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THE DEVELOPMENT OF GEORGIA AND POLAND COMPARED TO OTHER POST-SOCIALIST COUNTRIES

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Summary. Regional country-level analyses are the subject-matter of many research papers. Such assessments are made of post-socialist countries, as well. The studies are very diverse, as they can concentrate on economic development, the development of societies, or environmental sustainability. This paper analyzes post-socialist countries with regard to the three areas of population, economy and environment. The World Development Indicators database was used for analyzing the trends of individual indicators across the whole spectrum of their values (mean, maximum and minimum values). Against this background, changes that occurred in Georgia and Poland were presented. Despite the considerable differences between these two countries, the values of some of their indicators converged, those being: a declining trend in respect of population growth, similar life expectancy values, an approx. 4% GDP growth, and increasing exports and imports values. No convergence could be shown for the selected areas of study between post-socialist countries.

Key words: regional development, post-socialist countries, development indicators.

INTRODUCTION

The end of the 20th century saw the map of Eurasia change considerably. As a result of the dissolution of the Soviet Union (late 1991), some of its former republics turned into the sovereign states of Georgia, Kazakhstan, Kirgizstan, Tajikistan, Uzbekistan, Turkmenistan, Armenia, Azerbaijan, Belarus, Moldavia, Ukraine. Russia is usually classified into a separate category due to its dominating role in the region. These states chose to adopt capitalism for their economic system (Radzięta 2015).

The group of post-socialist countries also includes such Central and Eastern European states as Croatia, Poland, Estonia, Albania, Macedonia, the Czech Republic, Slovakia, Lithuania, Bulgaria, Romania, Hungary, Slovenia, Bosnia and Herzegovina, and Serbia.

Papers are available that explore the reforms undertaken in those countries and their effects on their development. A particularly insightful analysis is presented in the *Report on the 25 years of reforms in post-socialist countries*. The document divides post-socialist states into four groups: 1) Central European, 2) South-eastern European, 3) former Soviet republics which have adopted gradual reforms policies, 4) former Soviet republics which have delayed reforms. The EBOR data show discrepancies between the countries with the most--advanced market reforms and those slower at their implementation. Although all post-socialist

countries were at a similar level of development (far from that of a market economy) when they began their transformation, already in mid 1990s the differences between them were massive and kept growing. Importantly, the gap kept widening because the initial leaders continued their reforms while those countries that only adopted gradual reforms slowed down their transformation even further. The institutional development in post-socialist countries significantly lagged behind the economic liberalization. The empirical relationship between the pace of reforms and the relevant economic and social outcome indicators shows that fast reforms are better by a wide margin than any gradual or fragmentary reforms (Hałwryszyn et al. 2018).

Tridico, as well, analyzes the relationship between institutions and economic development in the post-communist countries of the Central and Eastern Europe and the former Soviet republics. He classifies them into five post-communist socio-economic models of the economic system: competitive capitalist, corporative, dirigiste, hybrid and state capitalist (Tridico 2011).

More papers focus on a selected group of countries (Domanski et al. 2003). Numerous authors analyze regional disproportions within the given country, while comparative studies between a larger number of states are less frequent.

In this paper, an attempt was made to analyze the development of Georgia and Poland against the background of 30 post-socialist countries after the year 2000. The main objective of these comparisons was to assess whether the changes occurring in the studied countries had been moving towards convergence or divergence.

The detailed objectives were to determine the trends for the particular indicators, to determine the rankings for selected areas (demographics, economy and environment) for the years 2006 and 2015.

The choice of Georgia and Poland as countries subjected to a more detailed analysis was dictated by the nationalities of this paper's authors.

GENERAL DESCRIPTION OF THE POPULATIONS IN THE COUNTRIES SURVEYED

In 2000, the total population in the countries surveyed amounted to 409 million. By 2007, this figure dropped to approx. 404 million, and subsequently started to grow in order to reach 412 million in 2015. The population variations were described by a quadratic trend function (Fig. 1).

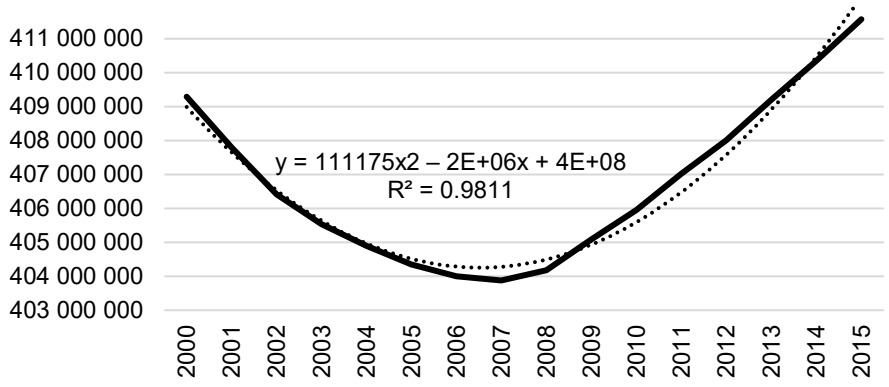

Fig. 1. Total population in the countries surveyed
Source: World Development Indicators 2019 database.

The functions of trend indicated an annual population growth for 13 countries (a strong positive correlation) and declining trends for 17 countries (a strong negative correlation). The latter group included Georgia, with the trend $y = -23488t$; $R^2 = 0.9691$ and Poland, with the trend $y = -17544t$; $R^2 = 0.9524$. In 2015, Georgia had a population of approx. 3.72 million, while Poland's population was ten times as large.

These changes mainly resulted from movements of people and the declining rates of natural increase. Fig. 2 presents the outcomes of an increase in net migration analysis for the countries surveyed. Net migration is the difference between the inflow and outflow of people. The figure shows the share of migration in the total population (in %). The highest (positive) share values were recorded for Armenia (4.51%) and Serbia (4.25%), and the lowest (negative) for Bosnia and Herzegovina (–7.01%). For Georgia, this share was positive (1.42%) and for Poland negative (–0.36%).

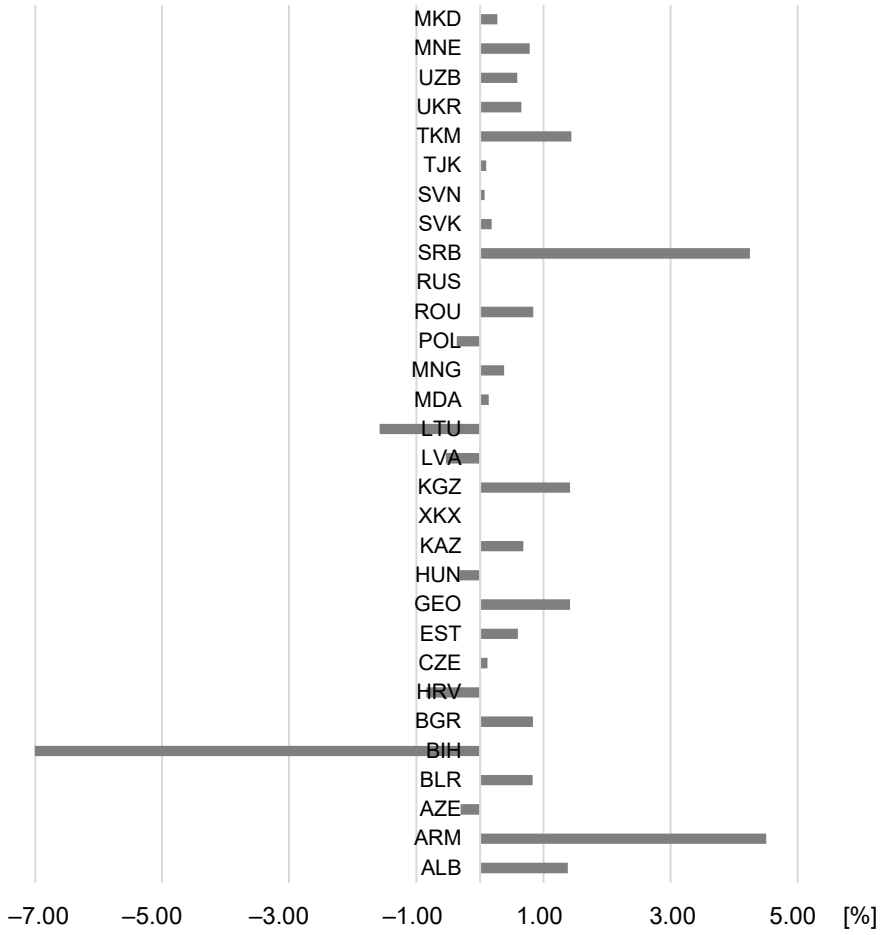

Fig. 2. Increase in net migration between 2002 and 2012
Source: World Development Indicators 2019 database.

In 2002, the highest value of net migration rate was observed for Russia (1,778 million people), and the lowest for Romania (–468 thousand people). For Georgia, the figure was –120 thousand people and for Poland 178 thousand people.

In 2012, Russia continued to demonstrate the largest net migration rate (1,800 million people), while Poland's rate was the lowest (–321 thousand people). Georgia had a migration rate of –95 thousand people.

The absolute net migration rate was the highest for Russia because it was the largest of the countries surveyed, although the share of migration in the total population showed a very different ranking.

MATERIAL AND METHODS

Indicators from the World Development Indicators 2019 database were used for the purposes of the analysis.

1. In the area of population:
   Population growth (annual %)
   Life expectancy at birth, total (years)
   Total fertility rate (number of births per woman)
   Mortality rate, under-5 (per 1,000 live births)
2. In the area of environment:
   CO_2 emissions (metric tons per capita)
   Electricity consumption (kWh per capita)
3. In the area of economy:
   GDP growth (annual %)
   Inflation, GDP deflator (annual % growth)
   Gross capital formation (% of GDP)
   Agriculture, forestry and fisheries, value added (% of GDP)
   Industry (including construction), value added (% of GDP)
   Exports of goods and services (% of GDP)
   Imports of goods and services (% of GDP)
   Trade in goods (% of GDP).

In order to pursue the paper's objectives, a statistical analysis was carried out of the indicators describing changes in the societies, economies and environment of 30 post-socialist countries in the 21st century. The results were used as a comparative background for Georgia and Poland. For the individual indicators, their trend functions were estimated.

Statistical and econometric analyses of selected indicators were performed. The trend functions were estimated for minimum, maximum and mean values for Georgia and Poland. Rankings of the countries surveyed were constructed and the years 2006 and 2015 were compared using dummy variables (Kukuła 2000).

INDICATOR ANALYSIS

Population

The following variables were assumed for describing the population changes in the countries surveyed: population growth, life expectancy at birth, fertility rate, under-five mortality rate. The estimated trend functions were statistically significant.

Population growth

Population growth (annual %). On average, the population figure declined annually by 0.19 pp (percentage points), while the values ranged between the countries from 4% to 5%, with the exception of 2003 where Georgia demonstrated a growth of 7.79% and 2004 where the figure declined by 9.08%. These values differed clearly from other countries (Fig. 3.).

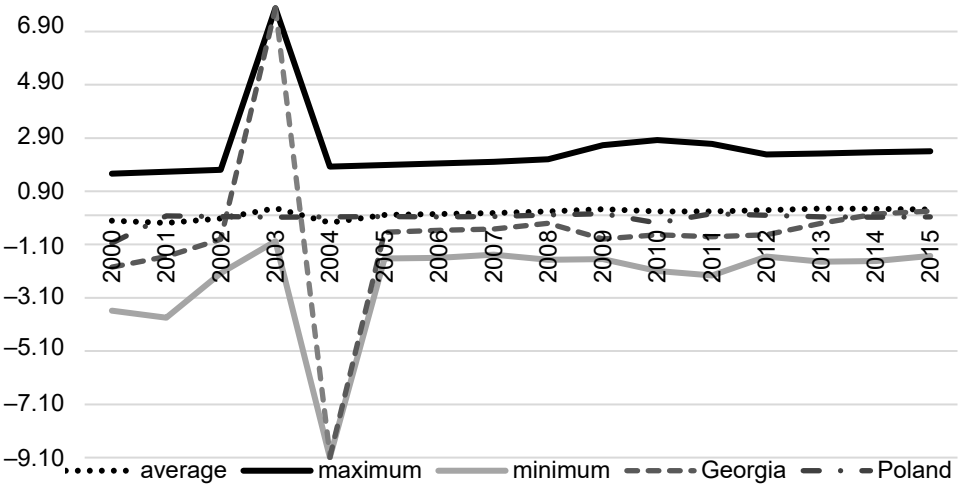

Fig. 3. Population growth (annual %)
Source: World Development Indicators 2019 database.

The reasons for this could be looked for in the changes that Georgia had been undergoing since early 2000, i.e. the time it transformed its system, made itself independent of Russia and changed its borders. The balance of the early-1990s conflicts was: loss of control over Abkhazia, South Ossetia and Adjara, over 200 thousand refugees and a deep economic crisis. Back then, Georgia lost two territories – Abkhazia and South Ossetia, which had originally been part of it, while in May 2004 a peaceful revolution helped restore the central control over the Autonomous Republic of Adjara. Presently, Georgia comprises the two autonomous republics of Abkhazia and Adjara, nine administrative regions and the independent municipality of Tbilisi. Despite massive destruction sustained by Georgian economy during a civil war in 1990s, with the assistance from the International Monetary Fund and the World Bank the country has undergone considerable economic development since 2000, achieving substantial growth in gross domestic product (GDP) and beating inflation. Over that time, Georgia carried out a deep transformation of its political system, moving from the Soviet-style planned economy to a free-market system based on private ownership.

Extreme values (lowest and highest) were in 2000 observed for Tajikistan (1.57%) and Kosovo (–3.58%). This shows that the range of values in terms of population growth between the countries surveyed fell from approx. 5% to approx. 4%.

For Georgia and Poland, the growth was negative and reached –1.94% and –1.04%, respectively. In 2015, Bosnia and Herzegovina had the lowest negative growth (–1.53%), and Tajikistan had the highest positive one (2.41%). For Georgia, population growth was positive (0.16%), but it remained negative for Poland (–0.07%).

Life expectancy at birth

Improvement in the quality of life is highlighted by an increase in life expectancy at birth. In the countries surveyed, life expectancy at birth grew systematically, on average by 0.3 years. In 2000, Slovenia had the highest life expectancy value with 75 years, and Tajikistan had the lowest one with 62 years. For Georgia, this indicator reached the value of 70 years, and for Poland 74 years.

In 2015, Slovenia had the highest life expectancy again with 81 years, while Turkmenistan occupied the other end with 68 years. Georgia's and Poland's values of 72.97 years and 77.45 years, respectively, were close to the mean value (Fig. 4).

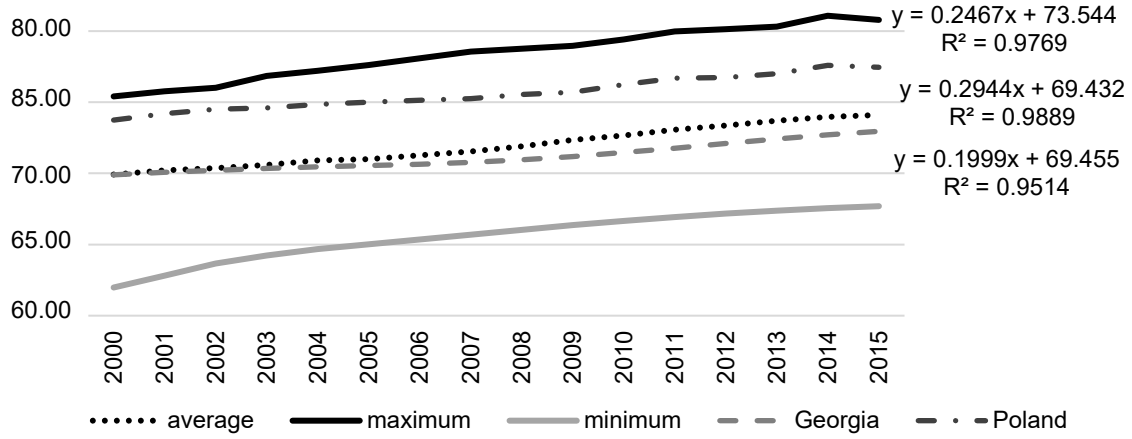

Fig. 4. Life expectancy at birth, total (years)
Source: World Development Indicators 2019 database.

In terms of life expectancy, the range of values betwee the countries remained approximately constant. In 2000 it was 13.43 years, to drop to 13.07 years in 2012.

Another indicator that highlits an improving quality of life is total fertility rate (number of births per woman), although improved quality of life is not positively correlated with the number of births. Rather, quite an opposite trend is observed where a better quality of life is linked with a lower rate of natural increase. The tendencies present in the countries surveyed are shown by the estimated trend lines. The trend lines for minimum and mean values indicate a slow increase in the number of births per woman (average annual growth by approx 0.1), with the line for maximum values showing an annual decline of approx. 3.4% (Fig. 5).

This shows that the number of women delivering more than 3 children was declining (with the maximum values occurring in Asian countries, Tajikistan having the highest values in 2000 (3.86 births) and 2015 (3.6 births)), accompanied by an increase in the total number of live births. The range of values between the countries surveyed was narrowing, which indicated convergence.

For Poland, this indicator turned an unfavorable value oscillating around the minimum and demonstrating a declining trend. Georgia had an opposite trend, with an average annual increase of approx. 0.04 per woman, i.e. 4 births per 100 women, across the entire study period. For this country, the number of births indicator was below the mean value until 2006 and exceeded the mean value as of 2009.

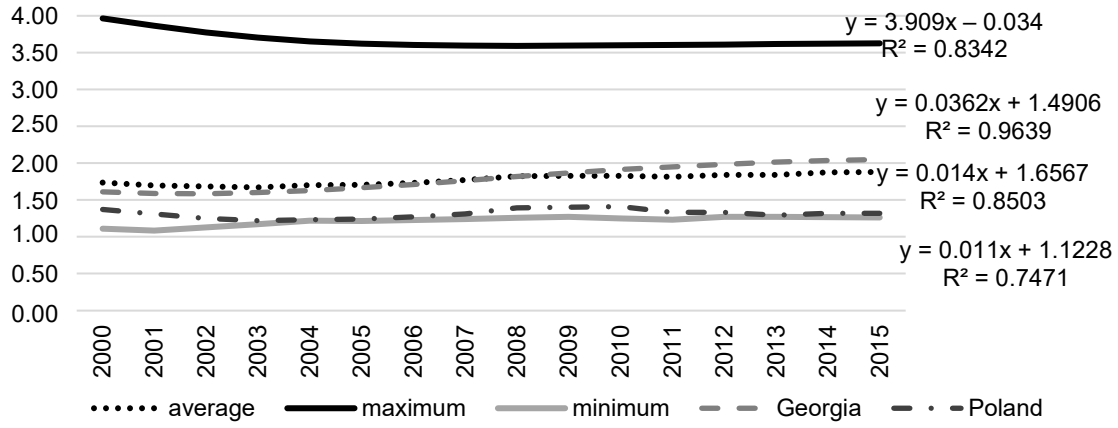

Fig. 5. Total fertility rate (number of births per woman)
Source: World Development Indicators 2019 database.

Mortality rate

Mortality rate, under-5 (per 1,000 live births), is an unambiguous indicator of an improved quality of life that proves the countries surveyed were undergoing favorable changes (Fig. 6). Very positively, the mortality rate dropped in those countries that demonstrated its highest values (approx. 2.1 per 1,000 live births), with a mean decline of approx. 1.1 per 1,000 live births. In the countries that demonstrated very low values, the indicator kept dropping by an average annual value of 0.2.

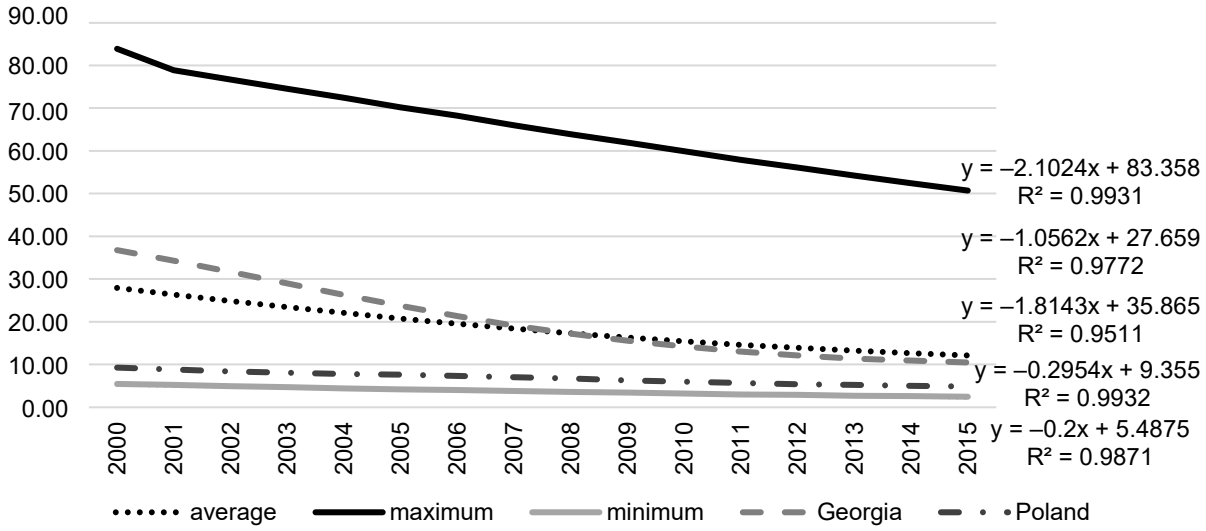

Fig. 6. Mortality rate below 5 years (per 1000 live births)
Source: World Development Indicators 2019 database.

For Poland, the estimated trend function indicated an average annual drop rate of 0.3 per 1,000 live births and assumed close-to-minimum values. The decline in the mortality rate in Georgia was six times that for Poland and was near the mean values.

The range of values between the countries surveyed was narrowed from 78 to 48 persons per 1,000 live births, which indicated convergence between them.

Environment

The environment was another area for comparative analyses between the countries surveyed. The level of environmental protection is described by two indicators: CO_2 emissions and electricity consumption per capita. One would normally expect that an increase in environmental awareness will help reduce CO_2 emissions. Unfortunately, however, the emissions of this gas were growing in the period covered by the study. The maximum values increased from approx. 12 metric tons per capita (Czech Republic) to approx. 14.8 metric tons per capita in 2014 (Estonia). The trend function indicated a 2% average annual increase of emissions. For mean values, this increase amounted to approx. 6% (Fig. 7).

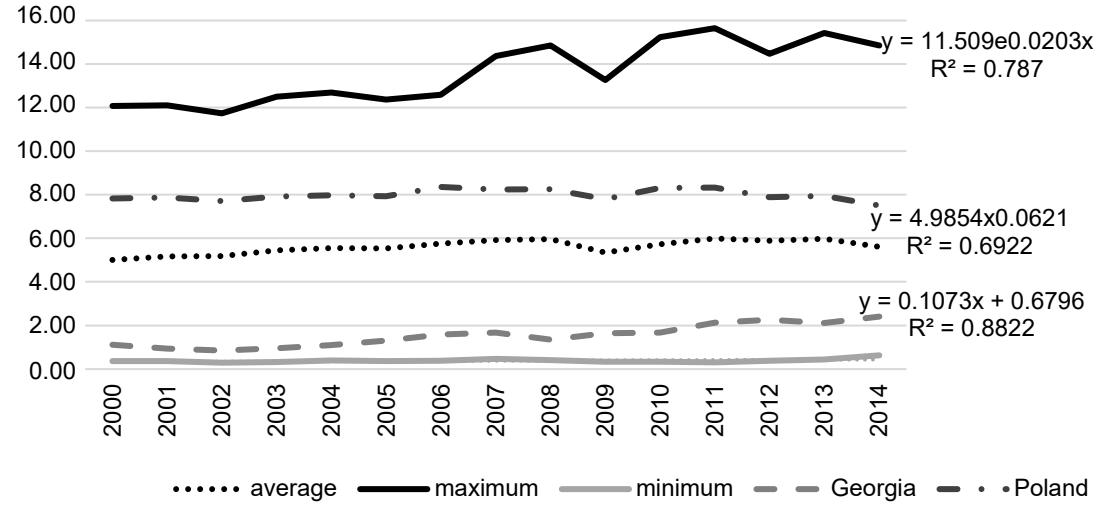

Fig. 7. CO_2 emissions (metric tons per capita)
Source: World Development Indicators 2019 database.

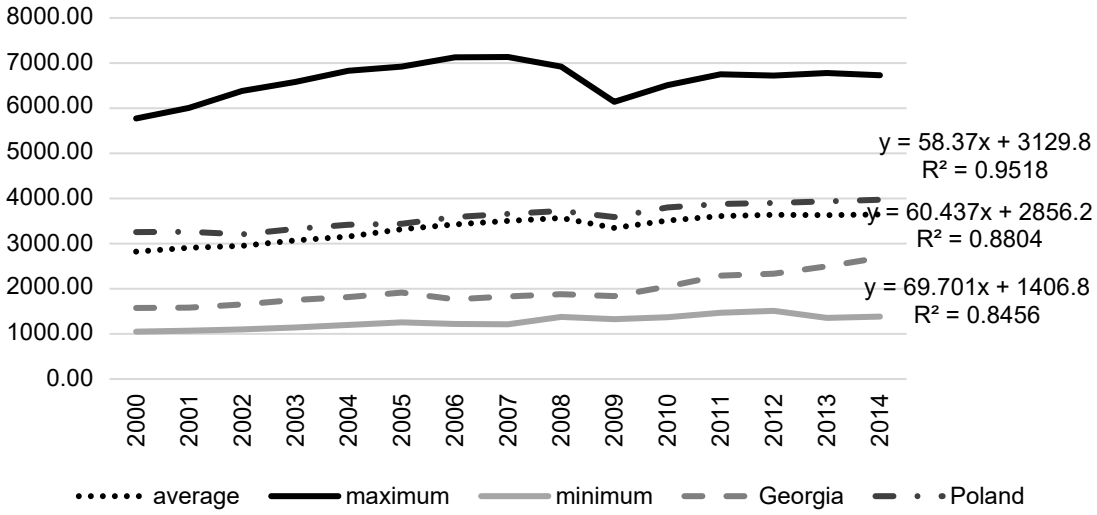

Fig. 8. Electricity consumption (kWh per capita)
Source: World Development Indicators 2019 database.

The trend function could not be estimated for Poland, but the values of CO_2 emissions declined slightly, from 7.8 to 7.5 tons per capita. In Georgia, CO_2 emissions were far lower, with approx. 0.9 tons per capita in 2000 increasing to 2.4 tons per capita by 2014. These changes were described by a linear trend function with an average annual increase of approx. 0.11 tons per capita (Fig. 7).

Electricity consumption per capita is the other of the indicators showing how well the environment is protected. Unfortunately, as economic development requires higher electricity supply, this indicator grew in all the countries surveyed, by an average of 60 kWh per capita (Fig. 8).

Georgia's electricity consumption per capita (with an average annual increase of approx. 70 kWh per capita) grew more dynamically than Poland's (with an average annual increase of approx. 58 kWh per capita). The range of values between post-socialist countries grew, as well (by approx. 13%).

Economy

The economic trends were described using the following indicators: GDP growth (annual %), Inflation, GDP deflator (annual % growth), Gross capital formation (% of GDP), Agriculture, forestry and fisheries, value added (% of GDP), Industry (including construction), value added (% of GDP).

The annual GDP growth varied considerably across the period of study. One of the causes of this was the global economic crisis of 2007–2008. The highest growth in 2000 was observed for Azerbaijan, Estonia and Russia (approx. 11%), but in 2015 it declined to 7.5% (Fig. 9).

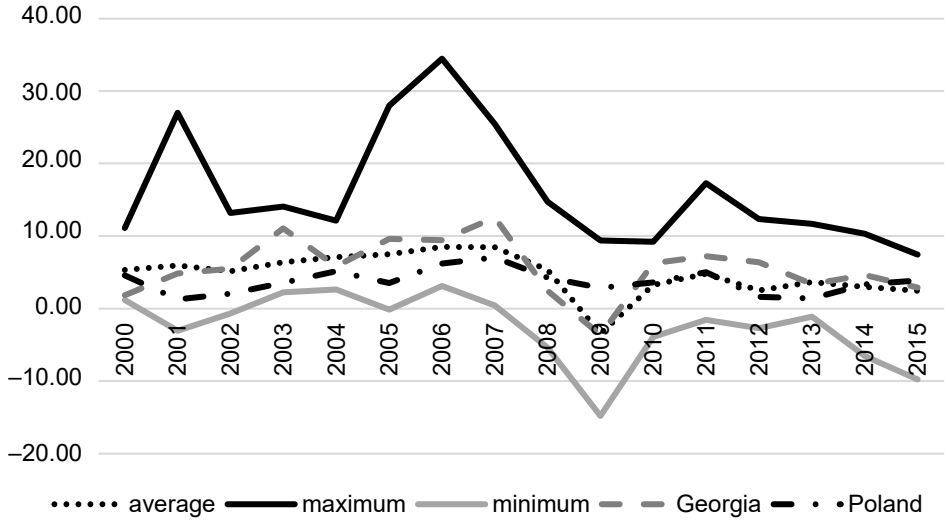

Fig. 9. GDP growth (annual %)
Source: World Development Indicators 2019 database.

Poland's and Georgia's GDP growth was also subject to variation, and in the last year covered by the study both the countries had an annual GDP growth of approx. 4%.

Inflation, too, was subject to regular change, with some of the countries even demonstrating deflation (Fig. 10). Maximum values are marked on the additional (right) axis below.

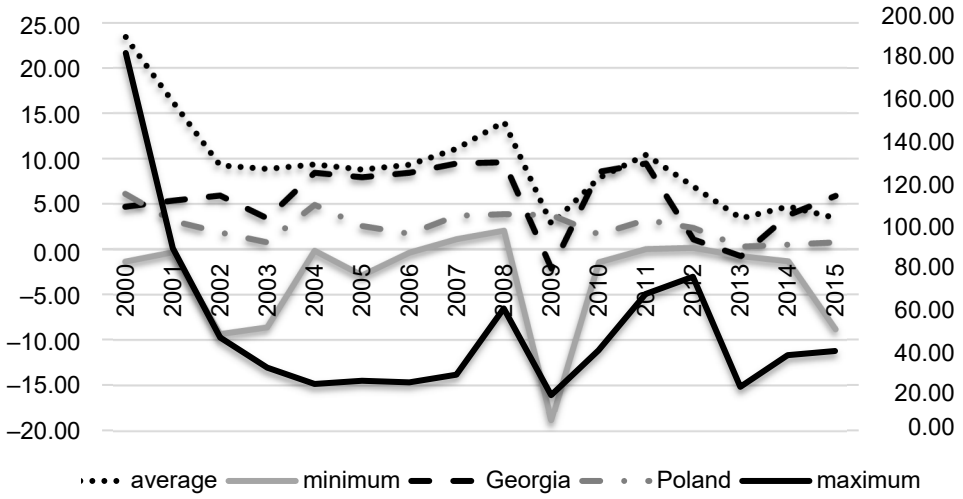

Fig. 10. Inflation, GDP deflator (annual % growth)
Source: World Development Indicators 2019 database.

Across the period of study, both Georgia's and Poland's inflation was below the mean value.

Another indicator explored here was gross capital formation (% of GDP). Its values varied greatly, and only for the mean values could a polynomial trend function be determined (Fig. 11). In 2000, Georgia's and Poland's gross capital formation was at a similar level. In subsequent years until 2008, however, Georgia's values were higher, before they equaled Poland's in the year of the crisis, again. Following a dramatic drop in 2009, they grew once more to reach approx. 31.3% of the GDP in 2015, while Poland's value of the indicator only amounted to 20% of GDP at that time.

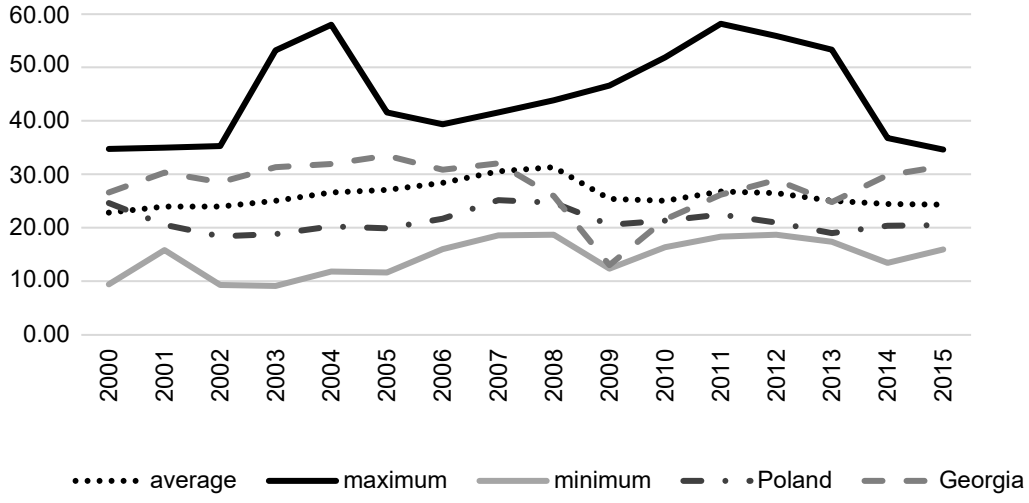

Fig. 11. Gross capital formation (% of GDP)
Source: World Development Indicators 2019 database.

In the period covered by the study, the value added of industry was subject to very irregular variation, as well. Only for the mean values could a quadratic trend function be determined (Fig. 12).

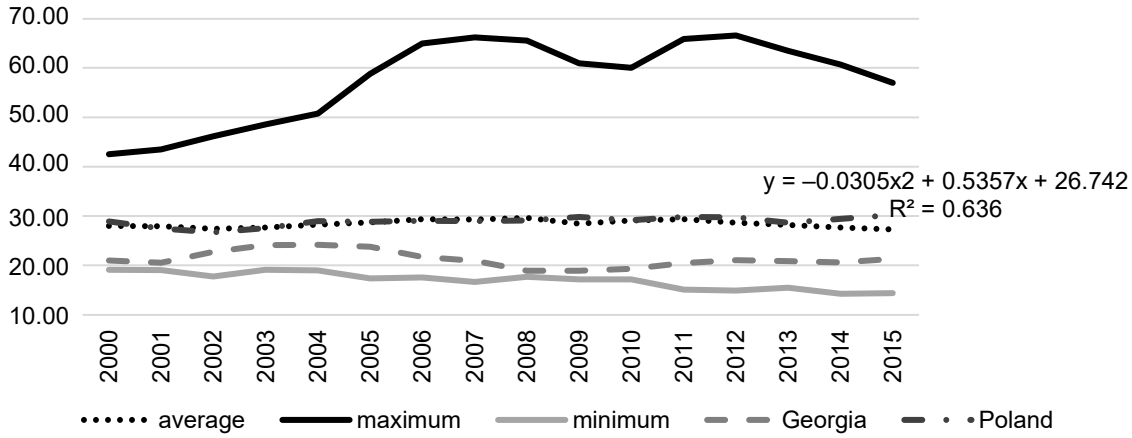

Fig. 12. Industry (including construction), value added (% of GDP)
Source: World Development Indicators 2019 database.

Poland's value added was close to mean values, while Georgia's was below them. The range of values between the countries surveyed grew. In 2000 it amounted to 23%, and in 2015 as much as 46%. In general, value added generated by industry for the lowest values declined from 19% to 14%.

As for value added of agriculture, forestry and fisheries, its trend was clearly downward, decreasing by 0.35% per year on average. The maximum values were described by a quadratic trend, with the minimum value occurring in 2009. The minimum values in the period of study decreased from approx. 3% to 2% (Fig. 13).

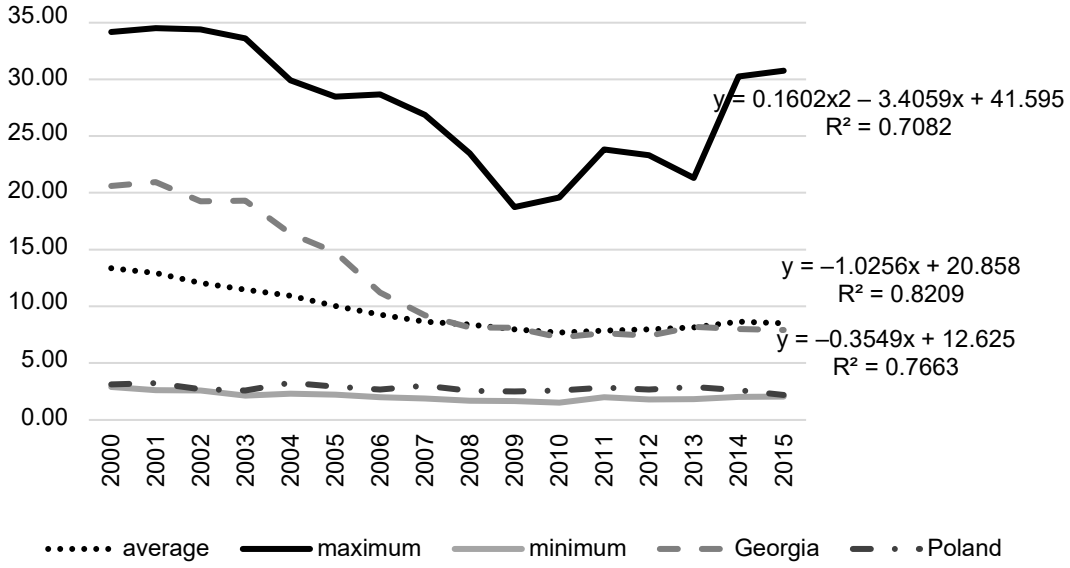

Fig. 13. Agriculture, forestry and fisheries, value added (% of GDP)
Source: World Development Indicators 2019 database.

For Poland, the value added of agriculture did not change much over the 16 years, from approx. 3% to 2%, and was close to the minimum values. Far more substantial changes occurred in Georgia, where the value added was approx. 20% in 2000 and approx. 8% in 2015. This trend was described by a linear function with an average annual decline of approx. 1%.

Trade has a substantial effect on the economy. It is described by the following indicators: Exports of goods and services (% of GDP), Imports of goods and services (% of GDP) and Trade in goods (% of GDP).

Exports showed an increasing trend, which was described by a quadratic trend function. The average annual increase was 0.56%. The highest values were described by a quadratic function, but no trend function could be determined for the lowest values (Fig. 13).

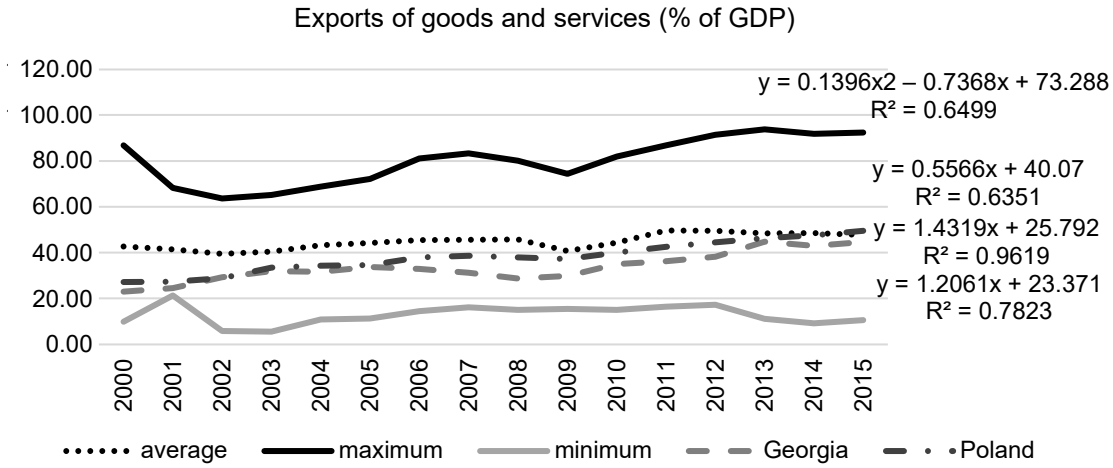

Fig. 13. Agriculture, forestry and fisheries, value added (% of GDP)
Source: World Development Indicators 2019 database.

For Poland and Georgia, the trend functions were linear with an average annual growth of 1.4% and 1.2%, respectively. The range of values between the countries surveyed declined slightly, from 31% to 28%.

As for imports, it was characterized by lower regularity and no trend function could be determined for the mean, minimum and maximum values (Fig. 14).

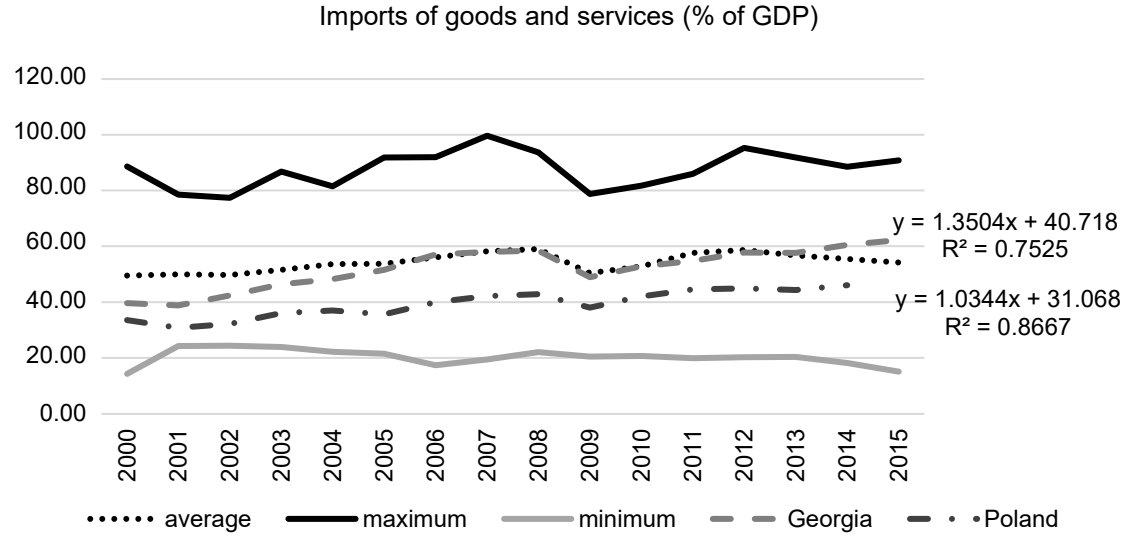

Fig. 14. Imports of goods and services (% of GDP)
Source: World Development Indicators 2019 database.

The range of values between the countries surveyed remained at a similar level.

For Georgia and Poland, the trend functions were linear and demonstrated a mode dynamic growth for Georgia (with an average annual value of 1.35%) than Poland (with an average annual value of 1.03%).

Trade was the last of the analyzed indicators.

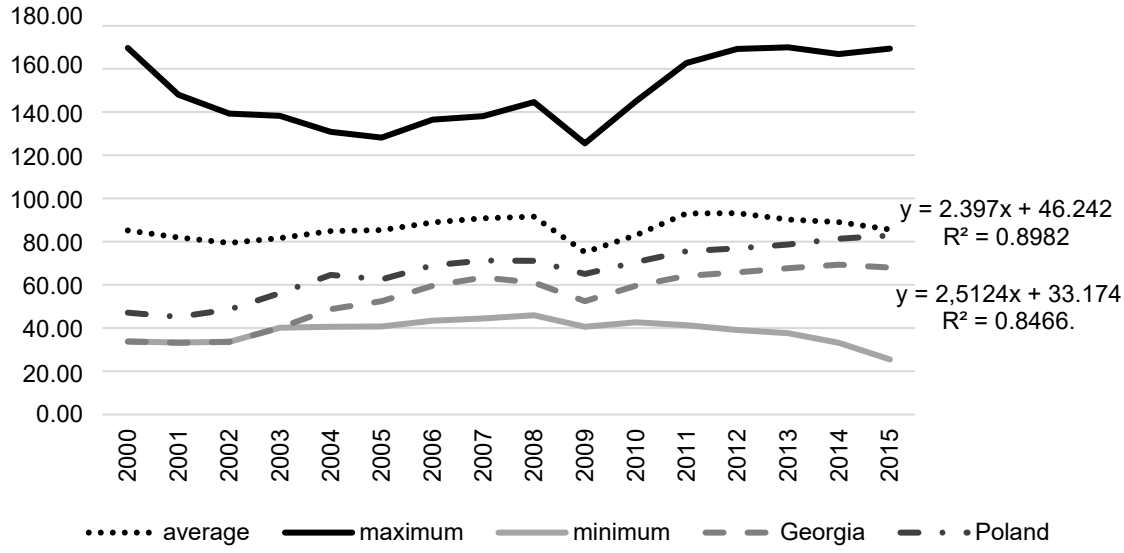

Fig. 15. Trade in goods (% of GDP)
Source: World Development Indicators 2019 database.

RANKING OF POST-SOCIALIST COUNTRIES

Dummy variables were determined on the basis of the indicators analyzed within the three aforementioned areas, which allowed for rankings for the years 2006 and 2015 to be built (Table 1).

As the above rankings show, in 2006 Mongolia scored the highest with regard to population and environment (1st and 3rd positions, respectively), but only came 28th with regard to economy. Montenegro found itself on the other end of the spectrum with regard to population and environment (27th and 30th positions, respectively), but in terms of economy it came 1st.

A decade later, in 2015 the first place in terms of population values was occupied by Moldavia, which came second with regard to economy and 6th with regard to environment. In terms of population and environment, Slovenia came 29th and 20th, but 12th with regard to economy.

With regard to population, the most substantial changes in the rankings over the decade occurred in Bosnia and Herzegovina (which progresses by 24 positions) and Mongolia (which dropped by 24 positions). With regard to economy, the largest drop of 25 positions was observed for Tajikistan, and the largest progress of 20 positions for Belarus. As for environment, the changes in the rankings were somewhat less pronounced. The largest progress of 20 positions was observed for Tajikistan, and the largest drop of 11 positions for the Czech Republic.

The range of ranking positions between Georgia and Poland declined: for Population from 17 to 3, for economy from 4 to 2, and for environment from 15 to 10.

Table 1. Rankings of countries according to the areas

No.	Country		2006			2015			Differences in rankings 2006–2015		
			P	Ec	En	P	Ec	En	P	Ec	En
1	ALB	Albania	25	27	15	22	24	17	3	3	–2
2	ARM	Armenia	14	29	19	16	23	11	–2	6	8
3	AZE	Azerbaijan	2	30	12	11	28	5	–9	2	7
4	BLR	Belarus	12	25	11	18	5	10	–6	20	1
5	BIH	Bosnia & Herzegovina	29	3	10	5	4	7	24	–1	3
6	BGR	Bulgaria	16	17	24	6	11	26	10	6	–2
7	HRV	Croatia	20	16	22	14	8	23	6	8	–1
8	CZE	Czech Republic	26	26	16	26	25	27	0	1	–11
9	EST	Estonia	23	22	8	24	13	9	–1	9	–1
10	**GEO**	**Georgia**	**5**	**13**	**20**	**17**	**14**	**18**	**–12**	**–1**	**2**
11	HUN	Hungary	19	14	21	15	17	25	4	–3	–4
12	KAZ	Kazakhstan	3	19	2	28	22	3	–25	–3	–1
13	XKX	Kosovo	8	18	6	2	15	15	6	3	-9
14	KGZ	Kyrgyz Republic	17	8	17	30	18	14	–13	–10	3
15	LVA	Latvia	11	15	23	10	9	22	1	6	1
16	LTU	Lithuania	18	11	25	7	10	21	11	1	4
17	MDA	Moldova	9	4	26	1	2	6	8	2	20
18	MNG	Mongolia	1	28	3	25	26	2	–24	2	1
19	**POL**	**Poland**	**22**	**9**	**4**	**20**	**16**	**8**	**2**	**–7**	**–4**
20	ROU	Romania	15	12	9	9	19	12	6	–7	–3
21	RUS	Russian Federation	6	6	13	8	6	20	–2	0	–7
22	SRB	Serbia	21	7	14	12	7	24	9	0	–10
23	SVK	Slovak Republic	24	23	27	19	21	28	5	2	–1
24	SVN	Slovenia	30	21	29	29	12	30	1	9	–1
25	TJK	Tajikistan	10	2	28	27	27	13	–17	–25	15
26	TKM	Turkmenistan	4	24	1	4	30	1	0	–6	0
27	UKR	Ukraine	7	10	7	3	1	16	4	9	–9
28	UZB	Uzbekistan	13	20	5	21	29	4	–8	–9	1
29	MNE	Montenegro	27	1	30	23	3	29	4	–2	1
30	MKD	North Macedonia	28	5	18	13	20	19	15	–15	–1

Source: the author's own study. Denotations: P – population, Ec – economy, En – environment.

CONCLUSIONS

The analyses performed as part of this study did not provide a clear answer to whether the pace of the changes occurring in the countries surveyed headed towards convergence or divergence. Convergence was observed for 5 of the indicators, and divergence for 3 others. Trends could be determined for most of the studied indicators, for the minimum maximum and mean values alike, including both for Georgia and Poland. Only four countries did not change their positions in the rankings between 2006 and 2015. Those were the Czech Republic and Turkmenistan with regard to population, Russia and Serbia with regard to economy, and Turkmenistan with regard to environment. In terms of population indicators, Georgia ranked higher than Poland both in 2006 and 2015. As for the areas of environment and economy, Poland ranked higher than Georgia.

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ROZWÓJ GRUZJI I POLSKI NA TLE KRAJÓW POSTSOCJALISTYCZNYCH

Streszczenie. Analiza regionalna na poziomie krajów jest częstym tematem opracowań. Dotyczą one również krajów postsocjalistycznych. Zakres analiz jest bardzo różny, obejmuje rozwój ekonomiczny, rozwój społeczeństw czy zrównoważenie środowiska. Tematem niniejszego opracowania jest rozwój państw postsocjalistycznych w trzech płaszczyznach: demografii, gospodarki i środowiska. Wykorzystano Database World Development Indicators do analizy trendów poszczególnych wskaźników w skali ogólnej (wartości średnich, maksymalnych i minimalnych). Na ich tle przedstawiono zmiany, jakie zaszły w Gruzji i Polsce. Mimo znacznych różnic między Polską a Gruzją w kilku wskaźnikach mają one zbliżone wartości: trend spadkowy przyrostu ludności, podobne wartości oczekiwanej długości życia, roczny wzrost PKB o ok. 4%, tendencje wzrostowe eksportu i importu. Nie udało się wykazać konwergencji w ramach wybranych obszarów między krajami postsocjalistycznymi.

Słowa kluczowe: rozwój regionalny, kraje postsocjalistyczne, wskaźniki rozwoju.