

**EMPLOYMENT AND LABOUR PRODUCTIVITY
VS ECONOMIC DEVELOPMENT OF POLISH REGIONS
(2000–2013)¹**

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Key words: employment, labour productivity, economic development.

A b s t r a c t

The main goal of the present article is to identify the main determinants and mechanisms through which the level and growth rate of labour productivity as well as selected aspects of employment influence the economic development of Polish regions over the 2000–2013 period. The conducted analysis suggests that among such productivity and employment-related factors as hourly labour productivity, total hourly work time per person employed, effectiveness of labour market, level of participation rate and demographic structure, of greatest importance for the economic development of Polish regions is their inner effectiveness reflected by the level of hourly labour productivity.

**ZATRUDNIENIE I WYDAJNOŚĆ PRACY A WZROST GOSPODARCZY POLSKICH
REGIONÓW (W LATACH 2000–2013)**

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Słowa kluczowe: zatrudnienie, wydajność pracy, wzrost gospodarczy.

¹ This research was financed from the funds of the National Science Centre as part of the 2014/13/N/HS4/02061 project, titled “Determinants of Regional Labour Productivity in Poland in the Years 1995–2013”.

Abstrakt

Przedmiotem opracowania jest próba określenia podstawowych determinant i zależności, przez które poziom i dynamika wydajności pracy oraz wybrane aspekty zatrudnienia wpływają na kształtowanie się rozwoju gospodarczego polskich regionów w latach 2000–2013. Przeprowadzone badania wykazały, że spośród takich wybranych obszarów w zakresie wydajności i zatrudnienia, jak: godzinowa wydajność pracy, całkowity godzinowy czas pracy przypadający na jednego zatrudnionego, efektywność rynku pracy, poziom aktywności zawodowej oraz struktura demograficzna, czynnikiem decydującym dla wzrostu, a w konsekwencji i rozwoju społeczno-gospodarczego polskich regionów, jest ich wewnętrzna efektywność odzwierciedlana godzinową wydajnością pracy.

Introduction

The recent growth of interest in the meso-economic level of analysis of economic phenomena, including those related to the situation on regional labour markets, is a result of considerable variations in the socio-economic situation within individual countries. The growing importance of regional economic research can be observed especially as regards the analyses devoted to countries, which are members of the European Union. The economic policy of the EU is a significant factor increasing this interest and encouraging analyses at the regional level, since it is conducted not only by governments, but also by local government authorities of individual regions.

Taking into account the persistent or even growing disparities among the regions of various countries – which are often ignored in the analyses at the national level – it seems important to identify the reasons for those differences and their exact nature. In the most general sense – and in light of the findings of economic theory – it has been argued that the disparities are probably a result of unequal spatial distribution of the factors of production and, on the other hand, of varying degrees of using them effectively. As regards the most direct measures which enable identification of the amount of resources available in the given economy (including those at the regional level), as well as the degree of their effective use, usually the categories related to employment and labour productivity are employed (JARMOŁOWICZ, KUŹMAR 2014, p. 333). Therefore, in order to identify the key factors responsible for the emergence of significant disparities among regions as regards their economic growth, it is necessary to take into account and evaluate the evolution of specific parameters concerning especially employment and labour productivity.

The paramount importance of employment and labour productivity in creating the social well-being of individual countries or regions constitutes one of the so-called stylized facts present in economic theory and referring to findings, which are so consistent that they are accepted as truth. At this point, it needs to be pointed out that these are precisely the categories, which are

primarily responsible for the level of gross domestic product (GDP) and, consequently, economic growth.

Taking into account the above mentioned circumstances, the present study aims at defining the main determinants and mechanisms through which the level of labour productivity as well as the level, growth rate and structure of employment influenced the dynamic of economic development of Polish regions in the years 2000–2013.

Therefore, the point of departure in this analysis is an attempt to identify the theoretical impact of employment and labour productivity on the economic development. The next step will consist in presenting an economic and statistical evaluation of the significance of selected areas and measures which were applied to them and which are related to labour resources and labour productivity, as well as their role in shaping the economic growth of Polish regions. The study is concluded by a short summary pointing out the most important implications resulting from the analysis conducted.

Employment and labour productivity vs economic development – a theoretical framework

The fundamental role of employment and labour productivity, as the key factors in shaping economic development (in a narrow sense, identified with the volume of production available to the population of the given area) was emphasized by A. Smith. He argued that the yearly production of each society can be increased only in two ways: either by increasing the productivity of the labour force currently employed in the given society or by increasing the amount of employed labour (SMITH 2015b, p. 326)]. This basic relation (the “fundamental identity”) can be presented nowadays in an expanded form, by means of the following relation (LANDMAN 2004, p. 7):

$$\frac{\text{Gross Domestic Product (GDP)}}{\text{population}} = \frac{\text{GDP}}{\text{total working time (h)}} \cdot \frac{\text{total working time (h)}}{\text{people employed}} \cdot \frac{\text{people employed}}{\text{labor force}} \cdot \frac{\text{labor force}}{\text{working age people}} \cdot \frac{\text{working age population}}{\text{population}}$$

At the risk of simplification, the above elements and relations can be synthesized and presented as a template characterized by the following parameters:

$$\text{economic development} = \text{labour productivity} \cdot \text{work time per person} \cdot \text{effectiveness of labour market} \cdot \text{participation rate} \cdot \text{demographic structure}$$

The above demonstrate – rather unambiguously – that five principal areas determine the level and growth rate of economic development², namely: labour productivity measured by the value of product per working hour, total hourly work time (during the year) per one person employed, the effectiveness of labour market, understood as a relation between people employed and those professionally active, the level of participation in labour market and the demographic structure of population. Additionally, the above findings provide a basis for further theoretical and empirical considerations related to factors determining economic development.

Labour productivity is commonly considered to be one of the main values measuring the effectiveness of managing human labour resources, both at the national and regional level and at the level of individual companies. A. Smith commented on this issue as well, suggesting that labour productivity is a potential source of the wealth of each nation; he argued that it depends on two features: first, on the abilities and skills and expertise with which the given job is performed, and, secondly, on the proportion of those who work usefully and the number of those who do not (SMITH 2015a, p. 4). Moreover, some economists point out the leading role of this category. For example, P. Krugman argues that labour productivity is not everything, but in the long run it is almost everything. Individual countries' ability to improve their standards of living depends almost entirely on their ability to raise their output per worker (KRUGMAN 1990, p. 9). In addition, A. BLINDER and W. BAUMOL (1993, p. 778) argued that over long periods of time even small differences in rates of labour productivity, like interest in a bank account, can make an enormous difference to a society's prosperity. The two authors point out nothing contributes more to the reduction of poverty, growth of freedom and the country's ability to finance education, public health or environment protection, than productivity growth.

Furthermore, hourly work time (understood as the average number of hours worked by one person during the year) is determined – on the one hand – by the legal regulations concerning maximum work time and public holidays, and on the other hand – and in a simplified sense – its value depends on the decisions made by individual participants of the labour market, as regards the allocation of time available to them for work and leisure time. Those types of decisions are conditioned first and foremost by circumstances such as: the pay offered by employers, the given people's individual preferences as regards the

² The authors of the present study wish to emphasize that they are aware of some limitations resulting from adopting the level of gross domestic product per person inhabiting the given area (region) as a measure of economic development. Their approach was dependent on methodological issues (an attempt at analysis of fundamental identity) and the availability of reliable statistical data at the regional level.

level of spending and the amount of leisure time, as well as the value of non-wage benefits they own. As has been indicated in the relevant literature, there exist other elements, which may influence the decision to take up employment and the amount of work on offer. Among them, there are factors such as: place of work (costs of commuting), type of work performed, tax burden, division of labour in the household to which the labour market participant belongs, or the insecurity concerning the expected earnings in the future (BLUNDELL, MACURDY 1999, p. 1586–1607, BOSWORTH et. al. 1996, p. 25–64).

Taking into account the issue of the effectiveness of labour market, understood as a relation between workers and people who are professionally active in the given labour market, it should first be emphasized that it defines the degree of utilizing (or not utilizing) the resources available on the said market. The higher (or lower) the relation, the smaller (or larger) the percentage of professionally active people who remain unemployed. The relevant literature shows that thus indicated level of effectiveness of labour markets is influenced especially by the economic situation and broadly understood labour market institutions. These institutions are defined as a set of legal rules, norms or conventions establishing limitations or incentives which influence individual decision as regards the exchange of labour services or wages (OSTOJ 2012, p. 42, WOŹNIAK-JĘCHOREK 2013, p. 3). Additionally, in the global research labour market institutions are analysed mainly using the framework proposed by J.R. Commons, according to whom institutions are norms defining the activity of labour market participants. More specifically, institutions are working systems (including their rules of functioning), from family, through corporations and trade unions, to the state proper (CHAMPLIN et al. 2004, p. 5, COMMONS 1934, p. 146). To give an example of a different approach, T. BOERI and J. VAN OURS (2011, s. 41) posit that these institutions are a product of collective choices and that they influence the exchange of labour services in return for wages.

Participation rate – analysed as a condition of economic development – points to the scale of participation of working-age people in the labour market. It is also – and perhaps most importantly – a result of individual decisions made by people entering the labour market as regards taking up and doing jobs at a specific location and time and under specific requirements. Nowadays of great importance for the size and structure of the professionally active population is, among other things, the considerable growth of women's professional activity. For instance, P. SAMUELSON and W. NORDHAUS (2012, p. 254) estimate that the rate of women's professional participation in the United States increased from 34% in 1950 to ca 60% in 2012. Various bibliographic sources indicate the fact that such a thorough transformation of

professional activity among women is determined not only by economic factors, but also by social changes related to the role of women as active labour market participants. The changes are especially striking as regards the evolution of the contemporary family model. By breaking with the traditional gender roles in favour of partnership, this model is conducive to an increase in women's professional activity (MAZUR-ŁUCZAK 2010, p. 17, 18, KALINOWSKA-SUFINOWICZ 2013, p. 13–24).

A greater flexibility of the labour market is an important factor contributing to the growth of women's professional activity. This is achieved through the development of flexible forms of employment, such as: part-time jobs, self-employment, solutions concerning flexible working hours, or remote working and teleworking. The flexible forms of employment are all the more important from the point of view of women, who still perform most child-rearing and care responsibilities (HAPONIUK 2014, p. 2, 3). Yet another element which can have a significant influence on the development of the given population's professional activity, and which is related directly to the decision to remain on the labour market despite reaching retirement age, is the growth of professional activity in the elderly population, i.e. people at post-working age who have already acquired pension rights. According to the literature and statistical analyses, this group typically consists of people who are 65 years of age or older (HAIDER, LOUGHRAN 2001, p. 1, SCHIRLE 2008, UPPAL 2010, p. 5).

The last aspect of the so-called fundamental identity discussed in the present article refers to the demographic structure of the population. The higher the share of working age population is in the total population of the given country or territory, the more favourable this structure is. At the same time the structure is a result of three basic processes, i.e. birth rate, age structure of the population and migratory flows. While mentioning the importance of birth rate as a factor, one should note that it influences the given working age population in the given time frame with a considerably delay. It is, after all, relatively easy to estimate that the increase or decrease of birth rate at any given moment will have an influence on the size of labour supply after many (from fifteen to twenty) years, depending on the moment in which the given person reaches productive age and will make a decision concerning professional activity (BLOOM, FREEMAN 1988, p. 63, 64).

Additionally, in the literature several factors have been identified which influence birth rate; for example, a significant role is ascribed to the level of family's income and the costs of supporting children. In order to offer a more detailed picture of the issue, J. BONGAARTS (1978, 1984) identifies two basic groups of determinants influencing the fertility rate: direct (biological) and indirect. Among the direct factors, he enumerates getting married, fertility, the duration of postnatal infertility, abortions performed and the use and

effectiveness of contraception. As regards the indirect factors, the author distinguishes socioeconomic factors as well as conditions related to culture or environment.

Taking into account the age structure of the population, life expectancy is equally important as birth rates. Furthermore, the decision to take up employment by individuals may be motivated not only by the wish to maximise usefulness at the given moment in their lives, but also by the wish to maximise it throughout their lives. Since the average level of remuneration for younger workers and the oldest workers is usually lower than in the case of middle-aged workers, the level of employment in the former groups is lower as well (BORJAS 2005, p. 70). Moreover, as I. KOTOWSKA (2008, p. 15) and others indicate, due to the fact that young people enter the labour market with delay, while the older workers leave the labour market earlier, the period of employment is becoming shorter despite increasing life expectancy.

Migratory flows constitute one more demographic factor, which may have an influence on the volume of labour supply in the given moment and in the given area. The mobility of labour resources may, on the one hand, contribute to the growth of the volume of labour resources in the case of countries or regions in which positive net migration is recorded, but, on the other hand, it can also reduce the labour supply for those areas, which are affected by negative net migration.

Employment and labour productivity vs economic development in Poland and its regions – an empirical approach

Economic and statistical analysis and evaluation of the areas of the so-called fundamental identity in Polish regions has been carried out on the basis of the data made available by the Central Statistical Office (GUS) in Poland as part of the so-called Regional Data Bank (BDL). Additionally, data obtained from the European Regional Database and processed by Cambridge Econometrics (CE) have been used. Taking into account the availability of data, the temporal scope of the analysis has been limited to the 2000–2013 period. In order to ensure the comparability of the data used, the value of gross domestic product and, consequently, the value of labour productivity derived from GDP, were expressed in constant prices from the year 2010. On the other hand, the data concerning the level of employment and professional activity were aggregated in accordance with the methodology of Labour Force Survey (BAEL)³. The data gathered in table 1 show basic descriptive statistics concerning the economic values for the selected years.

The data presented in Table 1 make it possible to conclude that among the economic values under analysis (and related to employment and labour productivity in Polish regions) the greatest variation and considerable positive dynamic were observed in regard to the level of GDP and labour productivity, which increased from ca PLN 24 thou. (GDP) and PLN 31 (hourly labour productivity) in the year 2000 to PLN 37 thou. and PLN 45 in the year 2013, respectively. At the same time, it should be observed that despite these positive changes, in the year 2013 the values of these variables in the region with the highest levels were more than two times bigger than in the regions with the lowest levels.

Table 1

Areas of fundamental identity in Polish regions

Year	Statistics	GDP per capita	Labour productivity	Work hours per person [h]	Effectiveness of labour market	Participation rate	Demographic structure
2000	average	23,851	31	2,068	0.83	0.57	0.81
	Var. Coeff. [%]	21.9	25.5	3.2	3.8	3.5	1.6
	min.	18,054	22	1,919	0.76	0.52	0.78
	max	39,393	48	2,132	0.88	0.60	0.83
2006	average	28,935	37	2,057	0.86	0.57	0.84
	Var. Coeff. [%]	24.3	22.9	2.5	2.1	3.7	1.2
	min.	21,401	26	1,935	0.83	0.54	0.83
	max	50,441	58	2,110	0.89	0.61	0.86
2013	average	36,565	45	2,049	0.89	0.55	0.85
	Var. Coeff. [%]	25.2	22.3	2.1	1.8	3.7	1.0
	min.	28,584	32	1,960	0.86	0.52	0.84
	max	64,613	69	2,120	0.92	0.6	0.87

Note: Var. Coeff. [%] – the coefficient of variation determined as a quotient of variability of the given characteristics – standard deviation – and mean value of the characteristics.

Source: author's own research on the basis of data: GUS, CE (access: 29.08.2016).

While analysing the hourly work time, it is worth noting a small decrease of interregional differentiation. The average number of hours worked per person decreased from 2,068 in the year 2000 to 2,049 in the year 2013. On the decidedly positive side, the increase in the effectiveness of labour market resulted in the decrease in unemployment rate. The data presented in the table demonstrate that the unutilized part of labour resources (unemployment rate) decreased from the level of ca. 16% in the year 2000 to ca. 11% in the year 2013. The scale of variation decreased considerably too (the drop of the coefficient of variation from 3.8% to 1.8%). Taking into account the state of professional

³ In accordance with this methodology, the working age population encompasses people who are at least 15 years old.

activity, it is possible to conclude that in the period under analysis it was relatively stable, both in terms of volume and its regional differentiation (the coefficient of variation remained at the level of 3.5%). Nevertheless, taking into account the demographic structure as well as the average levels of professional activity in the developed EU countries (cf. KNAPIŃSKA 2012, p. 124–135) – the level of this activity seems to be far too low. As regards the indices related to the demographic structure, it is possible to observe a small (and at the same time decreasing) scale of its interregional differentiation. The increase of the average percentage of the working age population in relation to the total population, from 0.81 in the year 2000 to 0.85 in the year 2013 shows a positive trend. Nevertheless, it should be emphasized that the change was probably a result of entering the labour market by the persons born during the baby-boom of the 80's., and of significant external migrations (ORGANIŚCIAK-KRZYKOWSKA, PIOTROWSKI 2011, p. 106, 107).

More detailed data – which takes into account individual regions' features – is presented in Table 2. It demonstrates that both in the year 2000 and 2013 the highest level of GDP per capita was recorded in the following regions: Mazowieckie, Dolnośląskie, Wielkopolskie, Śląskie and Pomorskie.

Table 2
Economic development and its determinants in Polish regions

Region	GDP per capita	Labour productivity	Work hours per person	Effectiveness of labour market	Participation rate	Demographic structure
1	2	3	4	5	6	7
2000						
Mazowieckie	39,393	46	2,113	0.87	0.60	0.82
Dolnośląskie	27,829	48	2,018	0.83	0.56	0.82
Wielkopolskie	27,439	31	2,092	0.86	0.58	0.80
Śląskie	26,478	36	2,087	0.79	0.55	0.82
Pomorskie	25,849	35	2,100	0.81	0.56	0.81
Łódzkie	25,601	37	2,130	0.83	0.55	0.80
Małopolskie	23,544	28	2,107	0.82	0.56	0.80
Zachodnio-pomorskie	23,084	24	2,125	0.83	0.57	0.83
Lubuskie	23,020	32	2,078	0.79	0.55	0.80
Kujawsko-Pomorskie	22,471	27	1,985	0.88	0.57	0.80
Opolskie	21,390	28	2,073	0.85	0.56	0.81
Świętokrzyskie	20,224	27	2,120	0.76	0.56	0.79
Podlaskie	19,796	23	2,063	0.84	0.52	0.81

cont. Table 2

1	2	3	4	5	6	7
Warmińsko-Mazurskie	19,248	23	2,132	0.85	0.59	0.80
Podkarpackie	18,198	22	1,947	0.86	0.60	0.80
Lubelskie	18,054	26	1,919	0.84	0.58	0.78
2013						
Mazowieckie	64,613	69	2,060	0.92	0.60	0.84
Dolnośląskie	45,150	61	2,040	0.89	0.54	0.86
Wielkopolskie	43,208	52	2,090	0.91	0.58	0.84
Śląskie	42,027	51	2,010	0.90	0.55	0.86
Pomorskie	38,796	48	2,065	0.90	0.56	0.84
Łódzkie	37,691	37	2,050	0.89	0.58	0.86
Małopolskie	35,733	46	2,000	0.89	0.56	0.84
Zachodnio-pomorskie	33,614	49	2,065	0.90	0.53	0.85
Lubuskie	33,559	41	2,060	0.90	0.54	0.85
Kujawsko-Pomorskie	33,086	44	2,080	0.88	0.56	0.85
Opolskie	32,546	47	2,015	0.91	0.54	0.87
Świętokrzyskie	29,470	32	2,105	0.87	0.54	0.86
Podlaskie	29,441	37	2,120	0.90	0.56	0.85
Warmińsko-Mazurskie	28,869	38	2,065	0.89	0.52	0.84
Podkarpackie	28,658	39	1,960	0.86	0.56	0.84
Lubelskie	28,584	32	2,000	0.90	0.57	0.85

Source: author's own research based on the data from: GUS, CE (access: 29.08.2016).

On the other hand, the lowest percentages of economic growth in the period under analysis were recorded in the following regions: Świętokrzyskie, Podlaskie, Warmińsko-Mazurskie, Podkarpackie and Lubelskie. Particularly striking is the significant and persistent advantage of the Mazowieckie region (the GDP in the second-ranked Dolnośląskie region constituted merely ca 70% of the GDP of the Mazowieckie region).

Table 3

Determinants of economic growth of Polish regions (Poland = 100)

Region	GDP per capita	Labour productivity	Work hours per person	Effectiveness of labour market	Participation rate	Demographic structure
Mazowieckie	177	153	101	103	108	99
Dolnośląskie	123	135	100	99	98	101
Wielkopolskie	118	116	102	102	105	99
Śląskie	115	112	98	101	100	101
Pomorskie	106	107	101	101	101	98
Łódzkie	103	82	100	99	105	101
Małopolskie	98	101	98	100	101	99
Zachodniopomorskie	92	108	101	100	95	100
Lubuskie	92	91	101	101	99	100
Kujawsko-Pomorskie	90	97	102	98	101	100
Opolskie	89	104	98	101	97	102
Świętokrzyskie	81	71	103	97	97	101
Podlaskie	81	81	103	101	101	100
Warmińsko-Mazurskie	79	85	101	99	94	99
Podkarpackie	78	86	96	96	102	99
Lubelskie	78	71	98	100	103	100
Polska	100	100	100	100	100	100

Source: author's own research on the basis of data: GUS, CE (access: 29.08.2016).

In light of such a significant and at the same time persistent disparity as regards the level of GDP per capita, it is vital to establish which areas of fundamental identity are primarily responsible for the emergence of those considerable differences. The data presented in table 3, in turn, show that in the year 2013 hourly labour productivity was a particularly important factor contributing to the significant disparities as regards the growth associated with GDP per capita. Differences in the levels of professional activity (participation rate) proved to be yet another factor, which to some degree – though not as much as the differences in levels of labour productivity – influenced the disparities among Polish regions as regards their economic development.

For example, a significantly higher (over 5%) than average level of professional activity was recorded in the Mazowieckie, Wielkopolskie and Łódzkie regions, whereas the regions in which participation rate negatively (level lower than average by 3%) impacted the growth of GDP included: Warmińsko-Mazurskie, Zachodniopomorskie, Opolskie and Świętokrzyskie. While analys-

ing the data in the table, it is possible to observe in the case of the Podkarpackie region the negative impact of such factors as total work time and effectiveness of labour market.

Conclusion

The aim of the present study, that of defining the main determinants and mechanisms through which labour productivity and employment influence the economic growth of Polish regions in the years 2000–2013. On the basis of an expanded fundamental identity between the volume of product of the given economy, its labour productivity and employment, five main determinants of the level and rate of economic growth were identified, namely: labour productivity measured by the value of hourly labour productivity, total hourly work time (during the year) per person employed, labour market effectiveness resulting from the relation between people employed and those professionally active, the level of participation rate and the demographic structure of the given economy.

The analysis conducted shows that the highest levels of GDP per capita in the period under analysis were recorded in the following regions: Mazowieckie, Dolnośląskie, Wielkopolskie, Śląskie and Pomorskie. On the other hand, the lowest level of economic growth was recorded in the following regions: Świętokrzyskie, Podlaskie, Warmińsko-Mazurskie, Podkarpackie and Lubelskie. The decisive and continuing predominance of the Mazowieckie region deserves particular attention (the level of GDP in the second ranked Dolnośląskie region constituted merely ca 70% of the level in the Mazowieckie region).

The evaluation of the determinants of economic growth under analysis proved that hourly labour productivity is of particular importance for the significant disparities among Polish regions as regards economic growth. Therefore, the findings indicate that the key factor determining the socio-economic development of Polish regions is their inner effectiveness, reflected by the level of labour productivity. However, the role of factors related to the level, growth rate and structure of employment is much more limited.

It is also worth emphasizing that the present article can be treated as a point of departure for more thorough analyses identifying the key factors responsible for the level and growth rate of labour productivity in Polish regions – a particularly significant parameter as regards their development.

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