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Changes in employment structure and remunerations in the Polish economy in the years 2004-2010

Abstract. It was analysed whether the changes in the employment structure, which had taken place over the last few years, influenced the formation of average monthly remuneration in the Polish national economy. The coefficient of the influence of structural changes, which had been proposed by the author in the previous publications, was used for the purposes of this research. On the basis of this analysis it was proved that the changes in the employment structure did not influence the formation of average monthly remuneration in some sectors of the national economy.

Key words: employment structure, remuneration, the coefficient of impact of structural changes

1. Introduction

In the years 2004-2010, significant changes occurred in the Polish economy, which were related primarily to the Polish accession to the European Union on May 1st, 2004, and which caused an increased influx of capital into Poland. In the last quarter of 2008, the Polish economy also came under the influence of global economic crisis, which reduced its growth rate (it is worth noting, however, that unlike other European countries, in Poland there was no decline in GDP, and during the period from the first quarter of 2004 to the fourth quarter of

2009, the overall GDP growth, seasonally adjusted in the reference prices from the year 2000, was approximately 25%).

The changes in the Polish labor market were a derivative of the changes taking place in the Polish economy. While in January 2004 the registered unemployment rate reached its maximum and amounted to 20.6%, in October 2008 it reached the minimum value of 8.8% in recent years. The result of the economic slowdown, however, was its rise to the value of 13% in February 2010. In the period from the first to the third quarter of 2004, employment in the national economy increased from 7,252.8 thousand to 8016.0 thousand people, i.e. by more than 10.5%, including in the corporate sector from 4,668.2 thousand to 5,302.0 thousand people, i.e. by more than 13.5%.

The economic growth together with falling unemployment also caused an increase in remunerations. The average gross remuneration in the national economy grew in the same period from 2,209.8 PLN to 3,113.86 PLN, that is nominally by nearly 41%, and in real terms, inflation-adjusted, by almost 25%.

2. Changes in the employment structure

As a result of the development of some, and shrinking of other, sections of the national economy during this period, there were also significant changes in the employment structure in the Polish economy. Unfortunately, due to the changes in the statistical classification, comparable data refer only to the period from the first quarter of 2005 to the fourth quarter of 2008. The changes in the employment structure in this period are shown in Table 1.

In almost all sections of the national economy there was a growth in employment of 11% on average, in the corporate section of 14.23% and the largest in the construction section of almost 31%. The decline in employment was observed only in agriculture, hunting and forestry and fishery (the biggest by more than 17%), and also in the industrial section in relation to mining and the production and supply of electricity, water and gas.

The largest changes in the employment structure were marked by a decline in employment in industry and in education by more than one percentage point, and a relative increase in employment in trade and repair, by more than one percentage point.

Table 1. Changes in average employment in thousands of people by sections of the national economy during the period from the first quarter of 2005 to the fourth quarter of 2008

Section	1 st quarter of 2005		4 th quarter of 2008		Dynamics 1 st quarter of 2005 = 100
	in thousands of people	in %	in thousands of people	in %	
Total	7330,9	–	8142,9	–	111,08
Business section	4746,2	–	5421,7	–	114,23
Agriculture, hunting, forestry	79,7	1,111	77	0,969	96,61
Fishery	2,3	0,032	1,9	0,024	82,61
Agriculture, including:	2439,6	34,100	2626,8	33,065	107,67
mining	186,3	2,604	183,2	2,306	98,34
processing industry	2031,7	28,398	2233,9	28,120	109,95
production and supply of electricity, water and gas	221,5	3,096	209,6	2,638	94,63
Construction	314,6	4,397	411,9	5,185	130,93
Trade and repairs	847,9	11,852	1039,7	13,087	122,62
Hotels and restaurants	91,2	1,2748	105,6	1,329	115,79
Transport, storage and communication	498,2	6,964	539,2	6,787	108,23
Financial brokerage	218,4	3,053	267,5	3,367	122,48
Real estate and business handling	531,2	7,425	658,8	8,293	124,02
Public administration and national defence	535,1	7,479	584,2	7,354	109,18
Education	997,8	13,947	1006,4	12,668	100,86
Healthcare and social welfare	598,3	8,363	625,4	7,872	104,53
Total selected sections	7154,2	100	7944,3	100	114,81

Source: author's own calculations based on GUS (CSO = Chief Statistical Office) data, www.stat.gov.pl

3. Changes in remunerations

The changes in the employment structure were accompanied by changes in remunerations. Table 2 shows these changes in both nominal and real terms, as well as from the point of view of formation of the average remuneration of people employed in the national economy in the period from the first quarter of 2005 to the fourth quarter of 2008.

The overall increase in remunerations in nominal terms amounted to more than 28%, and in real terms, to almost 17%. For employees in the business

section this growth was, respectively, almost 37% and 25%, while for the employees in the selected sections of the national economy, over 30% in nominal terms and almost 19% in real terms.

These changes in remunerations, however, were very diverse. The largest increase occurred in the case of agriculture, hunting and forestry – more than 75% in nominal terms and almost 60% in real terms, while in the case of education, this increase amounted to less than 6% in nominal terms, which really meant a decline in average remuneration of nearly 4%.

Table 2. Average monthly gross remuneration by sections of the national economy

Section	1 st quarter of 2005	4 th quarter of 2008	Real remun- erations 4 th quarter of 2008	Dynamics	Real dynamics
	in PLN/ person	in PLN/ person	in PLN/ person	1 st quarter of 2005 = 100	1 st quarter of 2005 = 100
Total	2415,45	3096,50	2822,70	128,20	116,86
Business section	2425,24	3322,09	3028,34	136,98	124,87
Agriculture, hunting and forestry	2196,63	3853,43	3512,70	175,42	159,91
Fishery	2117,40	2661,07	2425,77	125,68	114,56
Industry, including:	2457,18	3326,19	3032,08	135,37	123,40
mining	4097,30	6712,82	6119,25	163,84	149,35
processing industry	2211,41	2939,46	2679,54	132,92	121,17
production and supply of electricity, water and gas	3331,86	4487,86	4091,03	134,70	122,79
Construction	2177,89	3523,26	3211,72	161,77	147,47
Trade and repairs	2308,00	3036,31	2767,83	131,56	119,92
Hotels and restaurants	1844,71	2336,80	2130,17	126,68	115,47
Transport, storage and communication	2724,77	3736,25	3405,88	137,12	125,00
Financial brokerage	4594,61	5122,02	4669,12	111,48	101,62
Real estate and business handling	2501,77	3401,7	3100,91	135,97	123,95
Public administration and national defence	3467,13	4115,78	3751,85	118,71	108,21
Education	2834,38	2992,85	2728,21	105,59	96,25
Healthcare and social welfare	1997,90	3109,02	2834,11	155,61	141,85
Total selected sections	2593,33	3383,57	3084,39	130,47	118,94

Source: as in Table 1.

Owing to the considerable changes in the employment structure and the greatly varied growth in remunerations, it was resolved to check what influence the changes in the employment structure had on the average remuneration in the selected sections of the national economy.

4. The coefficient of impact of structural changes

In order to measure the impact of structural changes on the formation of various types of indicators the following coefficient of structural changes was applied¹:

$$S_{1/0} = \begin{cases} 0 & \text{when } W_1 = W_0 = W_{1/0} \\ \frac{W_1 - W_{1/0}}{|W_1 - W_{1/0}| + |W_{1/0} - W_0|} & \text{in other cases} \end{cases} \quad (1)$$

where:

W_0 – the value of the global index at the moment $t = 0$,

W_1 – the value of the global index at the moment $t = 1$,

$W_{1/0}$ – the theoretical value of the global index at the moment $t = 1$, while maintaining the analysed structure from the moment $t = 0$.

The $S_{1/0}$ coefficient takes the value of 0 when, and only when $W_1 = W_{1/0}$, i.e. if the entire change of value of the global index has been achieved owing to the changes of sub-indexes. It takes the value of 1 or –1 when $W_{1/0} = W_0$, i.e. when the entire change of value of the global index has been achieved owing to the changes in the structure. The value of the coefficient is positive when the changes of the structure result in an increase of value of the global index (generally speaking, they have a positive impact), whereas it is negative in the opposite case.

The interpretation of the obtained value of the $S_{1/0}$ coefficient is simple in the most common case, when the following inequalities take place

$$W_0 < W_{1/0} < W_1 \quad \text{or} \quad W_1 < W_{1/0} < W_0 \quad (2)$$

¹ See: S. Forlicz, *Propozycja nowego współczynnika wpływu zmian strukturalnych* [A proposal for a new coefficient of structural changes], "Prace Naukowe AE we Wrocławiu" No. 576, Wyd. AE we Wrocławiu, Wrocław 1991, pp. 61-65.

we state then that the structural changes appropriately influenced the increase or decline in the value of the global index in $S_{1/0} \cdot 100\%$.

In the case of the following inequalities:

$$W_0 < W_1 < W_{1/0} \text{ or } W_{1/0} < W_1 < W_0 \quad (3)$$

the value of the $S_{1/0}$ coefficient determines the extent to which the structural changes prevented the increase or decline in the global index as a result of the changes of sub-indexes going in the same direction.

In the case of the following inequalities:

$$W_1 < W_0 < W_{1/0} \text{ or } W_{1/0} < W_0 < W_1 \quad (4)$$

the value of the $S_{1/0}$ coefficient determines the power of impact of structural changes preventing the changes of sub-indexes going in the opposite direction.

Thus, in each and every of these cases, the same value of the $S_{1/0}$ coefficient should be interpreted in a different way. If, for instance, the following situation were to happen,

$$W_0 = W_1 < W_{1/0} \quad (5)$$

i.e. if $S_{1/0} = -0,5$, it would mean then that the negative structural changes managed to eliminate entirely the positive impact of changes of sub-indexes. If the following inequality were to be the case

$$W_{1/0} < W_0 = W_1 \quad (6)$$

then $S_{1/0} = 0,5$ and it would mean that the positive structural changes offset entirely the impact of changes of sub-indexes.

5. The impact of the changes in the employment structure on remunerations

The $S_{1/0}$ coefficient of impact of structural changes discussed above was used to examine the extent to which the changes in the employment structure in the national economy taking place in the years 2005-2008 had affected the development of the average monthly gross remuneration.

The W_0 index value, i.e. the value of an average remuneration in the first quarter of 2005 in the selected sections of the national economy amounted to 2593.328 PLN and the W_1 index value, i.e. the average remuneration in the fourth quarter of 2008 in the selected sections of the national economy amounted to 3383.572 PLN. However, the value of the $W_{1/0}$ coefficient, i.e. the theoretical value of the average remuneration in the fourth quarter of 2008 in the selected

sections of the national economy, assuming the employment structure in the first quarter of 2005 and the average remuneration in respective sections of the national economy from the fourth quarter of 2008, amounted to 3391.266 PLN.

Since it means satisfying the inequality

$$W_0 < W_1 < W_{1/0} \quad (7)$$

we can assert that the structural changes prevented an increase in the average remuneration in selected sections of the national economy, which resulted from the increase of the average remuneration of the people employed in respective sections of the national economy.

The value of the coefficient of the impact of structural changes, however, was in this case $S1 / 0 = -0.00955$, which means that this negative impact of structural changes on the development of the average remuneration practically equalled zero.

Literature

Forlicz S., *Propozycja nowego współczynnika wpływu zmian strukturalnych* [A proposal of a new coefficient of structural changes], "Prace Naukowe AE we Wrocławiu" No. 576, Wyd. AE we Wrocławiu, Wrocław 1991, pp. 61-65.
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