

Increased Employment Rates and the Nature of the Economic Growth in Poland's Voivodships

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Abstract

The purpose of the article is to study the impact of basic production factors (level of employment and value of fixed assets) on the economic growth rate in different regions of Poland. The hypothesis presented in the article is that in the process of economic growth, the human factor (level of employment) plays a greater role than the fixed assets. The hypothesis was verified using the data published by the Central Statistical Office in the Statistical Yearbooks of the Regions for the years 2000 and 2015. The results of the study confirm the validity of the formulated hypothesis. Also, the author of the article made the effort to identify the voivodships characterized by extensive and intensive economic growth.

Keywords: economic growth, extensive and intensive growth, employment, added value, fixed assets

JEL: E22, E24, R23

Introduction

The most often mentioned key production factors that determine economic growth are capital and labor. The hypothesis presented in the article is that in the process of economic growth, the human factor (level of employment) plays a greater role than the fixed assets. The hypothesis was verified using the data published by the Central Statistical Office of Poland in the Statistical Yearbooks of the Regions for the years 2000 and 2015. The article poses two additional research questions:

- Is it a valid statement that different regions of Poland are characterized by intensive and extensive growth?
- Are voivodships with higher economic growth rates characterized by a relative increase or decrease in the share of industry and the enterprise sector (companies that employ more than 9 persons) in the structure of the economy?

In order to answer the first of the above questions, in addition to absolute values the relative values of the change in the employment level, the value of fixed assets, and the gross added value in the different voivodships were compared to the average values for the entire economy. In order to answer the second question, an analysis was performed on the data related to employment and increase of fixed assets in the industry and the enterprise sector (companies that employ more than 9 persons).

1 Production factors that determine economic growth

According to the standard approach, the production factors that determine economic growth are labor, capital, and natural resources (land). Currently, the list of production factors is expanded by adding technology (which determines the level of utilization of the three basic production factors) and socioeconomic factors (related to the human factor) (Woźniak 2004, 104). Some authors believe that investment in material capital is the most important factor affecting economic growth.

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Their opponents emphasize the fact that decisions concerning the direction of investment (including creation of technologies or decisions to purchase solutions that are ready for use) and the effectiveness of their use depend on the human factor. The quality of decisions made by people depends, in turn, on their knowledge and skills; consequently, what is more important is investment in human capital (Domański 1993, 167–170; Jones 2016, 14–17; Ranis, Stewart, and Ramirez 2000, 198–203) defined as the potential of workers (education, qualifications, skills, abilities, attitudes, motivation, and health) (Fisher, Schoenfeldt, and Shaw 2006, 3). From the macroeconomic standpoint, of high importance to economic growth is accumulation of human capital (including years of education) and increased population (Moral-Benito 2009, 13–14). From the microeconomic standpoint, human capital and structural capital (organizational systems, management tools and philosophy, and innovation capital) form intellectual capital, which is the source of competitive advantage of businesses (Dubkevics and Barbars 2010, 1).

Countries (regions) may prefer growth based on use of labor-intensive technologies (especially in high unemployment conditions) or capital-intensive technologies (which increase the level of technological advancement of the economy but create few new jobs) (Bartkowiak 2013, 135). Economic growth may be extensive (when it is caused by increased utilization of labor, capital, and other production factors with small changes in their efficiency) or intensive (when the increase in labor efficiency exceeds the increase in the utilization of other production factors as a result of use of new technologies, better organization of work, etc.). Extensive economic growth slows down when the availability of any of the production factor is reduced (Woźniak 2004, 49–52, 110–111). Thus, the rate of GDP growth depends mostly on the level of utilization of the labor resources (employment rate, efficiency, length of work time) and on the technical infrastructure used by the labor (rate of investment, capital intensity dependent on the selected technologies and branches in which investments are made) (Piasecki 2011, 61–62).

The present article makes references to the concept of economic growth based on the paradigm of a knowledge-based economy. According to that concept, it is increase in the value of human capital that makes it possible to maintain long-term economic growth (as well as qualitative changes in the socio-economic structure—i.e., production structure, technology, labor, and management) (Fiedor and Kociszewski 2010, 211–215; Malik and Jasińska-Biliczak 2018, 2–3; Woźniak 2004, 20). The above assumptions are the basis for the hypothesis of the article presented in the introduction.

2 Production factors and the nature of economic growth in Poland's voivodships

Table 1 shows a comparison of the level of employment according to registered data in different regions of Poland in the years 2000 and 2015. The total employment and the employment in the industry are data valid as of 31 December of the respective year; in the case of the enterprise sector (companies employing more than 9 persons), the data shows the average yearly level of employment. In the analyzed period, employment decreased by 4,3% countrywide.¹ In 5 voivodships, employment increased. Those five voivodships are: Pomorskie (a 7,8% increase), Wielkopolskie (a 7,2% increase), Dolnośląskie (a 4,6% increase), Lubuskie (a 1,4% increase), and Mazowieckie (a 0,8% increase). The voivodships with a decrease in the level of employment that is close to the national average (0,9% to 8% of decrease of employment) were: Małopolskie, Śląskie, Warmińsko-Mazurskie, Kujawsko-Pomorskie, and Zachodniopomorskie. In the remaining voivodships, the decrease in the level of employment in the years 2000–2015 exceeded 10%.

In the case of the industrial sector the level of employment increased also in five voivodships. The place of the Mazowieckie Voivodship (decrease of employment in the industry by 17,8%) in the list of voivodships with increased employment level in the industry was taken by the Warmińsko-Mazurskie Voivodship (a 6,9% increase in the level of employment in the industry). The highest rate of increase of employment in the industry was observed in the Lubuskie Voivodship (an 11% increase). In the enterprise sector (companies employing more than 9 employees), the level of

1. [In the journal European practice of number notation is followed—for example, 36 333,33 (European style) = 36 333.33 (Canadian style) = 36,333.33 (US and British style). — Ed.]

Tab. 1. Level and rate of growth of employment in the years 2000 and 2015 in selected sections by voivodships

	Total employment			Employment in the industry			Employment in the enterprise sector ^a		
	thousands ^b		% ^c	thousands ^b		% ^c	thousands ^b		% ^c
	2000	2015	2015/2000	2000	2015	2015/2000	2000	2015	2015/2000
<i>Poland</i>	15 159,2	14 504,3	-4,3	3 134,4	2 994,2	-4,5	9 354,1	9 8 23,0	5,0
Dolnośląskie	1 025,6	1 073,0	4,6	246,1	263,0	6,9	727,1	766,5	5,4
Kujawsko-Pomorskie	762,7	707,1	-7,3	177,6	167,4	-5,8	480,8	444,7	-7,5
Lubelskie	979,1	817,2	-16,5	117,9	107,5	-8,9	402,9	390,4	-3,1
Lubuskie	330,1	334,6	1,4	79,6	88,3	11,0	230,2	216,9	-5,8
Łódzkie	1 066,0	956,9	-10,2	241,1	219,5	-9,0	601,1	577,7	-3,9
Małopolskie	1 334,2	1 321,9	-0,9	230,7	223,8	-3,0	715,2	801,4	12,0
Mazowieckie	2 387,0	2 406,7	0,8	388,8	319,6	-17,8	1 688,9	2 212,5	31,0
Opolskie	372,0	321,6	-13,5	82,8	76,3	-7,8	230,7	190,0	-17,6
Podkarpackie	945,6	809,7	-14,4	159,9	159,9	0,0	427,2	409,1	-4,2
Podlaskie	495,5	413,1	-16,6	66,1	63,9	-3,3	225,2	209,2	-7,1
Pomorskie	740,3	798,2	7,8	174,0	170,7	-1,9	521,3	540,4	3,7
Śląskie	1 750,8	1 672,0	-4,5	537,6	484,5	-9,9	1 295,5	1 183,3	-8,7
Świętokrzyskie	594,2	465,0	-21,7	87,3	80,2	-8,1	264,0	226,7	-14,1
Warmińsko-Mazurskie	454,0	433,2	-4,6	95,4	102,0	6,9	290,6	269,1	-7,4
Wielkopolskie	1 351,1	1 448,4	7,2	327,8	360,6	10,0	859,8	1 040,5	21,0
Zachodniopomorskie	571,1	525,7	-8,0	121,8	107,0	-12,1	393,7	344,7	-12,4

Source: *Statistical Yearbook of the Regions — Poland 2001* (pages 90, 92), *Statistical Yearbook of the Regions — Poland 2016* (pages 286, 288)

^a Average yearly level of employment, in the companies employing more than 9 persons

^b Thousands of persons

^c Rate of growth

Tab. 2. Value and rate of growth of Gross added value by region in current prices

	Gross added value			Gross added value per employee		
	PLN billion		% ^a	PLN		% ^a
	2000	2015	2015/2000	2000	2015	2015/2000
<i>Poland</i>	602,2	1 596,4	165,1	40 102	113 577	183,2
Dolnośląskie	47,9	134,6	180,7	46 005	128 529	179,4
Kujawsko-Pomorskie	29,4	70,7	140,9	38 997	101 985	161,5
Lubelskie	23,8	61,0	155,7	25 539	80 212	214,1
Lubuskie	14,3	35,3	146,8	42 337	108 205	155,6
Łódzkie	36,6	97,0	165,1	35 248	103 543	193,8
Małopolskie	44,9	126,1	180,8	33 629	100 202	198,0
Mazowieckie	119,7	353,9	195,5	51 760	148 986	187,8
Opolskie	14,5	33,5	131,6	38 424	108 242	181,7
Podkarpackie	23,6	62,6	165,5	25 404	84 744	233,6
Podlaskie	14,2	35,1	148,2	30 074	88 054	192,8
Pomorskie	34,4	91,9	167,3	46 470	117 603	153,1
Śląskie	83,3	197,7	137,2	46 446	121 371	161,3
Świętokrzyskie	16,1	37,8	134,4	28 318	84 944	200,0
Warmińsko-Mazurskie	17,0	42,5	149,3	36 896	100 026	171,1
Wielkopolskie	55,8	156,5	180,6	41 718	110 968	166,0
Zachodniopomorskie	26,7	60,2	125,7	45 541	115 728	154,1

Source: *Statistical Yearbook of the Regions — Poland 2002* (page 302), *Statistical Yearbook of the Regions — Poland 2017* (page 526)

^a Rate of growth

employment on the national scale increased by 5%. Employment in the enterprise sector increased at rates similar to the national average in the Dolnośląskie and Pomorskie voivodships. A much greater increase in the level of employment in this sector was observed in the Mazowieckie Voivodship (a 31% increase), the Wielkopolskie Voivodship (a 21% increase), and the Małopolskie Voivodship (a 12% increase). In other voivodships, the level of employment in the enterprise sector decreased.

Table 2 shows data concerning the changes in the gross added value (total and per employee) in the years 2000 and 2015. The voivodships where the total increase in the gross added value was above the national average (a 165,1% increase) were (in the order according to their ranking) the Mazowieckie Voivodship, the Małopolskie Voivodship, the Dolnośląskie Voivodship, the Wielkopolskie Voivodship, the Pomorskie Voivodship, and the Podkarpackie Voivodship. There are seven voivodships where the increase of gross added value per employee was above the national average (a 183,2% increase), namely the Podkarpackie Voivodship, the Lubelskie Voivodship, the Świętokrzyskie Voivodship, the Małopolskie Voivodship, the Łódzkie Voivodship, the Podlaskie Voivodship, and the Mazowieckie Voivodship. The leading voivodships are also those where the decreases in the level of employment are the greatest; consequently, the increase of the analyzed indicator is due to the reduction of employment by way of elimination of the least productive employees.

Table 3 shows a comparison of the gross value of fixed assets by region in Poland in the years 2000 and 2015. The total gross value of fixed assets in current book values increased between the year 2000 and the year 2015 by 140,3%, or less by 25 percentage points than the gross added value. This indicates that the nature of the economic growth in Poland is intensive (an increased effectiveness of utilization of labor in the economy). In eight voivodships, namely Lubuskie, Podkarpackie, Wielkopolskie, Dolnośląskie, Małopolskie, Łódzkie, Kujawsko-Pomorskie, and Pomorskie, the increase in the value of fixed assets was higher than the national average. The increase in the value of fixed assets in the industry was slightly lower and was equal to 137,7%. The increase in the value of fixed assets in the industry was higher than the national average in as many as ten voivodships,

Tab. 3. Value and rate of growth of Gross value of fixed assets in current book values

	Gross value of fixed assets			Gross value of fixed assets in the industry			Gross value of fixed assets in the enterprise sector ^a		
	PLN billion		% ^b	PLN billion		% ^b	thousands ^b		% ^b
	2000	2015	2015/2000	2000	2015	2015/2000	2000	2015	2015/2000
<i>Poland</i>	1 444,8	3 471,8	140,3	462,5	1 099,3	137,7	834,5	1 812,9	117,2
Dolnośląskie	107,3	276,7	157,9	38,3	110,4	188,0	62,1	162,1	161,1
Kujawsko-Pomorskie	62,5	155,3	148,6	20,2	49,4	144,8	30,4	75,0	146,6
Lubelskie	70,0	151,5	116,5	14,1	35,9	154,4	29,1	53,9	85,3
Lubuskie	32,8	97,6	197,4	9,0	37,0	311,9	15,4	45,2	193,8
Łódzkie	85,9	216,3	151,8	31,2	80,6	158,5	45,7	111,1	143,4
Małopolskie	100,9	258,7	156,3	33,6	73,0	117,1	56,0	121,9	117,8
Mazowieckie	298,3	715,5	139,9	81,7	157,6	92,9	207,2	431,9	108,5
Opolskie	43,2	81,7	89,3	19,5	32,3	65,9	24,0	41,1	71,4
Podkarpackie	58,3	152,9	162,1	20,0	48,8	143,5	27,0	64,7	139,8
Podlaskie	39,4	91,1	131,3	7,7	22,3	188,6	14,7	34,3	132,7
Pomorskie	79,9	196,5	146,0	20,2	57,5	184,2	47,1	101,4	115,4
Śląskie	190,8	417,4	118,8	90,3	192,9	113,5	138,3	252,2	82,3
Świętokrzyskie	41,6	89,2	114,3	15,5	31,9	106,2	19,6	40,0	103,6
Warmińsko-Mazurskie	45,7	102,1	123,6	8,4	27,0	222,3	17,9	38,8	116,5
Wielkopolskie	122,6	319,2	160,3	35,3	101,6	188,1	67,0	172,6	157,7
Zachodniopomorskie	65,7	150,1	128,5	17,5	41,2	135,8	33,1	66,5	101,3

Source: *Statistical Yearbook of the Regions — Poland 2001* (pages 290–291), *Statistical Yearbook of the Regions — Poland 2017* (pages 587–588)

^aIn the companies employing more than 9 persons

^bRate of growth

namely Lubuskie, Dolnośląskie, Podlaskie, Wielkopolskie, Dolnośląskie, Pomorskie, Łódzkie, Lubelskie, Kujawsko-Pomorskie, and Podkarpackie. A comparison of the ranking lists related to the total increase in value of fixed assets and the increase in the value of fixed assets in the industry leads to the conclusion that in the analyzed period industrialization was the basis for economic growth in the following voivodships: Lubuskie (the first place in both lists), Warmińsko-Mazurskie (the second place in the increase of the value of fixed assets in the industry and the twelfth place in the increase of the total value of fixed assets), and Podlaskie (the third and the tenth place, respectively). In the enterprise sector (companies employing more than 9 persons), the increase in the value of fixed assets was lower and was equal to 117,2%. In eight voivodships—i.e., Lubuskie, Dolnośląskie, Wielkopolskie, Kujawsko-Pomorskie, Łódzkie, Podkarpackie, Podlaskie, and Małopolskie, the value of fixed assets in the enterprise increased more than the national average.

Table 4 shows the ratios related to the changes in the level of employment, the value of fixed assets, and the gross added value. The ratios were calculated by dividing the ratios of specific voivodships by the ratios for the entire country, so as to determine whether the growth in individual voivodships is more intensive than the national average. Of the six voivodships where the economic growth was faster than the national average, in three (Dolnośląskie, Pomorskie, and Wielkopolskie), the employment level and the value of fixed assets increased faster than the gross added value. A similar situation took place in four voivodships where the growth of added value was slower than the national average, namely Kujawsko-Pomorskie, Lubuskie, Śląskie, and Zachodniopomorskie. This indicates a relatively (compared to the national average) extensive nature of the growth in those voivodships. In absolute numbers, an increase in the value of fixed assets that was higher than the increase of added value (which indicates extensive economic growth) was observed in the following voivodships: Lubuskie, Kujawsko-Pomorskie, and Zachodniopomorskie.

The voivodships where the economic growth was intensive and where the increase of gross added value exceeded the increase in the level of employment and in the value of fixed assets were Lubelskie and Mazowieckie voivodships. In the remaining voivodships, the increase of gross added value is between the increase in the level of employment and the increase in the value of fixed assets. The Mazowieckie Voivodship and the Lubelskie Voivodship are also the leaders with regard to the

Tab. 4. Ratios showing the changes in the level of employment, the value of fixed assets, and the gross added value in the years 2000–2015

	Employment	Value of fixed assets	Gross added value	
			Total	Per employee
<i>Poland</i>	100,0	100,0	100,0	100,0
Dolnośląskie	109,3	107,3	105,9	98,7
Kujawsko-Pomorskie	96,9	103,5	90,9	92,3
Lubelskie	87,3	90,1	96,5	110,9
Lubuskie	106,0	123,8	93,1	90,3
Łódzkie	93,8	104,8	100,0	103,7
Małopolskie	103,6	106,7	105,9	105,2
Mazowieckie	105,3	99,8	111,5	101,6
Opolskie	90,4	78,8	87,4	99,5
Podkarpackie	89,4	109,1	100,2	117,8
Podlaskie	87,1	96,3	93,6	103,4
Pomorskie	112,6	102,4	100,8	89,4
Śląskie	99,8	91,1	89,5	92,3
Świętokrzyskie	81,8	89,2	88,4	105,9
Warmińsko-Mazurskie	99,7	93,1	94,0	95,7
Wielkopolskie	112,0	108,3	105,8	93,9
Zachodniopomorskie	96,1	95,1	85,1	89,7

Source: Calculated by the authors based on the data provided in tables 1–3

increase of gross added value per worker. Also in this list, all of the seven voivodships that were described above as those where extensive economic growth was observed, recorded growth that was below the national average. If it is assumed that an increase of the gross added value per worker above the national average indicated intensive economic growth, then such growth was recorded in the following voivodships: Łódzkie, Małopolskie, Podkarpackie, Podlaskie, and Świętokrzyskie. In the last three of the aforementioned voivodships, as well as in the Lubelskie Voivodship, such a good result was achieved among others thanks to the largest decrease in the level of employment observed in Poland.

The correlation coefficient between rate of growth of the total gross added value and the rate of growth of employment in the enterprise sector turned out to be statistically significant at the level 0,01. Slightly lower (0,05) statistical significance was observed in the correlation between the rate of growth of total employment level and the rate of growth of total gross added value (positive correlation) and the rate of growth of gross added value per employee (negative correlation). Because the correlations between rate of growth of added value and rate of growth of value of fixed assets turned out to be statistically insignificant, this confirms the hypothesis of the article.

Tab. 5. Correlation coefficients between the rates of growth of specified indicators

	2000/2015 rate of growth of:	
	total gross added value	gross added v. per employee
2000/2015 rate of growth of:		
total employment	0,568*	−0,599*
value of fixed asset	0,477	−0,118
employment in industry.	0,175	−0,118
value of fixed asset in industry	0,057	−0,331
employment in the enterprise sector ^a	0,913**	0,028
value of fixed asset in the enterprise sector ^a	0,337	−0,155

^aCompanies employing more than 9 persons

* $p < 0,05$; ** $p < 0,01$

The determination coefficients were calculated for the relations that turned out to be statistically significant. In the case of the relation between rate of growth of total employment and rate of growth of total gross added value, the determination coefficient multiplied by 100% was equal to 32,27% and in the case of the relation between the rate of growth of total employment and rate of growth of gross added value per employee, it was equal to 35,94%. Thus, determination of economic growth by the level of employment is not high. A very high coefficient of determination multiplied by 100%, equal to 83,33%, was calculated for the relation between rate of growth of employment in the enterprise sector and rate of growth of total gross added value. This relationship is mutual: an increase in employment in companies larger than micro-businesses results in an increase in the GDP (gross added value) and economic growth enables higher employment in enterprises (e.g., as a result of micro-businesses transforming into small enterprises).

Conclusion

The hypothesis presented in the introduction (the human factor—i.e., the level of employment—plays a greater role than fixed assets in the economic growth process) is supported by the coefficients of correlation between those values. With reference to the research questions: relative changes in the level of employment in the industry do not determine the rate of economic growth by region, while voivodships with the highest rate of economic growth are characterized by a relative increase in the employment level in the enterprise sector.

The comparisons of the data indicated that extensive growth, both absolutely and relatively (compared to the national average), was observed in the Lubuskie Voivodship, the Kujawsko-Pomorskie Voivodship, and the Zachodniopomorskie Voivodship. The voivodships where economic growth was the most intensive were the Lubelskie Voivodship and the Mazowieckie Voivodship, whereby

the Mazowieckie achieved the highest increase in the gross added value, with growth of the value of fixed assets that was smaller than the national average.

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