eurostat, 1995]. Visitors can be divided into: tourists (using at least one accommodation in the visited place) and visitors who are staying for one day only (not using accommodation at the visited place).

Taking into consideration one-day trips impinges significantly on the scale of the phenomenon and economic effects of tourism, which is of particular importance

² The economic criterion makes it possible to unambiguously separate tourist travels from economic and political migrations, which have a different effect on the economy of tourism destination regions.

³ These criteria mean that tourist trips do not include trips aimed at permanent settlement, seasonal employment, commuting to work or school, because the time criterion ("no more than 12 consecutive months") or location ("out of everyday activities area") is not met. A tourist trip does not have to take place in leisure time, it may concern interests and professional matters, if the remuneration of the participants of this movement comes from the place of their permanent residence and not from the destination of the trip. According to the economic criterion, the effect, in the form of an inflow of financial resources to the place visited, will be the same (in terms of the direction of cash flow), as in case of tourist travels carried out in free time.

in the era of dynamic development of the so-called urban tourism, including growing popularity of short trips to big cities (i.e., city breaks). It also has impact on the nature of the tourist offers, as recognizing the needs of visitors who do not stay overnight enables the creation of specific market niches. For this reason, the approach to measuring the scale and intensity of tourist traffic, prevailing in the 1990s (based on data from accommodation facilities), is nowadays being increasingly replaced by measuring the number of arrivals to urban centers (and thus including one-day trips). It significantly changes knowledge about the economic effects of tourism development of the city.

Detailed data on measuring the effects of tourism development in Warsaw are presented in the following parts of the text, however, at this point it is worth noting that the number of tourists visiting the capital city in 2016 amounted to 9.6 million (of which 6.9 million are domestic tourists), while the number of one-day visitors exceeded 11.1 million people (of which 10 million are Poles). This information [SBRiPT, 2017] is essential not only due to the revenues generated for the city budget by one-day visitors, but also in the context of strategic planning – including taking measures to extend these stays, for example by appropriately shaping the cultural and recreational offer.

The economic consequences of tourism are manifested in the form of tourism goods and services – created, being available and developed to meet the needs of this movement (demand approach). Unlike other sectors of economy, tourism is not, as in case of other industries, vertical organization, covering all processes of production and distribution. They may include a wide variety of goods and services offered by the various branches of the economy. These include products manufactured mainly for tourists (e.g., accommodation services), but also goods and services used by other consumer groups, and goods that are unsuitable or difficult to use in a different way than through the tourist offer (beauty of the landscape and architecture, places of historical events, cultural legacy).

Large cities are the most important centers on the global tourism market [Law, 2002; Page, Hall, 2003; Hayllar et al., 2008; Maitland, Newman, 2009], while playing a dual role. First of all, they generate enormous “outside” tourist traffic (both in terms of business and leisure tourism due to the above-average wealth of residents). Secondly, they are the most visited areas and their significance is determined by: population potential, historical and cultural heritage, multi-functionality resulting from their diverse socio-economic structure, developed infrastructure and transport accessibility [Niemczyk, 2010]. Particular importance should be attributed to the so-called business tourism, for which the cities remain the most important destination. This type of traffic differs significantly from the others, both in terms of the standard of the sought services and the acceptable level of prices. Many tourism enterprises (mainly hotels, as well as catering businesses, transport companies and enterprises offering recreational

services), thanks to business trips, have the opportunity to differentiate their offer. A relatively new but important trend in the business tourism market is offering a special combination of business services and leisure travel services, referred to collectively as a *bleisure offer* (business plus leisure). Cities offer the greatest potential for this form of tourism.

The discussion on the tourism function of the city, should not be limited to the concept of urban tourism, because in urbanized areas various forms of leisure, business, cultural, religious, convention, and even qualified or health tourism can be implemented. Tourism function may be of a mass character, as well as organized or individual. It should also include visiting friends or relatives and distinguish the aforementioned one-day visitors who are more difficult to measure and characterize.

All forms of mentioned activities "constitute in-the-city tourism, but they are not always identical with urban tourism, which is a separate phenomenon (...) " [Madurowicz, 2008, pp. 11–16]. Key research issues should include:

- patterns of functional connections between strictly urban development and tourism infrastructure from a resident's, tourist's and planner's point of view;
- tourists' behavior in various moments of their stay in the city;
- cultural context of urban revitalization, the importance of tourism for regeneration of city centers and post-industrial districts;
- external and internal communication and service accessibility;
- business and organizational connections;
- recognizing the potential of tourism (e.g., in terms of spatial development, infrastructure, new jobs creation);
- dynamics of urban community interacting with visitors;
- potential sources of conflicts between residents and visitors;
- defining the boundaries of tourist absorption and, finally, promoting the tourism function and the city itself [Madurowicz, 2008; Van der Borg, 1991; Paskaleva-Shapira, 2007; Law, 1996; Page, 1995].

Tourism in the Structure of City's Functions

Zmyślony [2015] treats tourism as a component of city's economic structure, affecting it in the economic and spatial sphere. Therefore, the analysis should cover both the relation of tourism in connection to other types of socio-economic activities forming each city, as well as tourism shaping relations of the city with regard to closer and further environment. If we assume after Suliborski [2010] six basic approaches to urban functions (cognitive reflection, city's feature, city's activity, relationship, type

of activity of city's residents and clusters of work and places of residence), tourism undoubtedly is reflected in four of them: city's feature, cognitive reflection, relationship system and city's activities.

The approach to tourism function as the city's feature is the oldest and the most widespread, as it is associated with geographical perception of tourism function. It refers to strictly material (physical) form of urban space, in which the progress of city's development is usually of a jumping nature, triggered by investment activity, since a certain activity implies adequate development [Regulski, 1982]. In this sense, in every city there is a technical and social infrastructure, and within the latter, apart from educational, scientific, cultural, health and social care, public administration, we also deal with recreational, sports and tourism infrastructure [Ginsbert-Gebert, 1984].

Geographical approach to tourism function introduces the analysis of tourism values, tourism development (accompanying base) and finally the tourist traffic: its intensity, streams, flow direction, etc. [Fischbach, 1989; Włodarczyk, 2009]. The location of tourist facilities and devices usually shows a fragmented spatial concentration, which concerns both cultural sites and historical heritage objects, as well as contemporary business tourism development centers (convention and exhibition centers) and the accompanying transport base. Such development of tourism function often leads to creation of symbolically isolated (less frequently physically isolated) tourist zones, which when uncontrolled can lead to various dysfunctions: social, economic and even ecological, as it happens in big tourist metropolises⁴. Spirou [2011, pp. 78–87] distinguishes five types of tourist districts, indicating that two of them (ethnic and historical districts) are the essence of cities and are simply adapted for tourism purposes⁵, while others are created for the needs of urban tourism economy development (leisure, sports districts, theme parks).

Considering city's function within the second category – as a cognitive reflection – refers to the set of city's features that determine its individuality, uniqueness or similarity to other cities. In relation to the previous category (city's feature), cognitive reflection has a more symbolic, image-like level and has an extremely subjective character – each entity (researcher, resident, observer, tourist) creates his own image of the city, perceives its other features and looks for different ones (often referring to own expectations or general stereotypes). Zmysłony [2015] emphasizes that the semantic context of tourism function, analyzed through cognitive reflection, is broad,

⁴ After Merton [2002] it should be assumed that functions are "observable effects that contribute to the adaptation and modification of a given system", whereas dysfunctions are "observable results that reduce a given adaptation or modification" [Merton, 2002, p. 102].

⁵ Ethnic districts include China Town in Chicago, New York, London, Kazimierz in Cracow, Jozefov in Prague, French Vieux Carre in New Orleans, and historical: Roman Trastevere, Gothic Quarter in Barcelona, Acropolis in Athens, Lisbon Alfama or even Old Town in Warsaw.

interpreted on the basis of person's own perception and reflection emerging when experiencing the city, but also formulated in guidebooks, as well as in popular and scientific literature. Due to the subjective nature of cognition, tourism function of a city or its districts is a subject to further categorization, depending on previous interests and preferred form of tourist traffic practiced by a given person (cognitive, recreational, leisure, business, sports tourism, etc.). This fact should additionally lead to a deeper qualitative research of tourist traffic, since the results can help to verify the beliefs of city's authorities and tourism organizers regarding tourists' perceptions of the leading tourism function of the metropolis. Such a surprise, for example, was finding that a significant number of tourists visit Warsaw for recreational purposes and not for cultural or business ones.

The impact of tourism on city's competitiveness is most strongly manifested within the third category – in the city's social and economic activities. Tourism function is one of the most important generators of jobs and economic activity, and thus is a source of income for the city budget and indirectly its attractiveness as a place of work and life (investments, events, number of operating institutions, etc.). In addition to administrative, political, industrial, commercial and communication functions (housing, educational, cultural, health and communal), tourism function⁶ is present in most urban centers or specialized parts thereof, although it is not always distinguished as a separate one. The city's life cycle and changes in its surroundings (e.g., technological progress, globalization) affect changes in its functional structure, in particular they lead to changes in the dominant function (i.e., functions succession⁷). The urban role of tourism can sometimes lose its significance, when a frequently visited place becomes an attractive place for business meetings, and over time simply the target of investments. On the other hand, the former industrial cities (including ports or important trade centers), significant religious sites or important administrative nodes, as they get richer and develop, start to attract tourist traffic thanks to its cultural development, impressive architecture or organization of events.

An expression of presence and subsequent increase of tourism function's level is a growing number and spatial activity of visitors, exceeding the intensity of residents' activity. However, the problem of most studies on urban organisms is the shortage of statistics on the movement of people as an effect and manifestation of city's function, while at the same time an excessive number of quantitative research on tourism.

⁶ It should be noted that the health, recreational and business functions are also included in the tourism function of the city, although in some classifications it is a tourism function included in the category of service functions [Kielczewska-Zaleska, 1972].

⁷ Lack of function's succession leads to stagnation and even to regress in the development of the city [Kostrowicki, 1952].

Meanwhile, many activities in the city area, including periodically increasing clusters and flows of people, require reliable spatial and time analysis (daily and weekly fluctuations), correlated with tourist and non-tourist events as well as typological structure of travelers, the average length of their stay etc. Current monitoring systems (GPS, beacons, payment card systems, Wi-Fi and recording devices appearing within the routers' range without need to log in) allow for extremely detailed traffic analysis in urban space, and thus are the basis for managing this space and time, as well as making strategic decisions regarding planning, organization and transformation of urban functions. With regards to the tourism function, such a detailed analysis is additionally of great value from the accuracy perspective, when assessing the importance of tourist activity from social and economic function perspective. Usually the assessment of this role is distorted (overvalued in small cities and undervalued in large ones) or just blurred due to the heterogeneous character of the tourism industry.

Theories of central places and the economic base of the city are the conceptual basis for city's function as a relation [Maik, 1988; Suliborski, 2010]. On the structural and functional basis, tourism function of the city has been defined as the entire socio-economic activity directed at servicing tourists and at the same time implemented by a given city in the national economy system [Matczak, 1989] or (in the light of another definition) "activities and incentives generated by a spatial unit (...) towards inbound tourism, as well as the effects and consequences of this activity on its structure and economic life" [Liszewski, 1995, p. 4]. These definitions emphasize the important, city-creating role of tourism and its value from the perspective of internationalization of the city, thus, indicate the importance of distinguishing exogenous and endogenous functions [Brol et al., 1990]. Tourism heterogeneity makes these two dimensions to be often mixed up – numerous functions of services in the city (i.e., endogenous functions) determine the quality of life, therefore, have an impact on the city's competitiveness on domestic and global tourism market. The exogenous functions (implemented "for the outside world"), besides tourism, include also education, culture, external transport or administration – however, many of them could not be implemented without the development of the tourism infrastructure (accommodation, alimentation), but at the same time they stimulate the development of tourism (arrivals for the purpose of participating in cultural life, treatment or education).

The synergy of the phenomena discussed is also manifested in the creation of attractiveness of urban space in terms of tourist traffic, which in effect increases the attractiveness of living in the city and serves the residents. In this way, typical exogenous functions initiate endogenic changes. An important external function of tourism in the city is also the redistribution of income on the national scale and even at the international level. Finally, the last aspect of city's internationalization through

the development of tourism (outbound and inbound) is the opening to "the Other" – taming strangeness, accepting differences and diversity.

Finishing the reflections on the tourism function of the city, it is worth mentioning the diversity of human needs, which can be satisfied by participation in tourist traffic, its servicing or even just observation. These are not only cognitive (educational), recreational and business needs, but also social, economic and psychological needs influenced by diverse cultural, demographic, economic (including consumer) and social trends.

Functions and Dysfunctions of Tourism in the City

Tourism may have a negative impact on the socio-cultural and natural environment. Then, we can talk about the so-called tourism development dysfunctions that have determined the four phases of criticism of tourism business:

1. the earliest (nineteenth century) accuses certain social groups of being privileged (aristocracy) and the lack of access to tourism of other groups;
2. second phase indicates technical development of tourism so it becomes similar to post-war period industry (the birth of the concept of tourism industry);
3. third phase, initiated by the 3rd International WTO Congress in Manila in 1980, complains that tourism, in general, brings more damage than benefits, which is manifested mainly in the negative impact of foreign tourists on developing countries (a new form of colonialism), cultural conflicts and intensification of criminogenic phenomena;
4. current phase is concerned with the destruction of both natural and social environment.

As part of cultural and social dysfunctions, most frequently attention is drawn to the tourists' behavior deviating from the standards accepted in the visited places, prejudices and stereotypes (occur both on the side of tourists and residents); disappearance of authentic (non-commercial) hospitality, lowering the quality of residents' life in case of excessive concentration of tourist traffic which introduces many inconveniences and limitations in everyday life and professional life of residents; social pathologies (especially felt in large, anonymous human gatherings); demonstrative attitudes and behaviors of rich tourists; traffic congestion, limitation of pedestrians' freedom, numerous accidents, increased noise and undesirable architectural transformations.

In addition to desired economic effects (redistribution of income, economic activation, etc.), tourism also causes a number of economic dysfunctions, including intensifying cities competition (for the flow of tourism capital, investing in exchange

of services, creating and maintaining the headquarters of economic organizations, etc.). Other economic dysfunctions include the intensification of mutual dependencies of areas receiving tourists from places/countries of their origin (especially dangerous in case of the so-called tourist monoculture or being dependent on the stream of tourists coming from only one economic area). Tourism development may also be conducive to raising the inflation rate (in regions and tourist cities it is much higher than the national average), seasonality of employment (although this phenomenon is less relevant for large urban centers), speculation of construction grounds and uncontrolled increase of property prices. In spite of appearances, environmental dysfunctions concern not only valuable natural areas, but also common problems: discharges of waste and emission of pollution, littering streets, beaches, etc., occurring as a result of development and concentration of tourism, general problem of excessive number of tourists in relation to the number of permanent residents and congestion of hiking trails/tourist routes and selected objects⁸.

Many of the mentioned issues are within the scope of research on sustainable development of cities and tourism itself. In the most general terms, sustainable tourism in urban areas is tourism that reconciles the needs of today's tourists with the needs of city residents⁹, while protecting and strengthening the possibilities of their own development in the future. In other words, ensuring profitability at the same time does not harm the community, natural environment or cultural heritage of the city. The most important challenges for sustainable tourism are both located in the area of consumption patterns¹⁰ and the production model (the shape of value chain), where the local community and interactions between residents and visitors occupy an important place.

The topic of sustainable tourism development appeared, among others, in the Implementation Plan adopted in Johannesburg during The World Summit on Sustainable Development [Johannesburg Summit, 2011]. On the European level, the necessary guidelines for achieving sustainable tourism development and appropriate

⁸ On urbanized areas it is impossible to separate tourism space and ensure the isolation of permanent residents, as well as to preserve the conditions and quality of life they are accustomed to, all the more the indispensable element of tourist attractiveness is close contact with culture and the local community. As a result, competition for access to attractions and urban space intensifies, in which visitors often win (and the inflow of money behind them).

⁹ Ensuring a balance between the needs of residents and visitors is one of the greatest challenges for the development of urban tourism. An incisive example is the matter of car transport. Noise, air pollution, reduced street patency, limited parking space and degradation of traffic safety are phenomena so embedded in the landscape of large cities that it is difficult to determine what share should be attributed to tourism. Attempts to reduce these dysfunctions turn out to be either ineffective (e.g., park and ride system used in many European cities), or equally affect tourists and local residents, which causes conflict between these groups (paid parking zones or contingency charge system – "tax on congestion" – used in London).

¹⁰ This primarily concerns the use of urban space, seasonal distribution and tourist destinations.

models of continuous advancement for all types of tourist reception areas are increasingly stressed [COM, 2003; 2006]. However, literature in the field of sustainable tourism development does not necessarily allow to find indications and solutions that can be adapted in relation to tourism in urban areas.

The sustainable development of tourism in the city depends on such factors as:

- tourist attractiveness of the city,
- socio-economic potential of the city,
- compliance with proportions between shaping the rate of increase in the resource intensity of tourism economy in relation to natural and social environment and the rate of increase in the reproduction of resources,
- maintaining the quality of life and a cultural landscape as well as stable economic development,
- holistic and integrated approach to urban area management, taking into account various functions of the city [cf. Kołodziejcki, 2001; Kaźmierczak, 2008].

A characteristic feature of the city is a large accumulation and density of anthropogenic elements in relation to natural elements. The mutual proportions and dependencies between these elements of the city structure create a specific environment of human life. It is not a natural environment and, although to a various degree transformed, may pose a threat to life and health of residents and a barrier for further development of the city. At the same time, the dependence of tourism on the good quality of environment, cultural diversity and social interaction, sense of security and prosperity, make cities naturally perceived as an extremely important tourist destination.

The fact that poorly planned or over-developed tourism can contribute to the destruction of attributes that are of key importance for tourists, makes the needs of tourists to become a driving force for the protection and promotion of urban assets – either directly (by raising awareness and collecting funds for their support), or indirectly (by providing economic justification for providing such support by others). Thus, connecting the assumptions and guidelines for sustainable development of the city and tourism becomes a natural consequence and, at the same time, a *sine qua non* condition for the effectiveness of projects in this area.

The uncontrolled development of tourism becomes a threat to the foundations of its existence. The cost of these phenomena may, in extreme cases, exceed the benefits of tourism development, while these dysfunctions reduce the quality of tourists' experiences and violate the image of the city. It automatically reduces its competitiveness – both as a travel destination and a place to live. Therefore, the measurement of quantitative and qualitative effects of tourism development becomes a key problem of the development of tourism strategies of cities.

Measurement of Tourism Function of the City

Measures concerning tourist activity in the regional or urban dimension are categorized in a very diverse way. Heeley [2011] proposes the following groups of indicators:

- measures characterizing the economy (number of visits, accommodations, attendance rate in hotels);
- measures characterizing the impact of tourism on the local community (level of visitors' expenses, income from tourism, employment in tourism);
- marketing measures (effectiveness of urban tourism organizations);
- benchmarking measures (comparisons between cities).

In countries such as Poland, where the perception of tourist activity has long remained a social domain and not a branch of economy, methods are still being developed for measuring the economic function of tourism, which would better determine the importance of this industry for city budgets and the dynamics of their development. However, one should not forget that in the context of internationalization and increasing competitiveness of cities, qualitative research is also indispensable, as it will not only show the competitive advantages of a given city in the tourism dimension (domestic and international), but also the quality and attractiveness of life. Basic measures may become helpful. They include: number, capacity or structure type and distribution of accommodation, catering, conference and exhibition facilities, transport devices (for internal and external transport) and accompanying facilities (recreation and sports, cultural and leisure, shopping and services, organization and information, regeneration and cosmetics, or healing and spa). Due to the difficulty of measuring numerous elements and manifestations of city's tourism function, in order to simplify it, the number of accommodation places is considered to be a basic measure of benchmarking of the tourism function, according to the assumption that it reflects (through investors' involvement and the use of accommodation) the actual tourist attractiveness of the city in the business, political, recreational, and health dimensions (in case of a therapeutic or health recreation function) as well as cultural. This measure is used, among others, in the report of European Cities Marketing [ECM, 2014].

Quality characteristics are also established based on numerous quantitative tests (measures), e.g., based on the density and type of tourist routes and bike paths, the number and spatial distribution of gastronomic points, spatial distribution of tourist values in correlation with the location of tourist facilities, number and capacity of transport infrastructure facilities, punctuality of public transport, availability of tourist information (also in virtual form).

Great importance is also attached to measures of relative tourism function, because they reflect the intensity of tourism development (both the tourism function and the tourist traffic itself). These include indicators referring to the accommodation capacity in relation to the number of inhabitants (e.g., the Baretje and Defert index), or to the surface of the town and indicators of the intensity of tourist traffic (calculated as the ratio of tourists to the number of permanent residents, or the number of overnight stays to the number of permanent residents), alternatively, the tourist traffic density index may be used (relation of the number of tourists using accommodation to the area in square kilometers).

An excellent review of all applicable measures of tourism function was presented by Zmysłony [2015], at the same time indicating that in many cases the cost of measurement turns out to be higher than the benefits from the possible application of a given indicator. It is worth noting, however, that some measures allow the usage of benchmarking analysis for many cities, and on this basis determine their potential for internationalization and the ability to compete.

Through measuring the functional specialization of the city, one can make attempts to measure the tourism function as a city's activity, e.g., by measuring the share of employment in services and trade generated by tourism services, the number of tourism businesses or the relative rate of tourism activity. A certain challenge is the previously mentioned heterogeneity of tourism, which does not allow to separate from the urban structures those institutions or jobs that should be clearly and exclusively identified with tourism. Even accommodation facilities – apparently related only to tourist traffic – also organize ventures (banquets, conferences, etc.) addressed to permanent residents. In case of transport or gastronomy, it is even more difficult to determine the part of economic activity attributed to tourism.

This degree of blurring is particularly large in the major urban centers, where even shopping malls can obtain a significant share of income from serving visitors. Separating tourism from the list of various forms of economic activity is all the more difficult since Section I of the Polish Classification of Activities (PKD), most strongly associated with tourism (accommodation and gastronomy), does not disclose the scope of tourism economy, which, after all, includes the use of culture, leisure and sport, and in the conditions of the largest metropolises, it may even determine the profitability of maintaining selected cultural objects. Thus, with an increasing interest in the role of tourism in regional/urban development and the search for tools to measure its economic effects and active tourism policy, gradually increases the need to measure the impact of tourism on GDP, which is now a widely used measure of the size of country's or region/city's economy. In order to determine the contribution of tourism to GDP, it is necessary to select the types of economic activities and to divide them into

several categories depending on the strength of their relationship with tourism. Those, whose relationship with tourism is the strongest, have been described as characteristic tourism activities (tourism industries) and form the supply side of tourism. If it were assumed that the tourism supply is created by all goods and services purchased by tourists, in practice it would turn out that they can be almost all consumer products in the economy. Therefore, a solution was adopted which is based on the strength of relationship between a given type of economic activity and its basic products with reference to their significance for tourist consumption. One has distinguished three types of economic activities and corresponding products:

- specific tourist products (similarly characteristic types of tourist activities (CRDT), which include products that meet one of the following criteria:
 - the product represents a significant part of tourist expenses,
 - significant part of the production of a given product or service is purchased by tourists,
 - lack of a given product would have a meaningful impact on tourist demand, even if it does not represent a significant part of this demand;
- products related to tourism – which are largely purchased by participants of the tourist traffic; they correspond to the activities connected with tourism;
- other products that are occasionally purchased by tourists, and corresponding activities.

Due to different relevance of tourism in the economy of particular regions of Poland, it was also necessary to develop a method for estimating its effects (impact on GDP) at the national and regional (voivodship) level. This is a compromise, since the acceptance of smaller units, i.e., sub-regions, as a subject of analysis would significantly increase the labor-intensity and costs of the project, although it should be remembered that the sub-regions are more uniform in economic and geographical terms than the voivodships. In addition, a pilot study was also carried out for the capital city of Warsaw.

The Impact of Tourism on Warsaw Economy

Until 2016, no surveys of tourist traffic in large cities were carried out in Poland, which would meet the requirements of international standards and at the same time guarantee comparability of data in all major urban centers of the country. It was only in 2016 when "Standard for Measuring the Size of Tourist Traffic" (hereinafter referred to as the Standard) was developed, and it was the first attempt to disseminate a set of good practices and principles enabling the standardization of tourist traffic research

conducted by urban centers of metropolitan type. It was developed at the initiative of the municipal authorities of Gdańsk, Poznań, Warsaw and Wrocław, who wanted to reconcile on a way to study tourism (including estimating its size) and to disseminate a set of best practices for conducting tourism research, helpful for entities carrying out research based on the methods of applied social sciences.

The algorithm that is an integral part of the Standard includes in particular: indicating the type and scope of secondary data for the purposes of estimating the volume of tourist traffic available in the public statistics data sets for individual cities, indicating the type and scope of primary data for the purposes of estimating the volume of tourist traffic, description of obtaining primary data method, including the method of determining the sample size in continuous and incidental studies; description of sampling locations and its size in individual locations; list of questions covered by the standard for questionnaire surveys and description of measurement conditions (sample size, type of sample, measurement conditions, measurement technique, time period of field research).

Estimating the impact of tourism on Warsaw economy required linking the results of tourist traffic survey with methods of examining the economic significance of tourism according to methodology developed on the basis of recommendations of UNWTO, OECD and Eurostat. The main sources of data include the results of tourism research carried out in the capital city of Warsaw, statistical yearbooks of Mazowieckie voivodship and Warsaw as well as statistical bulletins. Due to the fact that the scope of published data was not adapted to the needs of the analysis of the tourism contribution to the city's economy, it was necessary to use additional sources of information:

- enterprises structural statistics database Eurostat,
- financial statements of PKP Intercity and Koleje Mazowieckie,
- information on income taxes provided by the Chamber of Tax Administration,
- statistics of the Civil Aviation Office,
- Ministry of Sport and Tourism register of tour operators and travel agents,
- results of field research conducted among people visiting Warsaw,
- results of the omnibus survey conducted on a sample of inhabitants of Poland aged 15+.

The scope of available information does not provide a full picture of the contribution of tourism to Warsaw economy, nevertheless, it allows to obtain the results of estimates in terms of tourism consumption, added value and tourism contribution to the creation of Warsaw's GDP, as well as data on the level and structure of employment, expenditure on fixed assets, income and outcome from the budget of the capital city of Warsaw generated by tourism in 2016, and for comparison – in 2014.

The study included the so-called tourism industries i.e., those for which tourism is an important development factor¹¹.

The contribution of tourism to Warsaw's GDP has been estimated at 14.2 million PLN in 2014 and 15.4 million PLN – in 2016 [SBRiPT, 2017]. The contribution of individual tourist activities to the creation of gross added value in 2014 and 2016 is presented in Table 16.1.

Table 16.1. Contribution of particular tourist activities to the creation of gross added value in 2014 and 2016

Types of activities	Gross added value generated in individual types of activities (million PLN)	
	2014	2016
Accommodation	416	472
Services related to catering	1,311	1,960
Passenger railway transport	1,263	1,550
Passenger land transport	2,079	1,944
Passenger air transport	2,050	2,200
Services supporting air transport	616	702
Activities related to tourism	316	364
Activities in the field of culture and leisure*	3,497	3,770
In total	11,547	12,962

* Activities of libraries, archives, museums and other cultural activities; sports, entertainment and recreational activities.
Source: SBRiPT [2017].

Added value generated in Warsaw by enterprises from characteristic tourist activities amounted to 11,547 million PLN in 2014 and accounted for 5.8% of the gross added value generated at that time. In 2016, it reached 12,962 million PLN (both values in current prices), which meant an increase of 12%. Nevertheless, the results of individual industries were varied – the largest increase was seen in food-related services (49%) as well as intercity passenger transport (23%). At the other extreme there was other passenger land transport, which recorded a 6% decrease in gross added value. The contribution of individual sectors in the creation of gross added value was relatively stable. Cultural and leisure activities had the largest share, while air and land passenger transports changed places: the second and third.

The calculation of tourism contribution to the creation of Warsaw's GDP requires complementing gross added value by the value of net indirect taxes on products

¹¹ They are estimates and may not fully take into account the effects of microenterprises' activities, for the reason that the majority of companies' data include entities with more than nine employees.

generated in tourism industries. As a result, its size is estimated to 14,175 million PLN in 2014 and 15,363 million PLN in 2016. In 2014, the contribution of tourism industries to GDP in Warsaw amounted to 6.2%.

When it comes to employment in tourism industries in Warsaw along with the division into types of activity – it is shown in Table 16.2.

Table 16.2. Employment in tourism industries in Warsaw in 2014 and 2016

Types of activities	Employees	
	2014	2016
Accommodation	13,190	13,000
Services related to catering	15,965	16,300
Passenger railway transport	9,844	9,800
Passenger land transport	4,564	4,375
Passenger air transport	3,000	3,050
Services supporting air transport	4,005	4,000
Activities related to tourism	3,527	3,700
Activities in the field of culture and leisure*	15,307	15,900
In total	69,402	70,125

* Activities of libraries, archives, museums and other cultural activities; sports, entertainment and leisure activities.

Source: SBRIPT [2017].

Data on the labor market are one of the most important information about the economic and social situation in a given country or region. However, in case of tourism supply, collecting these data is very difficult due to seasonality and low stability of employment, a large share of microenterprises and the presence of shadow economy. These phenomena particularly occur within catering services connected with accommodation in places other than hotels and partly in passenger transport. The impact of these factors on the labor market in tourism in urban tourist centers such as Warsaw is slightly smaller due to the lower seasonality index and the large share of hotels in the accommodation base. According to available statistical data, the number of employed in tourism industries in Warsaw amounted to 69,402 persons in 2014 and 70,125 persons in 2016. It constituted 6.2% of total employment in Warsaw in 2014 (no data for comparison in 2016). During this period, the employment in the tourism sectors increased in total by 1% [SBRIPT, 2017].

Investments on tourism in Warsaw are an interesting finding. Their calculation in tourism is not simple (limitations related to the lack of data or problems in including the initiatives into the tourism category). The estimated values for five characteristic activities (tourism industries) show an increase in expenditures, which cannot be

confused with the value of fixed assets generated in their effect. The largest investments are related to transport. It requires the most extensive infrastructure, including road and rail system (along with metro). It should be remembered that they also serve the residents of Warsaw (and even to a greater extent than tourists). The situation is similar regarding the expenditures on sports, leisure and cultural activities, which build the attractiveness of Warsaw, both from the perspective of tourists and residents. Investments related to the field of servicing the tourist traffic e.g., accommodation, are lower – 244.9 million PLN [SBRiPT, 2017]. This value most strongly indicates potential for tourism. The growing base, the activity of large hotel chains investing in facilities, whose basis of income are tourists, proves a positive perception of tourism as a field of economic activity.

Table 16.3. Investment expenditures on tourism in Warsaw in 2014 and 2016

Types of activities	Expenditures (million PLN)	
	2014	2016
Accommodation	244.9	268.5
Services related to catering	163.7	178.6
Transport*	1,238.3	1,358.9
Activities related to tourism	19.7	21.8
Activities in the field of culture and leisure**	553.4	591.0
In total	2,220.2	2,418.8

* Including activities supporting air transport.

** Activities of libraries, archives, museums and other cultural activities; sports, entertainment and leisure activities.

Source: SBRiPT [2017].

When it comes to the share of tourism in the budgetary revenue and expenditure of the capital city of Warsaw, the revenue from tourism in 2014 amounted to 80,266.9 PLN, and in 2016–99,041.7 PLN. The share of tourism in the budgetary revenue of the capital city of Warsaw in 2014 amounted to 0.59% and in 2016–0.67%. Budgetary expenditure on tourism in 2014 amounted to 4,156.3 PLN, a year later – 3,955.7 PLN, and 1,551.9 PLN in 2016. Finally, the share of tourism in the budgetary expenditure of the capital city in 2014 and 2015 amounted to 0.03%, and in 2016–0.04% [SBRiPT, 2017].

Tourism has a direct impact on the scale of own revenue of local government units. In the case of capital city of Warsaw, its main sources of income from this account were: share in revenue from income tax (from natural and legal persons) and income from property tax. It should be emphasized that the share of local government units in revenue from income tax varies depending on the type of taxpayer. In case of natural persons, in the years 2014–2016, the total revenues to the budget of county

government and municipal government from personal income tax were on the level of 49.59% of their total amount, while for legal entities – 8.11%. The analysis shows that the total revenue from income tax generated by tourism was systematically growing and amounted to: in 2014–76,721.9 PLN in 2015–88,303.8 PLN, in 2016–94,704.8 PLN [SBRiPT, 2017].

Another source of budgetary revenue of the capital city of Warsaw, generated by tourism, was income from property tax, collected from facilities that create tourist infrastructure and in particular facilities used for accommodating tourists. The lack of data concerning the size of these objects entailed the need to estimate it. The number of accommodation places (provided in statistical studies) and the minimum area per one accommodation space in this database specified in the regulations (taking into account the diversity resulting from the type, standard and category of the facility) became the basis for the calculations. It shows that the revenue from the real estate tax, collected from the facilities included in the accommodation base, amounted to: 4,305.0 PLN in 2014, in 2015–4,313.8 PLN and in 2016–4,336.9 PLN [SBRiPT, 2017]. However, the above calculation does not take into account the taxation of space used by travel agencies and tourist information centers. Adding these spaces justifies the conclusion that the income from property tax generated by tourism was higher than it results from the calculation presented. In the years 2014–2016, revenue from tourism, from income tax and real estate tax systematically increased and reached the following levels: in 2014–81 million, in 2015–93 million, and in 2016–99 million. Their share in total revenues also increased: from 0.59% in 2014 to 0.65% in 2015, and to 0.67% in 2016. Whereas, the spending on tourism in the analyzed period amounted to: in 2014–4.2 million PLN, in 2015–4 million PLN, and in 2016–5.5 million PLN. The share of expenditure on tourism in the total amount of expenses from the budget of the capital city of Warsaw ranged from 0.03% in 2014 and 2015 to 0.04% in 2016 [SBRiPT, 2017].

Warsaw in Rankings of Cities and Tourists Opinions

Openness in the tourism sphere proves general hospitality, tolerance and readiness of the city to build and care for transnational relations in other spheres of social, cultural and economic life. " (...) the scale and scope of internationalization should be treated in terms of the city's readiness to participate in various development processes of modern civilization" [Zmysłony, 2015, p. 317]. Taking this into consideration, Warsaw with 20.8 million visitors annually, of which almost 3 million are foreign visitors, is the largest internationalization center among Polish cities [SBRiPT, 2017].

Nevertheless, the distribution of main purposes for visiting Warsaw is surprising: while the highest rate is attributed to visiting monuments as part of domestic and foreign traffic (respectively 40% and 29%), the leisure purposes (17% of domestic tourists and 24% of foreigners) are in second place, and only in further places are: visits to friends and relatives (11% and 9%), business matters (5% and 7%) and participation in cultural events (5% and 2%) [Tourism in Warsaw, 2017]. On a scale of 1 to 10, the assessment of tourist attractiveness of Warsaw in the eyes of tourists is at the level of 8.2, and the average length of stay in the city is 4.5 days. As one can expect, the average declared amount of expenses during a visit in Warsaw is significantly higher for foreigners (1,422 PLN) than for Poles (402 PLN), but the average tendency of tourists to recommend a trip to Warsaw to a family or friend in both groups is at the level of 8.4 (on a scale of 1 to 10) [Tourism in Warsaw, 2017].

In the ranking of European cities with the best economic prospects [E-REGI, 2016], Warsaw occupies the 20th place (1st place among the cities of Central and Eastern Europe) while in the fDi ranking of European Cities and Regions of the Future 2016/17 it takes the 4th place in the business friendliness category, 6th place in the East European Cities of the Future 2016/17 category and in the EMEA Investor Intentions Survey 2016 ranking (in the field of real estate investments) [Mullan, 2016].

What is more, Warsaw achieves high results in terms of generally understood quality of life: 79% of residents having a choice indicate Warsaw for the city they want to live in, 85% – well assess the level of security in Warsaw, 84% – highly evaluate order and cleanliness in the city, 87% – well assess the condition of urban greenery and availability of green areas, 85% – highly evaluate functioning of public transport, and 70% – considers Warsaw a city friendly to cyclists [Tourism in Warsaw, 2017].

In the context of internationalization, the transport accessibility of the city – mainly aviation – is of particular importance. In the ranking comparing European airports in terms of amenities for passengers [Best Airports in Europe, 2016], Chopin airport took 11th place, and in the list of airports with the highest number of new connections (Euro ANNIE) – 1st place. Chopin Airport was also honored with the title of IDOLA among institutions and companies friendly to the blind (ultrasound typhlographic maps).

Another important indicator of the city's competitiveness and its internationalization is the number and nature of conference events. In 2016, over 17.5 thousand of these events were held (another Polish city in this category, Cracow, recorded only 7,000 meetings), and the number of participants reached almost 1.5 million. In the world ranking of ICCA (International Congress and Convention Association), Warsaw took 19th place among European cities [Tourism in Warsaw, 2017].

However, according to the synthetic indicator of the international potential of Polish cities, in terms of tourism function in 2012 (last survey), Cracow is ahead of

Warsaw (0.72 vs. 0.69), while at the beginning of the first decade of the 21st century Warsaw was the undisputed leader [Zmysłony, 2015]. Both cities improved their results, but Cracow noted a much higher dynamics of changes. These two cities have also achieved the status of international cities in respect of tourism functions, which means their very wide opening to foreign countries, nevertheless, the structure of their international potential is different. The earlier mentioned indicator was developed by Zmysłony [2015] on the basis of the following components:

- intensity of foreign tourist traffic (number of accommodations provided to foreigners/number of inhabitants \times 100);
- intensity of foreign accommodation and catering operations (number of foreign entities – accommodation + catering/number of business entities \times 100,000);
- city's networking/international cultural heritage (number of direct foreign air connections/number of inhabitants \times 1 million);
- intensity of foreign activities in the sphere of organization and servicing tourist traffic (number of foreign entities – organizers, pilots, guides/number of business entities \times 100,000);
- intensity of foreign activities in the sphere of culture and sport (number of foreign entities – culture + sport/number of foreign entities \times 100,000);
- international museum-connected activity (number of exhibitions from abroad in museums/number of inhabitants \times 1 million).

Being acquainted with the component structure of tourism internationalization potential indicator, it should be noted that Cracow is characterized by the highest degree of openness to foreign countries only in the area of the size of international tourist traffic, whereas in Warsaw the highest degree of internationalization was found in economic terms (the intensity of foreign activity in the field of accommodation and catering, organization and servicing tourism, culture and sport). Such a structure seems to be beneficial for two reasons: firstly, through diversification it reduces the risk of collapse of the internationalization potential. Secondly, it ties up the tourist climate of the city to a lesser extent with the level of economic stability of the rest of the world. In case of unfavorable economic phenomena abroad, reducing expenses on leisure tourism is the fastest, while much slower – on business tourism and economic exchange.

Conclusions

The dynamic development of tourism makes it not only an important source of income and employment in urban areas, but also of cultural and social development (redistribution of income, reduction of poverty, increase of attractiveness and quality of

life). It also causes negative consequences: from degradation of anthropogenic values, appropriation of urban space, reduction of accessibility (physical and economic) of the city center and attractions that are important from the point of view of local residents (parks, boulevards, promenades, recreational and cultural facilities), to increased costs of living and displacing other forms of economic and investment activity.

Undertaking activities in the field of investment plans, city development strategies or protection of its resources require reliable knowledge about the impact and significance of individual urban functions and the potential for their development. Tourism – as one of the most important exogenous functions – also shows significant importance in the context of internationalization of the city: it has both the power of attraction, as well as it is conducive to the generation of traffic, which strengthens ties with other economic areas, allows synergies in the development of culture and shapes social relations.

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Cultural Diversity of the City: Costs and Benefits. Research Overview

Lidia Danik

Introduction

The term diversity refers to any attributes that make other people perceived as different [O'Railly et al., 1998]. Cultural identity is one of the attributes that is associated with sharing certain norms, values, priorities or socio-cultural heritage [Cox, 1993]. The degree to which a person identifies with his/her own cultural group differs both in case of cultural groups and individual members of a specific community. Moreover, it may also depend on the context. Cultural identity is a comprehensive and dynamic social phenomenon [Ely, Thomas, 2001].

Cities, especially those well-developed economically and perceived as an attractive place to live, attract immigrants, which results in the increase of cultural diversity in a given area. On the one hand, it can be a source of fears and threats, on the other – it creates a chance for the city to achieve a great deal of benefits. The impact of cultural diversity on the standard of living of urban residents is the subject of numerous studies, especially of scientists from countries as culturally diverse as: USA, Canada, the United Kingdom, Australia. In Polish scientific literature, this subject is almost absent, nevertheless, it arouses a lot of interest among decision-makers, especially politicians and local authorities. The purpose of this chapter is an attempt to systematize knowledge about the benefits and risks that cultural diversity of cities brings, as well as an identification of its possible impact on their competitiveness.

Cultural Diversity of Cities as a Source of Threats

Cultural diversity of the city may generate costs manifested as conflicts, which is extensively explained by social psychology and in particular by:

- psychodynamic theories – allowing to better understand the dynamics of intergroup conflicts;
- cognitive theories – explaining how knowledge and information processing can affect intergroup relationships;
- relative deprivation theory – describing how the sense of deprivation (dissatisfaction), arising from comparing to groups whose needs are satisfied, may lead to prejudices and hostility towards others;
- realistic conflict theory – touching upon the problem of conflicts between groups competing for certain goods;
- social identity theory – showing that the creation of prejudices towards other groups is the result of a natural social categorization process.

The differences between groups (also between representatives of individual cultures) lead to conflict situations [Pelled et al., 1999]. This mechanism works in a variety of ways. First of all, members of other groups often become subject to prejudices and stereotypes, which causes conflicts. Secondly, individuals in their actions tend to favor members of their own group, which is also not conducive to good relations. What is more, cultural differences may make it difficult for the representatives of individual cultures to communicate; culture affects the entire communication process. Starting from pre-editing at the stage when decisions are made, what information should be known for general public and what should be kept for oneself; through coding, during which the thought is recorded using a specific code (e.g., direct communication or using phrases that require reading between the lines); then by selecting communication channels (e.g., personal transfer of information or via the Internet); up to process of decoding the message and its post-editing (the culture affects the type of information people see and how they perceive it).

Individual cultural groups may differ in terms of demand for public goods provided by the city. The differences in preferences may concern, for example, the division of expenditure on education, roads and public transport, health service, which can also generate conflicts.

Intercultural conflicts can also contribute to an increased sense of threat from new residents of the city, perceived by natives as strangers. The feeling of threat may concern various aspects of coexistence, ranging from anxiety caused by increased crime, through a sense of threat of losing jobs, housing, social benefits for strangers, to the threat of their own culture or even denationalization [Khovanova-Rubicondo, Pinelli, 2012]. Also, representatives of a cultural minority may incur costs related to living in a multicultural city. These include misunderstanding of the cultural context resulting in difficulties in professional and private life, being discriminated [Goeder, 2017], and exclusion. Lack of integration, difficulties in communication and conflicts

of individual cultural groups may, therefore, contribute to lowering the standard of living, production volume, income level of all cultural groups inhabiting the city.

It is difficult to find the research confirming the negative impact of cultural diversity on urban development to illustrate this problem. However, one can refer to the study on ethnic diversity, which, for some authors, is synonymous with cultural [Mathan, Lee, 2013], racial and linguistic diversity. Many of such analyzes have been conducted in the cities of the United States, which offer a good opportunity to isolate the impact of diversity on the economic situation. And so, the analyzes of spending on public goods in American cities showed that the share of expenditures on education, roads and town cleaning services was negatively correlated with the degree of ethnic fragmentation [Alesina et al., 1999]. The authors explain this by ethnic conflict. First of all, the majority group can oppose spending on the public sphere, of which the ethnic minority would benefit the most [Goodhart, 2004]. Secondly, the benefits of particular public goods may be lower for individual groups or also appear lower if they are used by people from other groups (e.g., parents may be afraid that the level of education at school will decrease if a large group of children, belonging to an ethnic minority, appears in it).

Another issue raised by researchers is the negative impact of diversity on social capital in individual communities. This relation is confirmed by the analyzes conducted by Alesina and La Ferrara [2000] regarding social capital in the US cities. The measure of social capital in this case was participation in religious, educational, youth and sports associations and groups, hobby clubs, etc. It was shown that income inequality and racial and ethnic diversity reduce the tendency to become involved in social life, through belonging to such groups. The strongest effect was observed for racial diversity. It affects more strongly the tendency to join groups in which the direct contact of members is important (e.g., in churches, youth associations) than those where the level of interaction is lower (e.g., in professional associations). An important observation seems to be that people who were particularly reluctant to interracial relations were the least interested in participating in life of the surveyed groups. Another interesting observation is that the level of education was positively correlated with participation in social life.

It is also worth mentioning another research of Alesina and La Ferrara [2002] dedicated to social capital. It concerned the determinants of trust. As it turned out, the reasons for low trust in other people can be seen in diversity: people living in racialized communities are characterized by less trust. The most likely explanation of lower trust is that people trust less those, who are different than themselves. As in the places characterized by a large diversity, the contacts between particular groups of people are relatively frequent, the average level of trust that other people are endowed with

is lower. If a certain number of members of a given community belongs to a group that is historically or currently discriminated, and in particular belongs to a minority, in the light of the authors' research, its members are characterized by a lower level of trust. Individuals surrounded by wary people are also less likely to trust other people, which is a kind of self-reinforcing mechanism. It was proven that people reluctant to racial integration were characterized by the lower level of trust in other people, the more racially diverse their community was.

Both trust and the tendency to unite are important components of social capital. They affect the quality of life in individual communities, and in particular the quality of public institutions' functioning, the effectiveness of economic transactions or ultimately the economic development of regions [Putnam, 1995; Fukuyama, 1997; Knack, Keefer, 1997]. Given the above, cities with higher diversity should develop slower and their inhabitants should achieve lower income. This dependence, however, is weakened by several mechanisms. First of all, as mentioned before, the growth of social capital in communities characterized by diversity is promoted by a higher level of education and openness to integration. The attitudes of the inhabitants can, therefore, significantly mitigate the negative effects of diversity. The higher negative effects of diversity on the income of residents and on economic development are observed mainly in poor [Alesina, La Ferrara, 2005] and undemocratic societies [Collier et al., 2001]. It can be assumed that rich democratic countries not only deal better with the problems arising from diversity, but also that these problems occur there less frequently, due to open attitude of their inhabitants. Moreover, they can take advantage of the benefits that diversity brings.

Cultural Diversity – a Source of Benefits for the City

The benefits for the city from cultural diversity can be considered from a social and economic perspective. When discussing the first one, it is stressed that thanks to cultural diversity, city residents have access to a more varied commercial and cultural offer – their quality of life rises, because they can use a wide range of services, corresponding to the tastes and needs of people from different parts of the world. In this sense, cultural diversity in itself is a value [Khovanova-Rubicondo, Pinelli, 2012].

The variety of commercial offer, culture, tastes, possibilities, needs or even obsessions, mosaic of inhabitants and visitors is one of the engines of the city's development [Jacobs, 1961, p. 137], also bringing more tangible benefits. The first of them is connected with the fact that culturally diverse centers attract talented employees from all over the world [Florida, 2002], thus, provide a supply of educated,

creative and innovative workforce to the enterprises located there. Newcomers are easier to acclimatize in such places thanks to access to products and services from the country they come from. Attracting talents by cities characterized by diversity has been confirmed in American and Canadian research [Florida, 2002; Gertler et al., 2002]. Cities attracting talents are more competitive and innovative.

Cultural diversity in itself promotes greater innovativeness, which results from the possibility of combining multiple points of view and the use of diverse knowledge. Diversity has also the opposite effect: innovativeness is decreased by communication problems and conflicts within the groups [Milliken et al., 2003]. However, most studies devoted to interrelations show that the benefits of cultural diversity, in terms of innovation, outweigh its negative effects. The positive impact of diversity on both creativity and the ability to implement new solutions is visible, among others, in analyzes performed by O'Railly et al. [1998] on the sample of clothing industry employees as well as the Niebuhr study [2006] of German regions included in the NUTS 3 EU classification (Nomenclature of Territorial Units for Statistics).

An important observation made in the latter research is that the diversity among highly qualified employees had the highest impact on innovativeness. Niebuhr says it is because the introduction of innovations is more determined by skilled than unskilled workers, hence, the cultural diversity among the latter is of lesser importance.

An interesting and non-obvious dependence between innovativeness and diversity was shown by Ozgen et al. [2011], who studied Dutch companies. As it turns out, a large percentage of foreigners among the companies' employees was associated with lower innovativeness. As the authors claim, this dependence is consistent with the neoclassical economic theory: in case of availability of immigrants with low wage expectations, companies base their strategies on labor-intensive technologies. Such technologies do not require investing in innovation. Nevertheless, the research showed that greater diversity among foreign workers stimulates process and product innovations. Thus, the level of diversity, and, to a lesser extent, the fact of employing workers from other cultures, affects innovativeness.

Also, Mathan and Lee [2013], who studied London companies, show a clear relationship between cultural diversity and innovativeness. The authors focused on the managerial staff, assuming that they influence key decisions related to innovation. Companies that had culturally diverse staff more often introduced product innovations than those in which employees were homogeneous. What is more, diversity also favored the internationalization of enterprises and the service of cosmopolitan London market. Besides, companies led by immigrants showed greater pro-activity. These observations are consistent with the results of the Organization for Economic Co-operation and Development (OECD) report, according to which in almost all

OECD countries immigrants are a bit more entrepreneurial and more often start new companies (thus, creating new jobs) than representatives of the host country [OECD, 2011]. Entrepreneurial activities do not only concern fields traditionally attributed to immigrants, such as small stores that provide food to people of a particular nation or originating from a specific region, but also all other economic activities, including innovative ones [see Saxenian, 1999; Wadhwa et al., 2012]¹. It is also worth emphasizing that culturally diverse staff, like the cultural diversity of the city, may not only attract but also retain for longer talented employees from around the world [Cukier et al., 2011].

The analysis of empirical research on the labor market shows that the influence of immigrants on the labor market is positive [Sieroń, 2016], while these benefits go far beyond the performance of low-paid jobs, unpopular among indigenous residents in developed countries and the replacement of aging employees. In the years 2000–2010, immigrants were responsible for e.g., 70% of employment growth in the European Union and 40% of growth in the USA [OECD, 2012].

Greater resistance to all kinds of shocks caused by changes in the environment is additional advantage brought by cultural diversity. Multicultural enterprises more easily adapt to changes – since individual cultures are linked to specific knowledge and abilities that may be useful in new specific circumstances [Khovanova-Rubicondo, Pinelli, 2012].

The positive impact of cultural diversity on the wealth increase of American cities hosting immigrants was shown in a long-term study performed by Ottaviano and Peri [2005]. The authors identified a positive impact of cultural diversity on the earnings of indigenous people in the years 1970–1990. However, it is worth noting that the benefits brought to cities by the immigrants who have integrated (i.e., they lived in the USA for a long time and used English language well), were larger than for new immigrants. The methodology proposed by Ottaviano and Peri [2005] was later used by Bellini et al. [2008] who confirmed the positive impact of cultural diversity on production efficiency in the following European countries: Austria, Belgium, Denmark, France, Germany, Spain, the Netherlands, Ireland, Portugal, Sweden, Italy, the United Kingdom (the analysis was based on data from 1990 and 2000 for NUTS 3 regions).

A similar conclusion was reached by Ager and Brückner [2013], who studied the economic growth of counties in the USA in the years of mass immigration (1870–1920). They confirmed that greater cultural fragmentation resulted in higher production per

¹ E.g., according to Saxenian, immigrants constituted 1/3 of researchers and engineers in the Silicon Valley in the last two decades of the 20th century. Wadhawa et al. state that in case of around ¼ of engineering and technology companies established in the USA, in 2006–2012 at least one of the founders was born outside the USA (for Silicon Valley, it concerned 43.9% of companies).

capita. In addition, they drew attention to cultural polarization² and showed that it has a negative impact on economic development. The authors explain the negative impact of cultural polarization on production per capita, by referring to literature on conflicts and indicating the destabilizing impact of polarization on social life.

Conclusions

Cultural diversity has multiple effects on the standard of living of urban residents. It can bring both positive and negative social and economic effects. The main threats posed by diversity are as follows:

- low social capital in multicultural cities;
- risk of conflicts between representatives of particular cultural groups;
- difficult communication;
- a sense of alienation, discrimination against cultural minorities;
- reduced spending on public goods in culturally diverse cities.

On the other hand, cultural diversity brings to the cities such benefits as:

- access to diversified products and services;
- attracting tourists and talented employees;
- increase in affluence of residents, thanks to higher innovativeness, proactivity, internationalization of enterprises and creation of new jobs.

Contact with people leading a different lifestyle (often through mass culture), mobility and higher education, help to fight the fears of coexistence with representatives of other cultures [Goodhart, 2004]. The institutions and legal regulations designed for integration also have a large impact on the possibility of achieving benefits from cultural diversity [Niebuhr, 2006]. Municipal authorities can actively prevent negative aspects of cultural diversity and support the emergence of its positive effects through:

- co-operation with organizations associating cultural minorities, especially in the area of deepening knowledge about particular cultures among city residents and promoting social and political involvement of representatives of cultural minorities, who, in this way, gain a tool to defend minority interests and popularize their own culture;
- employee training in the field of intercultural issues;
- various forms of support for newcomers from other cultures;
- promoting cultural diversity as an asset of the city;

² The polarization index reaches the maximum value when a given community consists of two groups having the same number.

- providing the representatives of individual cultures with the possibility of establishing relationships e.g., during cultural festivals;
- promoting intercultural dialogue through art;
- initiating anti-discrimination activities;
- managing urban space in such a way as to be friendly to representatives of various cultural groups [CLIP, 2010; Gooder, 2017].

Cities that want to take advantage of cultural diversity's potential can benefit from support under the "Intercultural Cities" program, a joint initiative of the Council of Europe and the European Commission. This program helps cities to create their intercultural identity and minimize conflicts as well as ethnic tensions. It also supports city management in such a way as to take advantage of talents, skills and ties of cultural minorities with the markets from which they originate. The authors of the EU program draw attention to building understanding between different ethnic groups, creating an atmosphere of mutual trust, cohesion and solidarity. Cities participating in the project receive support from experts and representatives of other cities that provide public space and services to all residents of the city, introduce innovative intercultural solutions in public institutions and conduct discussions in the media, serving in favor of positive perception of immigrants and minority groups³. The only Polish city taking part in this initiative is Lublin [CE, 2017], which is surprising, if one takes into account that cultural diversity can be of key importance for the city's competitiveness.

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³ More information on this subject can be found at: www.coe.int/en/web/interculturalcities.

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Final Conclusions

The Competitive Position of the Polish Economy in 2010–2017 with Focus on City Competitiveness

Marzenna Anna Weresa, Arkadiusz Michał Kowalski

The contemporary global economy is characterized by the increasing importance of cities and regions in economic and social development. On the one hand, there is a limited sovereignty of countries due to the role of supranational organizations and institutions. On the other hand, the decentralization of governance and the delegation of decision-making powers at the local level are observed. Due to their ability to adapt to the changing conditions of the market, technology and culture, cities are becoming increasingly significant in the global economic system. City competitiveness is an issue of growing scientific interest and high research potential, as a result of the increasing economic importance of cities, as well as the unique specificity and interesting nature of connections observed at the urban economic level. The economic and social impact of cities, especially metropolises, goes beyond the local level affecting the world economy (e.g., within a global network of cities), and creating new opportunities for their competitiveness.

The cities' competitiveness, as well as their growing role in shaping competitiveness of the whole country are one of the main motives for undertaking research on this subject presented in this monograph. The main objectives of the research are:

- identifying the factors affecting Poland's competitive position in 2017;
- determining the competitiveness of Polish cities, taking into account specific factors characterizing the competitiveness at the mezo-economic level;
- exploring how and why the competitiveness of the Polish economy changed from 2010 to 2017.

The analysis of Poland's competitiveness focuses on the national economy and its links with the global market. Economy's competitiveness refers to changes in the welfare of a society, including its social dimension (income inequalities), and takes into account the position of domestic goods and services on foreign markets, as well as the attractiveness for foreign factors of production.

Another dimension of competitiveness analyzed in this book is city competitiveness. Its definition has been derived from the economic literature. City competitiveness is

the ability of a city's economy to attract production factors and achieve productivity growth in the management process, resulting in a strong competitive position of local enterprises on the domestic and international market, and contributing to growing income levels and living standards of residents. The conducted analyzes emphasize the multidimensionality of competitiveness at the mezo-economic level (cities, regions). It goes beyond the economic aspect, as some elements of sustainable development should also be included. This is of significant importance in the context of striving for social balance and a sustainable use of the natural environment.

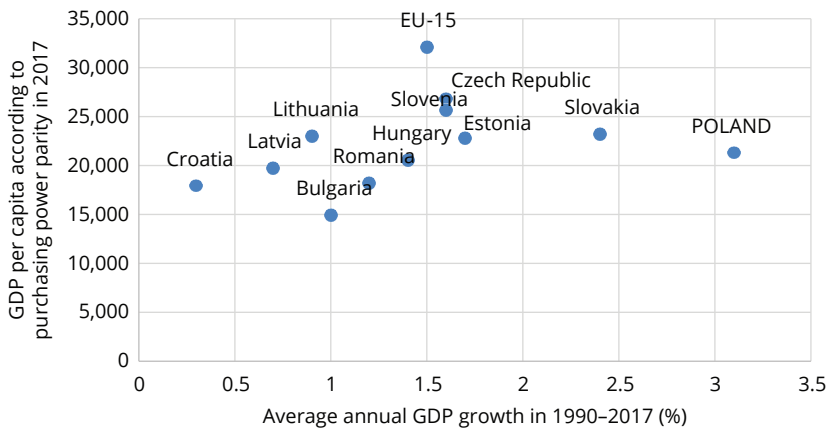
Under this conceptual framework, in this monograph Poland's competitive position has been compared to the other EU Member States, especially those from Central and Eastern Europe. The purpose of these analyzes is to find answers to the following questions: Did the competitiveness of the Polish economy improve during 2010–2017? What are the factors that determine the competitive position of the Polish economy and stipulate its changes? What is the current state of city competitiveness in Poland, and what specific features are the most significant in the process of shaping competitiveness?

The results of the analyzes conducted in subsequent chapters of the monograph indicate a slight improvement in Poland's competitive position in 2010–2017 in the European Union, as measured by the share of GDP in the entire EU area (according to the purchasing power parity standard). It grew from 4.7% to 5.3%. According to the estimates, the annual GDP growth rate in Poland (in constant prices) was equal to 4.2% in 2017. Poland lost the position of the economic growth leader in the group of Central and Eastern European countries as higher growth rates in 2017 were achieved by: Romania, Slovenia, Estonia and the Czech Republic. As a result, the process of catching up with more developed economies of the European Union slowed down, but Poland was still closing the development gap. During 2010–2017, the GDP per capita (according to the purchasing power parity) increased from 57% to 66% i.e., by nine percentage points (p.p.) in relation to the average in the EU-15 countries, while in the previous six-year period of 2004–2010 this difference decreased by as much as 14 p.p. Real convergence was the fastest in relation to the United Kingdom, Italy and Greece, and when compared to the EU countries from Central and Eastern Europe – to Slovenia and the Czech Republic. In 2017 Poland overtook Hungary in terms of GDP per capita, having overtaken Greece already in 2015.

Poland's position can be compared to that of the other EU countries from Central and Eastern Europe in the long-term perspective considering two criteria together i.e., the level of GDP per capita and the rate of real GDP growth (Figure 18.1). When analyzing the entire 27-year period that has passed since the beginning of the systemic transformation in this region, it can be concluded that Poland has achieved the best

results in terms of the real GDP growth rate, while it still lags behind several countries from Central and Eastern Europe in terms of GDP per capita (Figure 18.1).

Figure 18.1. GDP growth in 1990–2017 and the development level measured by the GDP per capita according to the purchasing power parity (PPS) in 2017: Poland compared to the EU countries in Central and Eastern Europe



Source: Own study based on Eurostat data.

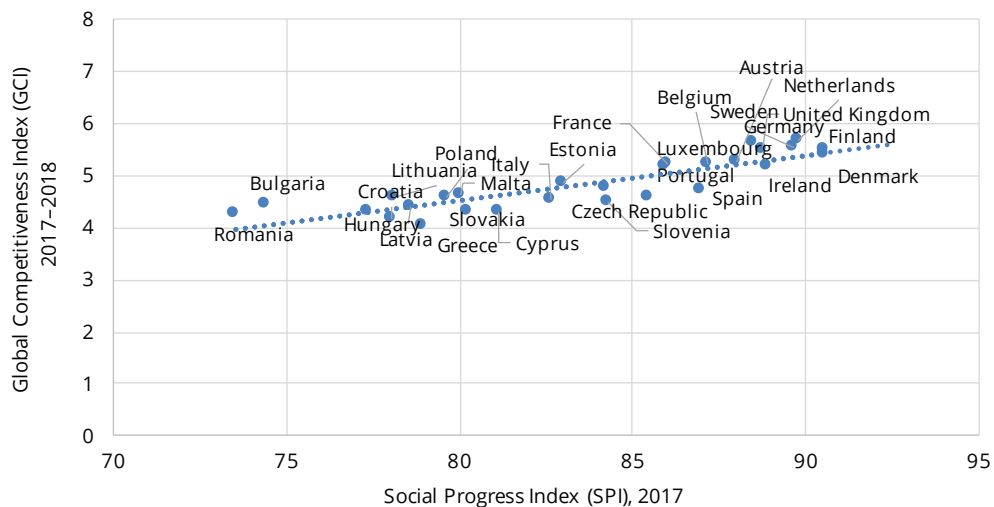
When adding a social dimension to the macro-economic dimension of competitiveness it is necessary to present the degree of household income distribution as measured by the Gini coefficient. In Poland, the level of income inequality and poverty risk is similar to the EU-28 average, and a gradual decrease in the indicators of income inequalities and the risk of poverty have been noted in 2010–2017. The Gini coefficient in Poland was equal to 30.4 in 2016, compared to 34.2 in 2010, which indicates a decrease in income inequality. The changes in income inequality were affected by the "Family 500+" program, as proven by the analysis conducted in chapter 3 of this monograph. Transfers from abroad, connected with the emigration of Poles to the other EU countries, also played a role, as proven in the last year's edition of this monograph [Weresa, 2017].

The Social Progress Index (SPI) is another measure of social development. It goes beyond GDP growth, covering social and environmental aspects of development. The index includes three dimensions: basic human needs, foundations of well-being and opportunities to progress [Porter et al., 2017, pp. 16–18]. The advantage of the SPI index in measuring social and environmental dimension of development is that it does not include economic results, such as economic growth rates. This means that it is possible to directly assess social progress and environmental protection without considering economic aspects. The SPI was used for the first time in 2015,

so conducting long-term comparative research is unfortunately impossible, as long time data series are not available.

When using the social progress index for measuring social and environmental components of competitiveness, it can be observed that Slovenia, in this respect, was the leader among the EU countries from Central and Eastern Europe in 2017, followed by the Czech Republic and Estonia, and later Slovakia and Poland. Poland was only 21st in terms of the value of the SPI in all of the EU, which is a decrease by three positions compared to the previous year. It also should be noted that social progress and competitiveness are interrelated, which is confirmed by the high correlation coefficient between the SPI index and the competitiveness index of the World Economic Forum (GCI). The Pearson correlation coefficient between the two variables for the EU countries was equal to 0.864 in 2017 (Figure 18.2).

Figure 18.2. Social and environmental factors and the competitiveness of the EU countries in 2017

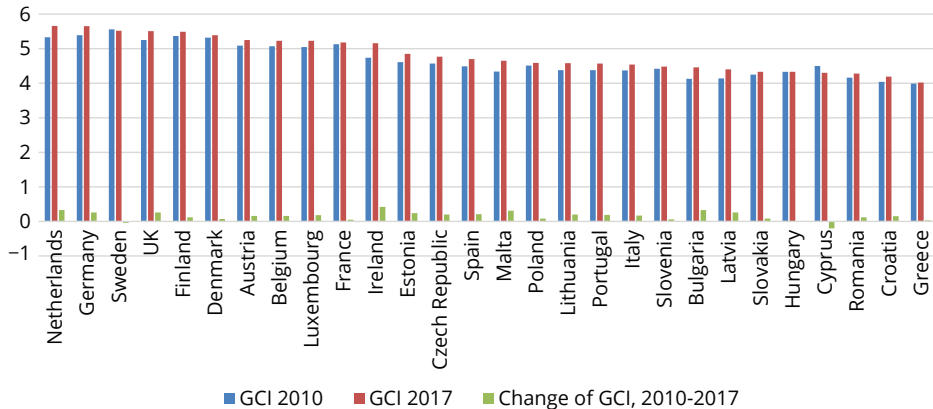


Source: Own study based on data [Porter et al., 2017, pp. 4–5] and [WEF, 2017, p. 13].

To wrap up the analyzes of the competitiveness of the Polish economy conducted in the monograph, an answer to the research question regarding the change of Poland's competitive position in 2010–2017 should be provided. It can be illustrated by the change in the Global Competitiveness Index (GCI) over the period of 2010–2017. Its value for Poland increased slightly in 2010–2017, but some EU countries improved their economic competitiveness more strongly than Poland (there are: Spain, Estonia, the Czech Republic, and Malta). As a result, Poland ranked at the 16th position in 2017

(as in 2016) among the EU countries, moving down by two positions in the ranking compared to 2010 (Figure 18.3).

Figure 18.3. Poland's position compared with the other EU countries in the World Economic Forum's competitiveness ranking: a comparison of 2010 and 2017



Source: Own study based on data [WEF, 2010, p. 15] and [WEF, 2017 p. 13].

In conclusion, Poland's competitive position in the EU in 2017 did not change compared to the preceding year, although it weakened throughout the overall period of 2010–2017. This is reflected in a decrease by two positions in the ranking of the EU countries since 2010. However, some positive changes have also been observed in Poland's competitiveness throughout the analyzed period. These include an increase of GDP per capita, the continuation of income convergence processes and gradual progress in the social and environmental dimension of competitiveness. The pace of these changes was however not sufficient to bring an improvement of Poland's position in the competitiveness ranking. In 2017, Poland took the 39th place in the WEF ranking, which covers 137 countries from around the world, falling from the 36th place it occupied in 2016 [WEF, 2017, p. 13].

What were the main determinants of changes in Poland's competitive position in the EU in 2010–2017? Two groups of factors were analyzed in detail in this monograph: changes in economic policy and institutional environment, as well as the development of tangible and intangible resources.

The influence of institutional factors and the economic policy pursued in recent years was multidirectional when considering the competitiveness of the Polish economy. As indicated in chapter 6 of the monograph, Poland is characterized by institutional inconsistency as implemented institutional changes come from different institutional orders and represent a low degree of complementarity. This is one of the

reasons why Poland has been slower in improving competitiveness than other countries. The second reason is the state's failure in providing a sound business environment for sustainable long-term economic development. This is reflected in insufficient institutional changes in the functioning of the R&D sphere, under-financing of the R&D sector and ICT, as well as insufficient support for the development of human and social capital. The weakening role of institutional factors in shaping Poland's competitiveness in 2010–2017 is reflected in the analyzes of the World Economic Forum. When it comes to the institutional pillar of competitiveness, Poland moved in the ranking of the WEF from the 54th to the 72nd position in 2010–2017. When comparing Poland's position in 2017 with the preceding year only, it can be observed that it moved down by seven positions in the 2017 ranking [WEF, 2017, p. 240].

As far as capital resources are concerned, diverse tendencies were noted in 2010–2017. The value of investments in Poland decreased in 2010–2013, mainly due to negative effects of the global economic and financial crisis during this period. The following years brought significant fluctuations in the value of domestic and foreign investments, which to some extent weakened Poland's competitive position compared to that of the other EU countries. In 2017, the value of investment outlays increased in Poland by over 5%. The growth rate of investment outlays in Poland was, however, lower than in Slovakia (5.6%), in the Czech Republic (8.4%) and in Hungary (21.5%) i.e., in countries that were traditionally Poland's main competitors in Central and Eastern Europe. These diverse tendencies show that investments did not play a significant role in stimulating Poland's competitiveness during 2010–2017.

The lower than expected improvement in Poland's competitiveness (and even its relative weakening in comparison with some countries, as indicated by the WEF analyzes) can also be attributed to the low innovativeness of the Polish economy. In terms of innovativeness Poland occupies the 25th place among EU countries, being a moderate innovator (see Chapter 8). Low expenditures on research and development as well as insufficient expenditures of enterprises on innovative activities are the reasons behind this low innovation performance. In 2010–2017, there was a slight increase in expenditure on R&D (only by 0.25 p.p. in relation to GDP), while the innovation expenditures as a percentage of turnover were quite high compared to the EU average, but rather stable in the analyzed period (in 2016, 1.25% compared to the EU average of 0.76%). However, they are still too low to create the critical mass that is necessary to improve competitiveness significantly. Underfunding R&D and innovation activities makes it difficult to conduct more technologically advanced research. Numerous years of low financing of research and innovation in Poland have hampered the ability of Polish companies to gain an important position on markets for

technologically advanced goods and services. This in turn leads to a low contribution of innovation in shaping the competitive advantages of the Polish economy.

The importance of institutions and tangible and intangible resources for shaping Poland's competitiveness in 2010–2017 can be determined by analyzing changes in total factor productivity (TFP). Considering that TFP is the result of technological, organizational and other changes related to the human capital development, it should be noted that Poland was among the countries of Central and Eastern Europe with the highest TFP dynamics in 2010–2017. However, the TFP contribution to growth is one of the lowest in this group of countries (see Chapter 9).

Exploring competitiveness of Polish cities was another objective of this monograph, and the third part of it has been devoted to this issue.

Structural changes taking place in the contemporary global economy are increasingly reflected in the spatial structure of countries and regions and in urban layouts. Considering that urban centers, especially those that are either big or large, are the main hubs of the economic structure of regions and countries, urbanization processes are an inseparable element of socio-economic development and technological progress. The starting point in empirical research on the competitiveness of cities in Poland is therefore the analysis of the dynamics of urbanization processes that took place in previous decades. A long-term analysis of the urbanization coefficient shows that from the 1940s to the 1990s there was a gradual increase in the number of urban residents, as well as their share in the overall country's population in Poland. It grew from around 8 million in 1946 (34% of the country's population) to over 23 million in 1995 (62% of the country's population). This tendency changed in the 1990s, as a result of growing willingness of Poles to move from urban to rural areas, i.e. to suburban municipalities located around large cities. This indicates the increasing importance of urban functional areas, which are spatially integrated systems composed of separate administrative units, including rural municipalities.

Our analysis shows that larger cities in Poland are more competitive than smaller ones. The least numerous group of voivodship cities inhabited by 19.2% of the country's population has the greatest growth potential. This potential can be seen for example in the total number of enterprises in cities (42.8%), including business entities with a high level of technological advancement (54.1%). The largest city is Warsaw, with a population of 1,744,351 in 2015, followed by: Cracow, Łódź, Wrocław, Poznań, Gdańsk and Szczecin. It can be observed that the highest level of GDP per capita in 2015 was achieved by Warsaw (134,302 PLN), when analyzing the income competitiveness of these cities. The growth rate of GDP per capita in Warsaw in 2010–2015 was, at the same time, the lowest in the analyzed group. However, the capital city maintained a significant lead over other urban centers. Warsaw also has the highest

level of entrepreneurship measured by the number of newly registered units in the REGON register per 10,000 inhabitants, as well as by the number of entities per 1,000 inhabitants in working age. However, there could be some inconsistencies between reality and statistical data, as there are many entities in the capital city that conduct actual economic activity in other parts of the country but have headquarters that are statistically assigned to Warsaw. The analysis of entrepreneurship measures has also indicated similarities between cities located in close proximity, such as Toruń and Bydgoszcz or Gdańsk and Gdynia. Such an observation may indicate the formation of bipolar or multi-center spatial systems in Poland and urban areas of different levels of complexity. Bipolarity of the agglomeration system does not always develop in urban centers that are in close geographical proximity and have similar levels of competitiveness. An example of this is the central zone, including agglomerations with significantly different socio-economic characteristics, such as Łódź and Warsaw.

Achieving a high competitiveness of a city requires financing increasingly complex and expensive urbanization projects. As a result, cities may encounter various problems related to excessive indebtedness, high costs of traditional forms of financing or previously mentioned relocations of people from cities to suburban municipalities, which is connected with a decrease in internal sources of financing. An overview of the sources of financing of urbanization projects used by Polish cities indicates that they usually include:

- 1) internal resources created by local governments e.g., local taxes, rents and bonds, with scope and size variation depending on individual cities;
- 2) external funds, both from public sources (e.g., bonds, domestic and foreign funds, especially the EU funds), as well as private funds (e.g., loans from private institutions or leasing);
- 3) a mixed form of financing, known as public-private partnership (PPP). The involvement of the private sector allows to obtain additional funds for the implementation of urbanization projects, and to carry out more projects planned by city authorities.

These forms of financing are interconnected. The effective acquisition of funds from internal sources significantly affects the financial situation of the city, determining the possibilities to undertake urban projects financed externally. Project management is of great importance in the process of ensuring efficiency of projects, which in turn increases chances for further financing. It has an impact on:

- increasing the city credibility and creditworthiness;
- public and private funding coordination;
- using assets to multiply them, for example by using financial leverage.

However, the research presented in the report showed that in practice, cities in Poland make little use of potentially available alternative financing instruments. This may be explained by the relatively weak development of some segments of the financial market and the lack of regional institutions enabling the use of non-traditional tools.

According to modern understanding, urban competitiveness is complementary to the smart city strategy, as both concepts go beyond the economic growth and include factors such as: the quality of life, social capital, social innovations, culture and education. The concept of smart cities should not be reduced only to the technological dimension because such understanding creates a threat of digital divide, in which some of the city's residents are technologically excluded, and in such case the implementation of smart city strategies can only increase the existing social differentiation. The analysis of widespread smart solutions in Polish cities indicates that they primarily apply to the digitization of existing products and services, and therefore correspond to the first generation of programs implemented under this concept. An example of this is the intelligent transport system or smart meters, which are a part of smart grids. However, there are also smart solutions implemented in Poland that include the smart city's second-generation features, in which intelligent technologies are used by local authorities to improve the quality of life in cities. An example of this is the initiative undertaken by Łódzki Klaster Gamedev in Łódź, which gives the opportunity to collaborate in the joint sector of computer game producers. Although sparse, smart third-generation initiatives, in which the central role is played by residents involved in city development, also exist. The creation of participation budgets is an example of this. The participation budget is based on the idea of co-deciding by city authorities and residents about selection of projects financed from a city budget. Another third-generation solution is the concept of the Internet of things, although it is yet to be expanded in Polish urban spaces.

The EU FP7 and H2020 framework programs are one of the sources of financing smart city projects, although analysis has shown that there is still a small number of Polish entities applying for funding in both programs. When it comes to the importance of financing the development of Polish cities from the operational programs focused on "innovation and entrepreneurship" in 2007–2013, it can be observed that in cities with over 100,000 inhabitants, over 18.2 thousand such projects have been completed with a total value of about PLN 45,340.7 million, which accounted for 29% of the value of all projects implemented in the largest cities. In terms of the number of projects, the ones focused on innovation and entrepreneurship are the most important, but in terms of their value this group of projects comes after the capital-intensive transport projects, which have the highest value among all projects undertaken by cities.

A city's competitiveness is also determined by its exogenous functions, which are related to the production of goods and services, not only for inhabitants of the city, but for the whole country and/or for abroad. Tourism is the most exogenous function of the city, as it determines the degree of its openness, while the span and quality of the development of tourism is determined by the city's reception possibilities. The development of tourism transforms exogenous functions into endogenic changes, as creating attractiveness of urban space for tourists also increases the quality of life of city residents. In turn, numerous endogenous functions of the city, which determine the quality of life, affect the city's competitiveness on the market of domestic and global tourism. Attracting tourists brings many advantages, such as redistribution of wealth or economic activation. There are, however, many disadvantages as well, including: overcrowding transport routes, a rise in inflation rate, seasonality of employment and uncontrolled increases in real estate prices, exposure to tourist behavior that deviates from the locally accepted standards and a degradation of the natural environment. An uncontrolled development of tourism can become a threat to city's competitiveness. Sustainable tourism is a solution that reconciles the needs of today's tourists with the needs of city residents, while simultaneously increasing the possibilities of a city's development. Inbound and outbound tourism also increases city internationalization and holds important social functions, as it exposes residents to diverse cultures and favors the synergy of culture development.

The cultural diversity of cities has been the subject of numerous studies, especially among researchers from countries that are culturally more diverse than Poland. Some similarities may be discerned among the observed benefits (e.g., exposing inhabitants to diversity, the synergy of culture development, the emergence of new jobs) and threats to cultural diversity (e.g., difficulties in communication, intercultural conflicts) with functions and dysfunctions of the previously discussed tourism. Cultural diversity also favors greater innovativeness, which results from the possibility of combining and using various sources of knowledge. However, diversity may also hamper innovation, as it may cause problems in communication and intergroup conflicts. Nevertheless, the results of most studies show that the advantages of cultural diversity in terms of innovation outweigh its negative effects, while being particularly beneficial to highly qualified employees who are most involved in innovation processes.

A conclusion of the subsequent edition of the monograph *Poland: Report on Competitiveness 2018* cannot be made without pointing out the implications of the research results for the Polish policy of supporting competitiveness. Strengthening the development of competitiveness factors, such as human capital and innovation is necessary. Poland is not able to compete with low resource costs, as their prices within the EU are gradually levelling up. An improvement of the quality of the institutions

and an increase in expenditures on research and development and education, as well as promoting co-operation within the knowledge triangle – i.e., science, education and business are indispensable. In order to reduce the scarcity of resources, it is necessary to open the country to the transfer of achievements from world innovation leaders and to strengthen international co-operation in the sphere of research, education, trade, and exchange of production factors. These long-term objectives of the pro-competitive strategy should be paired with a coherent short-term competitiveness policy aimed at removing barriers to innovation and entrepreneurship. Such barriers include, as shown by the World Economic Forum's survey: unfriendly tax regulations, a lack of labor market flexibility, arduous bureaucratic procedures and instability of policy directions [WEF, 2017, p. 240]. The Polish economy is not able to create a significant and sustainable improvement in its competitiveness without the implementation of a knowledge-based, innovation-based and collaborative development model. It is also relevant when it comes to the competitiveness of urban areas. Urban areas are the ones in which a concentration of financial resources, developed infrastructure, high-quality human capital and technologically advanced enterprises and scientific entities can be observed. The policy of supporting city competitiveness should be aimed at maximizing the creative potential of cities, while considering the need to strive for balanced territorial development. This is related to the strong internal diversity of cities, which have zones with severe structural problems and high levels of social exclusion in addition to creative districts. The policy of city competitiveness should therefore be conducted in an integrated manner, ensuring the entire city's development. A city's development strategy implementation to a high extent depends on cautious and stable financial policy with the use of financial engineering instruments. However, building the identity of an urban community by using solutions that fit in with the modern approach to the smart city concept can be of great advantage. It can be done not just by utilizing technologies enabling the digitization of many aspects of the city, but also by using tools for the participation of residents in urban space management. It should also be noted that due to the differences between individual cities, it is neither possible, nor was it intended to create a single model of urban policy. It is however important to stress that the competitiveness policy of each urban center should focus on the maximum use of its potential building on the features that distinguish it among other cities. Such specific strengths should be identified with the participation of residents and local institutions. The advancement of endogenous development in cities can be triggered by such an approach, which is based on the efficient use of local resources and opportunities.

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Modern approach to competitiveness does not focus only on the efficiency, with which the economy uses its resources, but goes beyond the economic dimension and responds to the need to take into account social aspects and elements of sustainable development. This is particularly applicable in the case of the competitiveness of cities, which is a multidimensional phenomenon consisting of a network of interrelated economic, social, geographical, political and legal factors. Hence, the analysis conducted in this publication, which aims to identify, on the one hand, the tendencies of changes in the competitiveness of the Polish economy in 2010-2017, and, on the other hand, the competitiveness of Polish cities, takes into account a variety of factors such as resources (investments, human capital, innovation) as well as institutional factors (financial system and economic policy). The research results indicate an improvement in the competitive position of Poland in the European Union measured by the share of GDP in the EU (according to the purchasing power parity) in 2010-2017, although the country lost its position as the leader of economic growth in the group of Central and Eastern European economies and the rate of catching up with richer European countries has slowed down. The analysis carried out at the mesoeconomic level allowed to confirm that the highest levels of competitiveness are achieved by the largest cities in Poland, i.e. voivodship cities, among which, in terms of many indicators, including population, income level, labour force education and entrepreneurship, Warsaw is the leader. At the same time, the rate of urbanization is gradually decreasing since the 1990s, which is related to the new direction of population movements from urban to rural areas, most often to suburban municipalities concentrated around large cities.

