European Research Studies Journal
Volume XXIV, Issue 2, 2021

pp. 48-67

Management of Expenditure on the Development of Higher Education – Poland as Compared to EU Countries

Submitted 09/01/21, 1st revision 28/02/21, 2nd revision 16/03/21, accepted 20/05/21

Agnieszka Skowronek – Grądziel[1], Wiktor Kołwzan[2],
Teresa Kupczyk[3], Mirosław Zabierowski[4]

Abstract:

Purpose: *The objective of the article is to identify, analyse and diagnose the current state of management of expenditure on the development of higher education in Poland as compared to other EU countries, and thus to indicate the necessary changes and recommendations.*
Design/Methodology/Approach: *The research relied mainly on data on the number of students and universities, enrolment, and expenditure on higher education. Polish and foreign data sources were applied to determine diversity of the distribution of students in Poland among public and private universities as well as the dynamics of the changes. In comparison to other EU countries, the changes in the coefficients of the level of higher education were analysed and the enrolment indices were compared with the indices of human development. Expenditure on higher education was examined with various approaches. In the study, statistical methods were used to describe the current trends.*
Findings: *During the study period, the structure of tertiary education, measured by the ratio of state-owned to private universities, changed from 95:5 to 34:66. However, in terms of the number of students, state-owned universities played a dominant role. In this case, the proportions hardly changed during the study period and were 77:23 at its end. Since 2007, a slowdown in the increase in the number of students has been observed in Poland, and since 2010 the same tendency was observed in the number of universities.*
Practical Implications: *In the long-term Polish education will develop efficiently, strengthen Poland's integration in Europe and, as a result, translate into the qualitative development of higher education in Poland.*
Originality/value: *Knowledge of trends and levels of development of higher education, defining the role of the state as compared to the other members of the EU are important for policymakers, helping them consciously to identify prospects for development, and thus effectively manage expenses by minimizing existing risks.*

Keywords: *Higher education, expenditure management, Poland, enrolment indicators.*
JEL classification: *M12, M38, O11x.*
Paper Type: *Data analysis and Research study.*

Acknowledgement: *The authors would like to thank all employees of education monitoring companies who made it possible to carry out the analyses contained in the article.*

[1]*Department of Management, General Tadeusz Kościuszko Military University of Land Forces, Poland, ORCID: 0000-0003-1296-9663,*
e-mail: agnieszka.skowronek-gradziel@awl.wroc.pl
[2]*Same as in 1, ORCID: 0000-0003-0181-9344, e-mail: wiktor.kolwzan@pwr.edu.pl*
[3]*Same as in 1, ORCID:0000-0003-0361-2128, e-mail: teresa.kupczyk@awl.edu.pl*
[4]*Same as in 1, ORCID: 0000-0001-5632-6948, e-mail: miroslaw.zabierowski@awl.edu.pl*

1. Introduction

Currently, at the level of higher education in Poland, there are both public – state-owned and non-public – private units. The breakthrough came in 1989 thanks to the round table, during which the process of systemic changes was initiated. As a result, in 1990, Poland adopted a package of economic and systemic reforms known as the Balcerowicz Plan[i], and in 1991 the first free elections were held. Before the start of the transformation process, in Poland, as in other countries of central and eastern Europe, the model of central economic planning and management was applied, and there were mainly state universities[ii]. The competent Minister ruled on the maximum number of students.

The accession to the EU and the initiated process of system transformation provided the basis for the operation of market mechanisms in all areas of the economy, also in the field of higher education. For example, in Poland, in September 1990, the Act on Higher Education (Act of 12 September 1990 on Higher Education, Journal of Laws No. 65, item 385) was announced. It regulated the legal aspects of functioning of universities. Universities regained autonomy in their operation, and non-state universities began to appear spontaneously[iii].

The article is designed to provide cognitive and practical value. The central objective of the study was to examine the regularities and identify the current state of development of higher education in Poland. The term "development of higher education" is understood as the shaping of the analysed quantitative indicators. Knowledge about the trends and the degree of development of higher education is important for decision-makers in the field of social policy, as it allows them to consciously define development prospects, minimize the risks existing on the competitive market and, as a result, effectively manage the analysed sector.

The main research hypothesis verified during the study was the statement that over the course of almost thirty years, higher education in Poland has already undergone the most dynamic quantitative development (manifested by an increase in the number of students and universities). At present, the qualitative development of education should take place, stimulated by an increase in expenditure on education, universal access to education and possibilities of more effective application of educational results in the economy.

2. Selection of Diagnostic Properties and Description of Research Methods

Identification of the current state of development and description of the regularities in higher education in Poland was started with the analysis of the number of universities and students in Poland in the period from 1999/2000 to 2016/2017. The 1990/1991 academic year was included in the analyses for a broader insight.

The indicator of the ratio of higher education in the EU was used to assess the prevalence of education[iv]. The adopted measure was applied to determine the percentage of people aged 30-34 who successfully graduated from higher education. The measure is used in the strategic framework for education and training in the EU (ET 2020) to monitor the Europe 2020 strategy. Changes in the level of higher education in the EU were discussed for the years 2000 to 2019. The year 2019 was selected as the most recent in terms of available data. Universality of education was measured also by gross[v] and net[vi] scolarisation coefficients. During the study, the evolution of the enrolment level in 1990-2018 was examined against the value of the human development index (HDI).[vii]

In determination of the potential of higher education in Poland, the total expenditure on higher education in Poland and other EU countries was compared in various aspects. Both public and private funding sources were included in the study, as different countries have different models of financing higher education. Some countries, such as Bulgaria, Croatia, Cyprus, or Malta, were not included in the analyses due to the lack of data, therefore, in detailed studies of the level of expenditure on higher education in relation to GDP, the main source of knowledge about the research subject was information about the dominant source of financing education higher in EU countries, for which statistical data on public expenditure were published to a much greater extent.

Extending the scope of the analyses, the expenditure of public institutions per student against GDP per capita (Expenditure per student, tertiary as % of GDP per capita) and gross enrolment rates were compared in the EU countries. In 2015, the index values for both areas were divided into three categories. Based on low (up to 53.98%), average (53.98% - 88.19%), high (> 88.19%) gross enrolment index values and low (up to 22.27%), average (22.27% - 33.33%) and high (> 33.3%) expenditure per student in proportion to GDP per capita, a matrix was developed, allowing for division of the analysed countries into groups. For comparison, a similar analysis was performed for 2010.

The most up-to-date, complete, and reliable data from 1990 to 2019 were applied for the analysis. In individual studies, depending on the source of origin, data for 2017[viii], 2016 and 2015 were used. Data for 2018 and 2019 were analysed, if available. The studies also included the years 2010, 2000 and 1990 for comparative purposes. When possible, attempts were made to approximate the data from the previous year.

When selecting data for the exploration of the higher education market in Poland, efforts were made to ensure that all formal and statistical criteria postulated in the literature on the subject were met (Nowak, 1990). The correctness of the content was guaranteed using specialist data from Statistics Poland (GUS) and the European Statistical Office (Eurostat). To present the broadest possible spectrum of conclusions from the research, the analysis was supplemented with data from the

World Bank (UK), the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OECD) and the United Nations Development Program (UNDP).
The necessary calculations were performed with the use of Excel and Gretl computer packages.

3. Results

3.1 Development of Higher education in Poland

In 1990, public universities still dominated the structure of higher education in Poland. The systemic transformation process initiated in 1989 resulted in the dynamic development of private universities. As a result, over a short period of time, the proportions of state-owned and private universities changed radically. The observed tendency was not reflected in the number of students of both above-mentioned types of higher education institutions (Table 1).

Table 1. *The structure of higher education in Poland in terms of public and non-public education in the academic year 1990/1991 and in the years 1999/2000 to 2016/2017 [in%]*

Academic year		1990/1991	1999/2000	2000/2001	2001/2002	2002/2003	2003/2004	2004/2005	2005/2006	2006/2007	2007/2008	2008/2009	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017
Higher education institutions	State-owned HEIs	95	39	37	36	33	32	30	29	29	29	29	28	29	29	29	30	30	32	34
	Private HEIs	5	61	63	64	67	69	70	71	71	71	71	72	71	71	71	70	70	68	66
Students [thousand]	State-owned HEIs	77,2	70,7	70,2	70,4	70,6	70,6	69,8	68,2	67,0	65,9	65,8	66,7	68,5	70,6	72,6	74,3	75,6	76,5	76,7
	Private HEIs	22,8	29,3	29,8	29,6	29,4	29,4	30,2	31,8	33,0	34,1	34,2	33,3	31,5	29,4	27,4	25,7	24,4	23,5	23,3

Source: *Original study based on GUS 1998b – 2020b*

The average share of people studying at public universities in the total number of students, from the academic year 1999/2000 to 2016/2017, as measured by the median, was 70.5%. In the case of students at non-public HEIs, the corresponding measure was 29.5%. In the initial period of the process of systemic changes in Poland, in the academic year 1990/1991, students at state universities accounted for 77.2% of all students, in the last two years of the study, it was, respectively: - 76.5%

and 2016/17 - 76.7%. The lowest value of the ratio of 65.8% was recorded in the academic year 2008/2009. Non-public universities, on the other hand, distanced public competitors in terms of the number of institutions. In the academic year 1990/1991, there were 106 state and 6 non-state higher schools in Poland. Twenty-six years later, in the 2016/2017 academic year, there were 132 and 258 of them, respectively. This means that during the study period, the structure of the higher education market, measured by the ratio of the number of state-owned universities to private ones, changed from 95:5 to 34:66. Another analysis was carried out to determine the dynamics of the development of the higher education market in Poland. The obtained results are presented in Table 2.

Table 2. *Changes in the number of universities, the number of students in Poland and the number of potential students (people aged 18), in the years 1990/1991 - 2016/2017 [in%].*

Years	Higher education institutions		Students at HEIs		People aged 18
	State-owned	Private	State-owned	Private	
2016/2017 vs 1990/1991	25	4200	231,9	241,1	-30,6
2000/2001 vs 1990/1991	6,6	2800,0	225,0	354,4	13,4
2000/2001 vs 1999/2000	1,8	12,1	9,9	12,7	4,7
2001/2002 vs 2000/2001	7,0	13,3	8,7	7,8	4,0
2002/2003 vs 2001/2002	1,6	14,0	5,1	3,8	-2,2
2003/2004 vs 2002/2003	0,8	8,7	3,2	3,2	-3,0
2004/2005 vs 2003/2004	0,0	9,9	2,4	6,6	-6,8
2005/2006 vs 2004/2005	3,2	4,7	-0,8	6,6	-5,0
2006/2007 vs 2005/2006	0,0	1,0	-2,4	3,1	-2,3
2007/2008 vs 2006/2007	0,8	1,9	-1,9	3,1	-2,7
2008/2009 vs 2007/2008	0,0	0,3	-0,7	-0,2	-1,1
2009/2010 vs 2008/2009	0,0	1,5	-0,1	-4,0	-2,5
2010/2011 vs 2009/2010	0,8	-0,6	-0,5	-8,4	-5,7
2011/2012 vs 2010/2011	0,0	0,0	-1,2	-10,7	-3,8
2012/2013 vs 2011/2012	0,0	-2,1	-2,3	-11,3	-4,0
2013/2014 vs 2012/201300	0,0	-4,7	-5,4	-13,3	-6,1
2014/2015 vs 2013/2014	0,0	-1,3	-3,6	-9,9	-2,8
2015/2016 vs 2014/2015	0,0	-6,3	-3,2	-8,2	-4,0
2016/2017 vs 2015/2016	0,0	-8,8	-3,8	-4,6	-4,1

Source: *Original study based on: GUS 1998b – 2020b; GUS 1998c – 2020c; GUS 1991d.*

From the academic year 1990/1991 to 2016/2017, the number of people studying in Poland increased by 234% (by 337% to 2011/2012). In the analysed period, the

average annual growth rate of students at universities in Poland was 4.7%, while between 1990/1991 and 2011/2012 on average each year the number of students increased by 7.3%.[ix] The highest number of students was recorded in Poland in the academic year 2005/2006 (almost 1,954,000 people). From that year the number of people studying at state universities began to decline, a similar tendency in the case of non-state universities began in 2008/2009, which may be related to the declining number of people aged 18 years and over since 2002 (most probably also people who waived their education after a secondary school in the past and could follow it up with a university grade after the transformation)10, i.e., a generally declining number of potential students - the indicator decreased by over 30% during the years of the study.

The largest number of higher education institutions operated in Poland in the academic year 2009/2010 (461 in total). It was also the year before which the number of private universities had been systematically growing. Most new state universities (20) had been established by the 2003/2004 academic year, and during the entire period of the study, the number of state universities in Poland increased by 25. Since 2011/2012, the number of state universities has remained constant – 132. The decrease in the number of private universities was recorded for the first time in the 2010/2011 academic year. A year later, for the first time, the overall number of universities operating in the market did not change (the increase was 0% compared to the previous year). The largest decrease in the sector of non-public higher education took place in the 2013/2014 academic year. Compared to the previous year, the number of students decreased by over 13%, and the number of universities by over 5%.

3.2 Ratio of Higher Education in Poland

In the next step, the indicator of the level of higher education in the EU was used to determine the stage of development of higher education in Poland. Table 3 shows the value of the indicator for individual countries in the years 2000-2019.

Table 3. *Values of the ratio of higher education index in the EU in 2000 - 2019 [in %].*

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Austria	—	—	—	—	20,9	20,7	21,1	20,9	21,9	23,4	23,4	23,6	26,1	27,1	40,0	38,7	40,1	40,8	40,7	42,4
Belgium	35,2	35,2	35,2	37,7	39,9	39,1	41,4	41,5	42,9	42,0	44,4	42,6	43,9	42,7	43,8	42,7	45,6	45,9	47,6	47,5
Bulgaria	19,5	23,6	23,2	23,6	25,2	24,9	25,3	26,0	27,1	27,9	28,0	27,3	26,9	29,4	30,9	32,1	33,8	32,8	33,7	32,5

Romania	Portugal	**Poland**	Netherlands	Malta	Luxembourg	Lithuania	Latvia	Italy	Ireland	Hungary	Greece	Germany	France	Finland	Estonia	Denmark	Czechia	Cyprus	Croatia
8,9	11,1	**12,5**	26,5	7,4	21,2	42,6	18,6	11,6	27,5	14,8	25,4	25,7	27,4	40,3	30,4	32,1	13,7	31,1	:
8,8	11,6	**13,2**	27,2	12,9	23,9	21,2	16,3	12,2	30,6	14,8	25,0	25,5	29,5	41,6	28,5	32,9	13,3	32,7	:
9,1	12,9	**14,4**	28,6	9,3	23,6	23,4	17,3	13,1	32,0	14,4	23,5	24,2	31,5	41,2	27,7	34,2	12,6	36,0	16,2
8,9	14,7	**17,2**	31,7	13,7	17,3	25,2	18,3	13,9	35,1	16,3	23,0	25,1	34,8	41,7	28,0	38,2	12,6	39,9	16,9
10,3	16,3	**20,4**	33,6	17,6	31,4	30,9	18,2	15,6	38,6	18,5	25,1	26,8	35,6	43,4	28,3	41,4	12,7	41,0	16,8
11,4	17,5	**22,7**	32,6	17,6	37,6	37,7	18,5	17,1	39,2	17,9	25,5	26,1	37,7	43,7	31,7	43,1	13,0	40,8	17,4
12,4	18,3	**24,7**	34,2	20,7	35,5	39,4	19,3	17,6	41,9	19,4	26,9	25,8	39,7	46,2	32,5	43,0	13,1	46,1	16,7
13,9	19,5	**27,0**	34,9	20,8	35,3	36,4	25,7	18,6	45,2	20,6	26,3	26,5	41,4	47,3	33,5	38,1	13,3	46,2	16,8
16,0	21,6	**29,7**	38,0	21,0	39,8	39,9	26,3	19,2	47,9	22,8	25,7	27,7	41,0	45,7	34,4	38,9	15,4	47,1	18,5
16,8	21,3	**32,8**	38,3	21,9	46,6	40,4	30,5	19,0	50,4	24,0	26,6	29,4	43,0	45,9	36,3	40,4	17,5	45,0	21,3
18,3	24,0	**34,8**	41,4	22,1	46,1	43,8	32,6	19,9	51,4	26,1	28,6	29,7	43,2	45,7	40,2	41,1	20,4	45,3	24,5
20,3	26,7	**36,5**	41,2	23,4	48,2	45,7	35,9	20,4	51,0	28,2	29,1	30,6	43,1	46,0	40,2	41,3	23,7	46,2	23,9
21,7	27,8	**39,1**	42,2	26,3	49,6	48,6	37,2	21,9	52,2	29,8	31,2	31,8	43,3	45,8	39,5	43,2	25,6	49,9	23,1
22,9	30,0	**40,5**	43,2	28,7	52,5	51,3	40,7	22,5	53,6	32,3	34,9	32,9	44,0	45,1	42,5	43,4	26,7	47,8	25,6
25,0	31,3	**42,1**	44,8	28,6	52,7	53,3	39,9	23,9	54,6	34,1	37,2	31,4	43,7	45,3	43,2	43,6	28,2	52,5	32,1
25,6	31,9	**43,4**	46,3	29,1	52,3	57,6	41,3	25,3	53,8	34,3	40,4	32,3	45,1	45,5	45,3	45,7	30,1	54,5	30,8
25,6	34,6	**44,6**	45,7	32,0	54,6	58,7	42,8	26,2	54,6	33,0	42,7	33,2	43,7	46,1	45,4	46,5	32,8	53,4	29,3
26,3	33,5	**45,7**	47,9	33,5	52,7	58,0	43,8	26,9	54,5	32,1	43,7	34,0	44,4	44,6	48,4	48,2	34,2	55,9	28,7
24,6	33,5	**45,7**	49,4	34,7	56,2	57,6	42,7	27,8	56,3	33,7	44,3	34,9	46,2	44,2	47,2	48,4	33,7	57,1	34,1
25,8	36,2	**46,6**	51,4	38,1	56,2	57,8	45,7	27,6	55,4	33,4	43,1	35,5	47,5	47,3	46,2	49,0	35,1	58,8	33,1

Slovakia	10,6	10,7	10,5	11,5	12,9	14,3	14,4	14,8	15,8	17,6	22,1	23,2	23,7	26,9	26,9	28,4	31,5	34,3	37,7	40,1
Slovenia	18,5	18,1	20,7	23,6	25,1	24,6	28,1	31,0	30,9	31,6	34,8	37,9	39,2	40,1	41,0	43,4	44,2	46,4	42,7	44,9
Spain	29,2	31,3	34,4	35,1	36,9	39,9	39,4	40,9	41,3	40,7	42,0	41,9	41,5	42,3	42,3	40,9	40,1	41,2	42,4	44,7
Sweden	31,8	26,6	28,3	31,0	33,9	37,6	39,5	41,0	42,0	43,9	45,3	46,8	47,9	48,3	49,9	50,2	51,0	51,3	51,8	52,5
UK	29,0	29,9	31,5	31,5	33,6	34,5	36,4	38,3	39,5	41,4	43,1	45,5	46,9	47,4	47,7	47,8	48,1	48,2	48,8	50,0

Source: *Compilation based on Eurostat 2021.*

In the analysed period, the percentage of people aged 30-34 who successfully completed tertiary studies in Poland increased systematically, every year by 7.2% (from 12.5% in the baseline year to 46.6% in 2019), i.e., during the study period it increased by over 34%. In the same period, the average rate of growth of the phenomenon over time in the EU countries ranged from 0.8% for Finland, to 9% for Malta, and absolute increases from 7% for Finland, to 35% for Luxembourg. The highest value of the indicator was recorded in 2019 for Cyprus (58.8%), the lowest (7.4%) in 2000 for Malta. The compilation of the rankings of EU countries based on the level of the higher education index showed that from 2015 Poland was ranked 12th, while in 2000, it was 21st.

Another measure that was used to assess the degree of mass education in Poland was the gross enrolment rate. According to the data of the World Bank, the gross enrolment rate in higher education in Poland increased from 20% to 69% between 1990 and 2018 (Table 4). For comparison, in the case of the Czech Republic and Hungary, i.e., the countries of Central Europe, which underwent systemic changes in a similar period as Poland and became members of the EU at the same time (May 1, 2004), gross enrolment rates changed in the analysed period from 16% to 64%, and from 15% to 50%, respectively. In five of the six^{x} most socially and economically developed countries in the EU (based on the values of the human development index from 2018), i.e., Ireland, Sweden, the Netherlands, Denmark and Finland, gross enrolment rates in 1990 ranged from 28% to 44% (with the average value measured by the median equal to 26% - the median was calculated on the basis of data from 28 countries), and in 2018 from 72% to 90% (when the median was 71% - the median was calculated on the basis of data from 28 countries).

Table 4. *Enrolment indicators and human development index in EU states for 1990 and 2018*

Country	*Enrolment indicators*	*Human development index HDI*	*Enrolment indicators*	*Human development index HDI*
	Years			
	2018	2018	1990	1990

Austria	87	0,92	33	0,80
Belgium	79	0,93	38	0,81
Bulgaria	72	0,81	26	0,71
Croatia	68	0,85	21	0,68
Cyprus	81	0,89	9	0,74
Czechia	64	0,90	16	0,74
Denmark	81	0,94	34	0,81
Estonia	70	0,89	25	0,74
Finland	90	0,94	44	0,79
France	68	0,90	37	0,79
Germany	70	0,95	–	0,81
Greece	143	0,88	24	0,76
Hungary	50	0,85	15	0,71
Ireland	77	0,95	28	0,77
Italy	64	0,89	30	0,78
Latvia	93	0,86	26	0,71
Lithuania	74	0,88	33	0,74
Luxembourg	19	0,91	–	0,80
Malta	59	0,89	10	0,75
Netherlands	87	0,94	36	0,84
Poland	**69**	**0,88**	**20**	**0,72**
Portugal	66	0,86	20	0,72
Romania	51	0,82	8	0,71
Slovakia	45	0,86	–	0,74
Slovenia	77	0,91	23	0,77
Spain	91	0,91	36	0,76
Sweden	72	0,94	31	0,82
United Kingdom	61	0,93	26	0,78

Source: *Original development based on World Bank 2014 & 2021, (–) no data*

3.3 Financial Indices of Higher Education in Poland

The level of development of a given area can also be assessed by the indicator describing the sector's share in GDP (Table 5).

Table 5. *Total expenditure on educational institutions as a percentage of GDP in the EU countries in 2000, 2010, 2016 and 2017 (in%)*

Country	2017	2016	2010	2000
Austria	1,7	1,8	1,5	1,1
Belgium	1,5	1,5	1,4	1,3
Bulgaria	–	–	–	–
Croatia	–	–	–	–
Cyprus	–	–	–	–
Czechia	0,9	0,9	1,2	0,8
Denmark	1,7	–	1,9	1,6
Estonia	1,5	1,5	1,6	1,2
Finland	1,6	1,7	1,9	1,7
France	1,5	1,4	1,5	1,3
Germany	1,2	1,2	–	1,1
Greece	0,8	–	–	0,8
Hungary	1,1	1,1	0,8	0,9
Ireland	0,9	0,8	1,6	1,5
Italy	0,9	0,9	–	0,9
Latvia	1,1	1	–	–
Lithuania	1,0	1,1	–	–
Luxembourg	0,5	0,5	–	–

Malta	–	–	–	–
Netherlands	1,7	1,7	1,7	1,4
Poland	**1,2**	**1,2**	**1,5**	**1,1**
Portugal	1,2	1,2	–	1
Romania	–	–	–	–
Slovakia	1,0	1	0,9	0,8
Slovenia	1,0	1	1,3	
Spain	1,3	1,2	1,3	1,1
Sweden	1,6	1,6	1,8	1,6
United Kingdom	2,0	1,7	1,4	1,1

Source: *Original development based on OECD 2014 & 2021.*

According to OECD data, the amount of expenditure on higher education in GDP in Poland increased from 1.1% in 2000 (compared to the average for the analysed countries at 1.17% and a slight level of differentiation, measured by the coefficient of variation – 24%), to 1.2% in 2017 (with an average of 1.25% and average variation of 28%), i.e., a similar percentage as in the case of Portugal or Germany. Country rankings were developed based on data on public institutions' expenditure on higher education per student against GDP per capita in 2000, 2010 and 2015 (Table 6).

Table 6. *Countries' ranking of public expenditure on higher education per one student measured in comparison to GDP per capita in 2000;2010;2015. Public expenditure per student as a % of GDP per capita is the total public expenditure per student in tertiary education as a percentage of GDP per capita. Public expenditure (current and capital) includes government spending on educational institutions*

Country	Rank			Average
	2015	2010	2001	
Austria	6	5	6	6
Belgium	13	9	7	10
Bulgaria	—	24	25	25
Croatia	—	19	4*	12
Cyprus	14	8	5	9
Czech Republic	24	20	13	19
Denmark	2*	2*	1	2
Estonia	10	17	20	16
Finland	8	6	8	7
France	12	7	14	11
Germany	9	—	—	9
Greece	26	—	19	23
Hungary	23	15	10	16
Ireland	25	10	15	17
Italy	18	13	18	16
Latvia	16	25	23	21
Lithuania	19	22	9	17
Luxembourg	4	—	—	4
Malta	1	1	—	1
Netherlands	11	3	3	6
Poland	**15**	**21**	**24**	**20**
Portugal	17	11	17	15
Romania	20	18	11	16
Slovak Republic	5	23	12	13
Slovenia	21	16	16	18

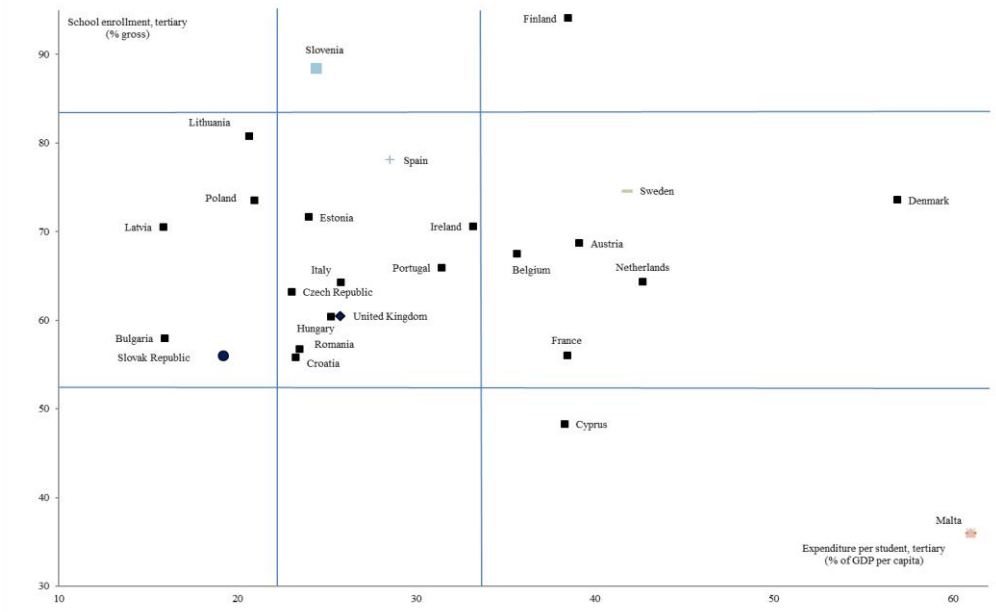
Spain	22	12	22	19
Sweden	3	4	2	3
United Kingdom	7	14	21	14

Source: *Original study based on World Bank 2013 & 2021, (–) no data, (*) data forecast based on data from the previous year.*

In 2001, Poland, along with Bulgaria and Latvia, belonged to the group of countries where public expenditure on higher education per student in proportion to GDP per capita was the lowest in the EU and amounted to 18% (at the same time, the same the rate for Denmark was 76%). In 2010, Poland was 21st out of twenty-five EU countries for which data on the analysed indicator was available. Since 2012, a systematic increase in the share of public expenditure on higher education per student in GDP per capita has been observed in Poland. It was respectively 22.5% in 2012, 25.4% in 2013 and 26.5% in 2014. and 28% in 2015. Additionally, in the discussed period, the level of the analysed indicator in other EU countries decreased, e.g., in the case of the previously mentioned Denmark it decreased by 43%. As a result, in 2015, out of the 26 countries surveyed, Poland was ranked 15th. In 2016, the value of the indicator for Poland decreased to 25.4%.

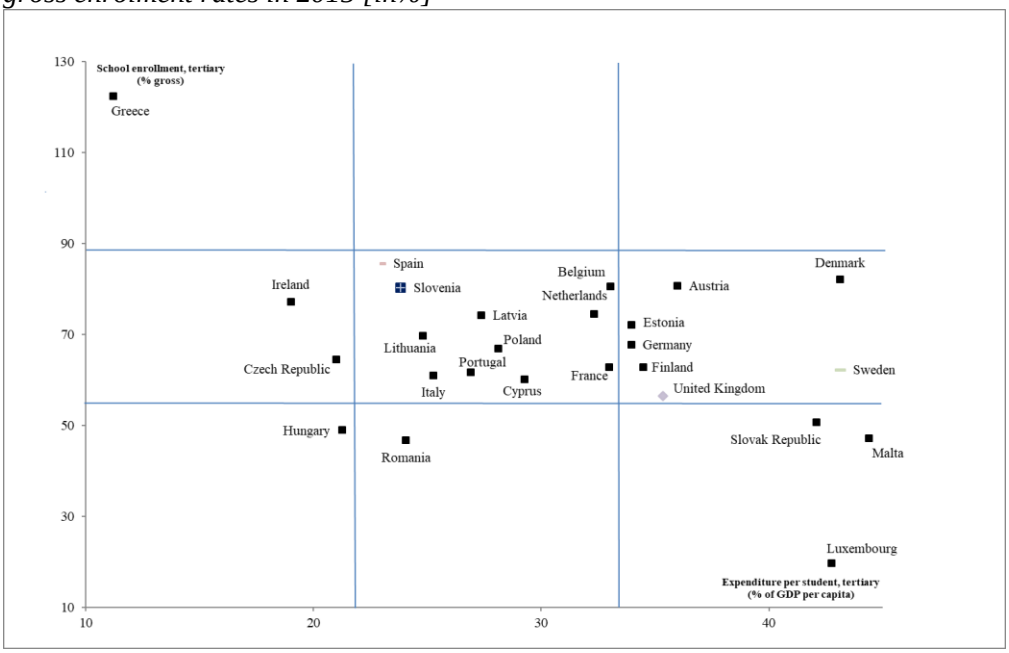
In the next stage of the research, the expenditure of public institutions on the education of one student in proportion to GDP per capita of EU countries (Expenditure per student, tertiary% of GDP per capita) in 2010 and 2015 was compared with gross enrolment rates. As a result, graphs 1 and 2 were obtained.

Figure 1. *Spending of selected countries per student as per GDP per capita, and gross enrolment rates in 2010 in%*



Source: *Original study based on World Bank 2021, (*) data for 2001.*

Figure 2. *Spending in selected countries per student as per GDP per capita, and gross enrolment rates in 2015 [in%]*



Source: *Original study based on: World Bank 2021, (*) data for Denmark for 2014.*

The detailed division of countries into groups according to the two variables used is presented in Table 7.

Table 7. *Division of countries according to expenditure per student in GDP per capita and gross enrolment rates in 2010 and 2015*

Group no.	Group name	Groups of states	
		Years	
		2015	2010
I	Low expenditure per one student in proportion to GDP *per capita*, low enrolment ratio	Hungary	
II	Low expenditure per one student in proportion to GDP *per capita*, average enrolment ratio	Cech Republic Ireland	Bulgaria Latvia Lithuania **Poland** Slovak Republic
III	Low expenditure per one student in proportion to GDP *per capita*, high enrolment ratio	Greece	
IV	Average expenditure per one student in proportion to GDP *per capita*, average enrolment ratio	Belgium Cyprus France Italy Latvia Lithuania Netherlands **Poland** Portugal	Croatia Cech Republic Estonia Hungary Ireland Italy Portugal Romania Spain

		Slovenia	United Kingdom
V	Average expenditure per one student in proportion to GDP *per capita*, high enrolment ratio		Slovenia
VI	Average expenditure per one student in proportion to GDP *per capita*, low enrolment ratio	Romania	
VII	High expenditure per one student in proportion to GDP *per capita*, low enrolment ratio	Luxemburg Malta Slovak Republic	Cyprus Malta
VIII	High expenditure per one student in proportion to GDP *per capita*, average enrolment ratio	Austria Denmark Estonia Germany Finland Sweden United Kingdom	Austria Belgium Denmark France Netherlands Sweden
IX	High expenditure per one student in proportion to GDP *per capita*, high enrolment ratio		Finland

Source: *Original development based on World Bank 2021.*

In 2010, public expenditure for the education of one student amounted to 21% of GDP per capita in Poland, and the enrolment rate was 74%. As a result, Poland, along with Bulgaria, Latvia, Lithuania, and Slovakia, was classified in the group where the values of the first indicator were assessed as low, and the second as average. In 2015. expenditure of public institutions per student in GDP per capita in Poland increased to the level of 28%, and the enrolment rate reached the level of 67%. Poland, along with nine countries such as Belgium, Cyprus, France, Italy, Latvia, Lithuania, Netherlands, Portugal, and Slovenia, found themselves in the group in which the degree of enrolment and expenditure per student in GDP per capita was defined as average.

4. Discussion, Summary, and Conclusions

While researching higher education in Poland, it was noticed that, as in other areas[xi], the indicators strengthened in the initial phase of socio-economic development. Until 1989 Poland had a centrally planned economy system. System changes initiated at the beginning of the 1990s resulted in the development of higher education. There has been a dynamic increase in both the number of universities operating in Poland and the number of students.

In the early phase of the change, the dynamics were much greater. In twenty-three years, from the academic year 1990/1991 to 2012/2013, the number of universities in Poland increased by 341 (from 112 to 453), and the number of students increased by over 290%, which means an additional 1.2 million students. As a result, the values of the indicators determining the level of tertiary education – the enrolment rate and the share of expenditure on higher education in GDP increased to levels comparable to those recorded in the richest countries. The structure of the market has also changed. Before the systemic transformation, there were almost exclusively

state-owned universities in Poland. In 2012/2013, there were almost two and a half times as many private universities in Poland as public universities.

Currently, the changes are slowing down. Between 2013 and 2018, the number of students in higher education in Poland decreased by almost 320 thousand (Students enrolled in tertiary education), and the number universities by 65. The observed tendency may be caused by the decreasing number of people after secondary school, at the age at which the decision to continue education is made. Based on the value of the correlation coefficient (r = 0.98), determined for the number of students and the number of people aged 19 to 24, a conclusion can be drawn that the analysed indicators are very strongly interdependent.

Examination of the structure of the market in terms of the distribution of students between public and non-public universities shows that throughout the analysed period, education at state-owned universities was the dominant form in Poland. There are several reasons for the observed condition. The most important ones seem to be:

- Prestige of state universities and the quality of the service provided,
- The method of financing higher education,
- The level of socio-economic development, which translates into the financial condition of the Polish higher education market and a single student.

State-owned universities in Poland are units with traditions[xii], with a well-established position on the market and high quality of the service offered, which have enrolment been earning their image and recognition for many decades (often hundreds of years).[xiii] The greater number of students at public universities[xiv] than at private ones may also result from the fact that public higher education in Poland is free, besides, most of the expenditure on higher education in Poland goes to state universities. As a result, on the Polish market has large, strong state-owned universities, as well as non-public universities which are many, but much smaller.

The last important reason why Polish students choose state universities was the level of social and economic development, which in macro terms translates into the financial condition of the entire Polish higher education[xv], but also affects an individual student.

The analysis of the values of enrolment indicators and human development indicators confirmed that both indicators were characterized by a strong linear relationship. The Pearson correlation coefficients for Poland, also for countries with the highest enrolment rates, such as Greece, Latvia, Spain, or the highest levels of human development rates, such as Denmark and Ireland, determined by the data from 1990 to 2018, were respectively: 0.952, 0.972, 0.937, 0.993, 0.987, 0.964. Polish students more often chose free studies at Polish state universities because

private universities[xvi] were usually beyond their financial capacity. Similarly, studies abroad were still too expensive for most Polish students.[xvii]

Assessment of the spread of higher education in Poland based on the gross enrolment index and the percentage of people aged 30-34 who completed tertiary education (the ratio of higher education) revealed that the level of the studied measures has increased between 1990 and 2018. Analysing the total share of expenditure on educational institutions as a percentage of GDP in Poland and the state investment in terms of public expenditure on higher education per student in proportion to GDP per capita (Public expenditure per pupil as a % of GDP per capita), it was found that also in terms of expenditure, Poland's position was strengthened in comparison to other EU countries.

Based on the results obtained, one can get the impression that higher education in Poland has already reached the stage of maturity. However, in-depth analysis of the data showed that the gross enrolment indicators for Poland had been systematically decreasing since 2012, from 73.96% in 2012 to 68.63% in 2018. Since 2015, it has also been lower than the average in the EU countries (the median for the EU in 2018 was 71%). The level of expenditure on higher education in Poland was not as high as it could be based on the indicators showing the share of expenditure in GDP compared to other EU countries. Although in Poland, between 1999 and 2017, the amount of expenditure per student was increased by €1,503, which was an increase by 85% compared to the baseline year, but in other countries, the analysed indicator achieved much higher values. For example, in the Czech Republic, which joined the EU in 2004, expenditure on education per student in 2004 amounted to EUR 3.7 thousand, in 2006 over 4.4, in 2010 - 4.6, in 2015 – 3.5, and in 2017 - 3.8 thousand euros. In Poland, it was slightly over 2.7 in 2004, 3 in 2006, 4.4 in 2010, 2.9 in 2015 and 3.2 thousand in 2017, respectively. In the EU, the most money spent on education per student was in Luxembourg. In 2017, it was over EUR 19.7 thousand, with an average of EUR 6,263.

In the case of the measure illustrating the share of total expenditure on higher education in GDP per capita, which in 2017 was about 1.2%[xviii] in Poland, similarly to Germany and Portugal, considering the level of GDP per capita itself, which was 3.2 times higher for Germany than 1.6 times higher for Portugal than for Poland (Eurostat 2021), it again turned out that Polish annual expenditure on higher education was not as high as it would appear from the ranking.

Further evidence that the financial condition of the Polish higher education market is not strong, arises from both the indicators (and their evolution) of the share of public expenditure on higher education in GDP, but also of current expenditure on basic research in universities in GDP, investment expenditure, annual expenditure of public and non-public institutions on the education of one student, expenditure per one student as per GDP per capita (GUS).

Comparing public expenditure for the education of one student in GDP per capita and enrolment rates, it was found that in 2010 Poland, along with four other countries, was classified in the group in which the level of the first indicator was described as low, and the second as average. At that time, it was the group described by the weakest characteristics.[xix] In 2015, although the expenditure of public institutions per student in GDP per capita in Poland increased to 28%, and Poland was included in the group in which the analysed indicators were defined as average, the level of the enrolment rate in Poland in the analysed period decreased to 67% (from 74% in 2010).[xx] The highest levels of the analysed indicators were recorded in the case of economically and socially strong Western European and Scandinavian countries, where the state treats education as a very important areas and the importance of education is historically and culturally conditioned.

Currently, higher education in Poland enters the next stage of development. Many universities and a decreasing number of potential students resulted in saturation of the education market with scientific and research institutions and an increase in competitive struggle, as a result from the 2010/2011 academic year, there was an observed decrease in the increase in the number of universities in Poland. The observed tendency confirms the truth of the hypothesis presented in the introduction that the higher education market in Poland has already undergone the most dynamic quantitative development, i.e., simple, extensive growth opportunities (understood as an increase in the number of students and universities) have been exhausted. Soon, as economic growth progresses, there should be an increase in expenditure on education, and with it the qualitative development of higher education in Poland.

In the longer term, when the Polish economy reaches the level of development typical of the richest countries, it should be expected that the level of expenditure per student should continue to grow, as the market matures, the indicators will stabilize, expenditure per student, also in proportion to GDP per capita will reach a level comparable to that of the most developed EU countries. The higher education market will witness survival of diverse institution, offering services at different levels, oriented on quality and systematically working to build their prestige. Those will be big and small institutions, both state-owned and private, but there will be no top-down decisions on who will remain active on the market, it will depend on market processes. Nowadays, in the context of governance, decision-makers must be aware that education is a long-term investment with a high rate of return and one of the most important, fundamental factors in the integration of the countries of the EU.

References:

Bukietyńska, A. et al., eds. 1998. Statystyczne metody analizy danych. Wrocław: Akademia Ekonomiczna.

Eurostat. 2021. Database: Education and training – Overview, http://epp.eurostat.ec.europa.eu [2013.11.20], [27/01/2021] & [07/02/2021].

Galanc, T., Kołwzan, & W., Pieronek J. 2011. A quantitative method supporting the management of the teaching process. Operations Research and Decisions, vol. 21 nr 1, 33-51.

Kołwzan W., & Pieronek J. 2011. Elementy teorii użyteczności w analizie procesu nauczania. Wrocław, Zeszyty Naukowe WSOWL, Nr 4 (162), 325-331.

Kołwzan, W., & Pieronek. J. eds. 2012. Elementy teorii decyzji. Wrocław: WSOWL.

Nowak, Edward, eds. 1990. Metody taksonomiczne w klasyfikacji obiektów społeczno-gospodarczych. Warszawa: PWE.

Panek, T., eds. 2009. Statystyczne metody wielowymiarowej analizy porównawczej. Warszawa: SGH.

Pluta, W., eds. 1986. Wielowymiarowa analiza porównawcza w modelowaniu ekonometrycznym. Warszawa: PWN.

Pawłowski K., Zarządzanie marketingowe szkołą wyższą w warunkach silnej konkurencji na rynku edukacyjnym – refleksje z perspektywy rektora uczelni niepublicznej http://www.krzysztofpawlowski.pl/ (2011-02-14).

Główny Urząd Statystyczny. 2012. Mały Rocznik Statystyczny Polski. Warszawa, GUS.

Główny Urząd Statystyczny. 2019. Szkoły Wyższe i ich finanse w 2018 roku. Warszawa, GUS.

Główny Urząd Statystyczny. 2018. Szkoły Wyższe i ich finanse w 2017 roku. Warszawa, GUS.

Główny Urząd Statystyczny. 2017. Szkoły Wyższe i ich finanse w 2016 roku. Warszawa, GUS.

Główny Urząd Statystyczny. 2016. Szkoły Wyższe i ich finanse w 2015 roku. Warszawa, GUS.

Główny Urząd Statystyczny. 2015. Szkoły Wyższe i ich finanse w 2014 roku. Warszawa, GUS.

Główny Urząd Statystyczny. 2014. Szkoły Wyższe i ich finanse w 2013 roku. Warszawa, GUS.

Główny Urząd Statystyczny. 2013. Szkoły Wyższe i ich finanse w 2012 roku. Warszawa, GUS.

Główny Urząd Statystyczny. 2012. Szkoły Wyższe i ich finanse 2011. Warszawa, GUS.

Główny Urząd Statystyczny. 2011. Szkoły Wyższe i ich finanse 2010. Warszawa, GUS.

Główny Urząd Statystyczny. 2010. Szkoły Wyższe i ich finanse 2009. Warszawa, GUS.

Główny Urząd Statystyczny. 2009. Szkoły Wyższe i ich finanse 2008. Warszawa, GUS.

Główny Urząd Statystyczny. 2008. Szkoły Wyższe i ich finanse 2007. Warszawa, GUS.

Główny Urząd Statystyczny. 2007. Szkoły Wyższe i ich finanse 2006. Warszawa, GUS.

Główny Urząd Statystyczny. 2006. Szkoły Wyższe i ich finanse 2007. Warszawa, GUS.

Główny Urząd Statystyczny. 2005. Szkoły Wyższe i ich finanse 2006. Warszawa, GUS.

Główny Urząd Statystyczny. 2004. Szkoły Wyższe i ich finanse 2005. Warszawa, GUS.

Główny Urząd Statystyczny. 2003. Szkoły Wyższe i ich finanse 2004. Warszawa, GUS.

Główny Urząd Statystyczny. 2002. Szkoły Wyższe i ich finanse 2003. Warszawa, GUS.

Główny Urząd Statystyczny. 2001. Szkoły Wyższe i ich finanse 2002. Warszawa, GUS.

Główny Urząd Statystyczny. 2000. Szkoły Wyższe i ich finanse 2001. Warszawa, GUS.

Główny Urząd Statystyczny. 1999. Szkoły Wyższe i ich finanse 2000. Warszawa, GUS.

Główny Urząd Statystyczny. 1998. Szkoły Wyższe i ich finanse 1999. Warszawa, GUS.

Główny Urząd Statystyczny. 2020. Rocznik Statystyczny Rzeczypospolitej Polskiej 2020. Warszawa, GUS.

Główny Urząd Statystyczny. 2019. Rocznik Statystyczny Rzeczypospolitej Polskiej 2019. Warszawa, GUS.

Główny Urząd Statystyczny. 2018. Rocznik Statystyczny Rzeczypospolitej Polskiej 2018. Warszawa, GUS.
Główny Urząd Statystyczny. 2017. Rocznik Statystyczny Rzeczypospolitej Polskiej 2017. Warszawa, GUS.
Główny Urząd Statystyczny. 2016. Rocznik Statystyczny Rzeczypospolitej Polskiej 2016. Warszawa, GUS.
Główny Urząd Statystyczny. 2015. Rocznik Statystyczny Rzeczypospolitej Polskiej 2015. Warszawa, GUS.
Główny Urząd Statystyczny. 2014. Rocznik Statystyczny Rzeczypospolitej Polskiej 2014. Warszawa, GUS.
Główny Urząd Statystyczny. 2013. Rocznik Statystyczny Rzeczypospolitej Polskiej 2013. Warszawa, GUS.
Główny Urząd Statystyczny. 2012. Rocznik Statystyczny Rzeczypospolitej Polskiej 2012. Warszawa, GUS.
Główny Urząd Statystyczny. 2011. Rocznik Statystyczny Rzeczypospolitej Polskiej 2011. Warszawa, GUS.
Główny Urząd Statystyczny. 2010. Rocznik Statystyczny Rzeczypospolitej Polskiej 2010. Warszawa, GUS.
Główny Urząd Statystyczny. 2009. Rocznik Statystyczny Rzeczypospolitej Polskiej 2009. Warszawa, GUS.
Główny Urząd Statystyczny. 2008. Rocznik Statystyczny Rzeczypospolitej Polskiej 2008. Warszawa, GUS.
Główny Urząd Statystyczny. 2007. Rocznik Statystyczny Rzeczypospolitej Polskiej 2007. Warszawa, GUS.
Central Statistical Office. 2006. Statistical Yearbook of The Republic of Poland 2006. Warsaw, GUS.
Główny Urząd Statystyczny. 2005. Rocznik Statystyczny Rzeczypospolitej Polskiej 2005. Warszawa, GUS.
Główny Urząd Statystyczny. 2004. Rocznik Statystyczny Rzeczypospolitej Polskiej 20041. Warszawa, GUS.
Główny Urząd Statystyczny. 2003. Rocznik Statystyczny Rzeczypospolitej Polskiej 2003. Warszawa, GUS.
Główny Urząd Statystyczny. 2002. Rocznik Statystyczny Rzeczypospolitej Polskiej 2002. Warszawa, GUS.
Główny Urząd Statystyczny. 2001. Rocznik Statystyczny Rzeczypospolitej Polskiej 2001. Warszawa, GUS.
Główny Urząd Statystyczny. 2000. Rocznik Statystyczny Rzeczypospolitej Polskiej 2000. Warszawa, GUS.
Główny Urząd Statystyczny. 1991. Rocznik Statystyczny 1991. Warszawa, GUS.
International Monetary Fund. 2013. World Economic Outlook Database April 2013. Washington, DC: International Monetary Fund.
Organisation for Economic Co-operation and Development, 2020, Dataset: Educational finance indicators - EAG 2020, http://www.oecd.org [2020.02.03].
Organisation for Economic Co-operation and Development. 2020. Education at a Glance 2020: OECD Indicators. OECD Publishing, http://www.oecd.org [2021.02.02].
Organisation for Economic Co-operation and Development. 2019. Education at a Glance 2019: OECD Indicators. OECD Publishing, http://www.oecd.org [2021.02.02].
Organisation for Economic Co-operation and Development. 2013. Education at a Glance 2013: OECD Indicators. OECD Publishing, http://www.oecd.org [2013.11.20].

Organisation for Economic Co-operation and Development. 1998. Education at a Glance 1998: OECD Indicators. OECD Publishing. http://www.oecd.org [2013.11.20].
Organisation for Economic Co-operation and Development. 2011. Society at a Glance 2011: OECD Social Indicators, http://www.oecd.org [2013.11.20]
United Nations Development Programme. 2021, Human Development Reports 2021, http://hdr.undp.org. [2021.02.02]
United Nations Development Programme. 2014, Human Development Reports 2014, http://hdr.undp.org. [2014.02.05]
United Nations Development Programme. 2011. Human Development Reports 2011 – Human development statistical annex. New York, http://hdr.undp.org.
UNESCO, 2020, Institute for Statistics, http://uis.unesco.org/.
Ustawa Prawo o szkolnictwie wyższym, Dz. U. nr 65, poz. 385 z 1990.
Ustawa Prawo o szkolnictwie wyższym, Dz. U. nr 164, poz. 1365 z 2005 roku ze zmianami.
World Bank. 2005. World Development Report 2005. Washington, DC: World Bank. http://data.worldbank.org [2014.02.05]
World Bank. 2014. 2015, United Nations Development Programme: http://data.worldbank.org [2014.02.05]
World Bank. 2021, database: World Development Indicators, http://data.worldbank.org [2021.01.29]

Notes:

[i] *The economic and political reforms introduced within the transition were based on the concepts of the Washington Consensus.*

[ii] *For example, in Poland before 1989, there were two non-state-owned higher-education institutions, including the Catholic University of Lublin established in 1918.*

[iii] *The first non-state-owned higher education institution established according to the Act of higher education of 1990 was registered in August 1991 (GUS 1998b).*

[iv] *The level of education refers to 2011 ISCED 5 - 8 (International Standard Classification of Education) levels. For data from 2014 I to ISCED 5 - 6 1997. For data up to 2013. The indicator is based on the EU Labor Force Survey: http://epp.eurostat.ec.europa.eu [27/01/2021].*

[v] *The gross enrolment ratio is the percentage proportion of all people studying at the given level in the entire population of people at the age formally assigned to this level (GUS 2004b, 17).*

[vi] *Net enrolment ratio is the percentage proportion of all students at the age formally assigned to this level of education to the entire population of this age (GUS 2004b, 17).*

[vii] *Human development index – applied in international comparison, synthetic measure describing social and economic development of countries. The measure is based on data concerning: mean life expectancy, mean number of years in education for residents aged 25 and more, expected number of years in education for children at the beginning of the education process and GDP per capita in USD, calculated by the purchasing power parity (PPP): (UNDP 2011, 127).*

[viii] *The most recent data published by OECD concerned 2017. For 1990, data for only six out of the 28 member states of the EU were available, in the case of 2000 for 8, in the case of 2010 for 12, in the case of 2016 for 7, and in the case of 2017 for 5.*

[ix] *The number of students quoted by Statistics Poland is aggregated including Polish and foreign students. For example, in 1990/1991 academic year, foreigners accounted for 1% of all people studying in Poland, while in 2012/2013 – 1.7% (GUS 1999b, GUS 2013b).*

[x] *In 2018, the highest value of HDI was recorded in Germany (0.95). However, this country was not included in the comparisons, because in the statistics published for 1990 there was no information available on the value of the German Enrollment Index.*

[xi] *Similar trends were observed on the example of the advertising market and the environmental protection sector in Poland.*

[xii] *Strong research units have also been found among non-public universities in Poland for many years. For example, Kozminski University in Warsaw, in 2020, was ranked 45th in the Financial Times ranking and was a leader among business universities in Central and Eastern Europe.*

[xiii] *All higher education institutions operating in Poland under the centrally planned economy were state-owned, but some were established after WWII and nationalised, e.g., what is now the University of Economics in Wrocław, while others have centuries of traditions, like the Jagiellonian University or the University of Wrocław.*

[xiv] *Currently, Polish students have access to the educational offer of both Polish and foreign institutions, e.g., in 2008 – 2011 Poles studying abroad accounted for about 2% of all Polish students, while for twenty EU states covered by an OECD study the median was 3.5 and for Poland's closest rich neighbours, e.g., Germany and Czechia, the indicator achieved 5 and 3%, respectively (OECD 2013).*

[xv] *This association is correct both ways: development of the higher education sector affects the economic development.*

[xvi] *Free studies are available at state-owned higher education institutions exclusively for full-time students, in the case of part-time students, tuition is payable at state-owned universities, too.*

[xvii] *Currently, Polish students have access to the educational offer of both Polish and foreign institutions, e.g., in 2008 – 2011 Poles studying abroad accounted for about 2% of all Polish students, while for twenty EU states covered by an OECD study the median was 3.5 and for Poland's closest rich neighbours, e.g., Germany and Czechia, the indicator achieved 5 and 3%, respectively (OECD 2013).*

[xviii] *The tendency was even more prominent in 2010, when in countries, where the share of expenditure on higher education in GDP was 1.5, as in Poland, while GDP per capita was more than three times higher than the measure for Poland (in the case of Austria: 3.7 times, France: 3.2).*

[xix] *The analysis of the obtained results showed that in the studied years, there were categories that included no countries. In 2010, there were three classes with no elements assigned: low and high expenses with low enrolment ratio, as well as average expenditure and low enrolment ratio. Consequently, the group of low expenditure and average enrolment ratio was the one with the weakest characteristics.*

[xx] *Higher education ratio concerns levels 5 – 8 of ISCED (International Standard Classification of Education) of 2011 for data of 2014, and levels 5 – 6 of ISCED 1997 for data of 2013. The indicator is based on the labour force study in EU: http://epp.eurostat.ec.europa.eu [27/01/2021].*