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DECOMPOSITION OF UNEMPLOYMENT RATES IN POLAND ACCORDING TO VOIVODESHIPS IN THE YEARS 2013–2018

Abstract

Background: Unemployment is a phenomenon that occurs in all market economies, although with different intensity. Its rate is influenced by many factors related to labour demand and labour supply, as well as by structural mismatches between the two sides of the labour market, its effectiveness, the type of macroeconomic policy, and the labour market institutions.
Research purpose: The aim of the research is to determine the influence of labour supply and labour demand factors on changes in unemployment rates in Polish voivodeships from 2013 to 2018.
Methods: The unemployment rates for Poland and its voivodeships are decomposed using the aggregate data on unemployment rates, employment rates, and economic activity rates published by the GUS and the formula proposed by Elsby, Hobijn, and Sahin (2010).
Conclusions: The research results point to rising employment rates as the key factor driving the fall of unemployment rates between 2013 and 2018 in most Polish voivodeships. The exceptions are the Lubelskie and Świętokrzyskie voivodeships, where unemployment rate decreases were mainly caused by outflows from employment to inactivity. The downward trends in unemployment rates in Poland and some of its voivodeships in the years 2015–2018 were facilitated by processes taking place on the supply side of the labour market.

Keywords: region, unemployment, employment, activity rate.

JEL classification: J22, J23

1. Introduction

The level of unemployment in every economy changes over time due to the impact of a number of factors on the demand and supply side of the labour market. In addition to these factors, the unemployment rate is affected by structural mismatches between labour supply and labour demand, labour market performance,

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as well as the nature of macroeconomic policy and labour market institutions. These factors affect the level of unemployment with varying intensity and sometimes in different directions. The factors mentioned above also have an impact on the situation in regional labour markets.

The determinants of unemployment have long drawn the interest of economic theory. A detailed review of unemployment theories can be found in the works by Kwiatkowski (2002), Socha and Sztanderska (2000).

The aim of the paper is to determine the importance of demand and supply factors in shaping changes in unemployment rates in Poland's voivodeships in the years 2013–2018. During that period, significant changes took place in the Polish labour market. With economic growth gaining momentum, the unemployment rate dropped to its lowest since the onset of the transition. In 2013, a law was passed that raised and equalised the mandatory retirement ages of men and women. Several years later, the reform was reversed, and the previous retirement ages were restored[1]. Changes in the retirement age significantly affect the economic activity of the population and thereby, the supply of labour. Increasing economic activity boosts labour supply, which eases wage pressure, but when it is falling, the economy reacts in the opposite direction. From the economic policy perspective, it is also important to know how changes in labour demand and supply influenced changes in the regional unemployment rates.

The matter has been frequently explored in the Polish economic literature, but studies investigating the effect of labour demand and supply factors on Poland's regional labour markets are still few. Among those are works by Kwiatkowski and Wcisła (2010), Kwiatkowski and Kucharski (2014), and Cicha-Nazarczuk (2015).

Data from the Survey of Economic Activity of the Population in Poland (Badania Aktywności Ekonomicznej Ludności – BAEL) from the years 2013–2018 were used in the paper.

The structure of the paper is as follows. Section 2 is devoted to the analysis of the levels and changes in unemployment rates, economic activity rates, and employment rates by voivodeship in the years 2013–2018. Section 3 presents the results of the decomposition of changes in unemployment rates in the studied voivodeships and in the entire economy. Section 4 contains conclusions from the conductd considerations.

[1] On 1 January 2013, a law came into effect that raised the mandatory retirement age to 67 years for both men and women. It was cancelled by the law of 1 Oct. 2017, which restored the previous retirement ages of 60 (men) and 65 (women) years.

2. The level and changes in employment rates, unemployment rates, and economic activity rates in voivodeships

This part of the study uses the Central Statistical Office aggregate data on employment rates and unemployment rates and the indicators of economic activity in Poland in the years 2013–2018 derived from the Labour Force Survey.

Let us examine the situation in regional labour markets in the period under consideration. Data on the level of unemployment rates in all voivodeships in the years 2013–2018 are presented in Map 1. Three groups of voivodeships have been distinguished. The group with the highest level of unemployment rates includes those in which the unemployment rate was higher than the arithmetic mean of unemployment rates (in all voivodeships) with the standard deviation. Those voivodeships in which the unemployment rate was lower than the arithmetic mean minus the standard deviation are included in the group with the lowest level of unemployment rates. The remaining voivodeships comprise the third group. As can be seen in Map 1, the number of entities in the individual groups is similar.

The group of voivodeships with the highest level of unemployment rates encompasses Lubelskie, Podkarpackie, Świętokrzyskie, Kujawsko-Pomorskie, and Warmińsko-Mazurskie. These are mostly voivodeships with a relatively high share of employment in the agricultural sector and a low share of employment in the service sector. In 2016, the agriculture share of employment was 44.5% in the Lubelskie voivodeship, 36.9% in Podkarpackie, 38.6% in Świętokrzyskie, 18.8% in Kujawsko-Pomorskie, and 19.9% in Warmińsko-Mazurskie (GUS 2020). The service sectors' shares of employment in these voivodeships were 39.2%, 38.5%, 39.9%, 50.7%, and 49.6%, respectively (GUS 2020).

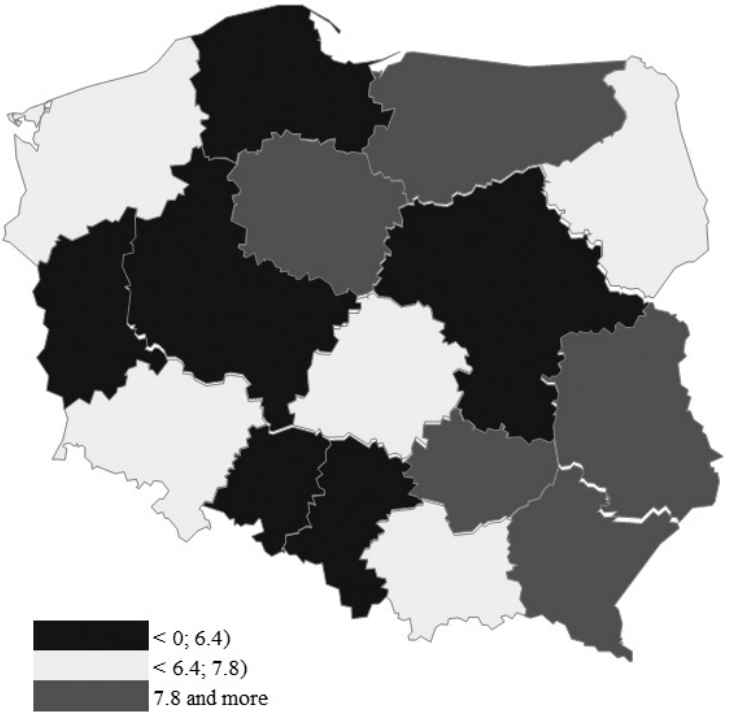
The lowest unemployment rates were found in the following voivodeships: Lubuskie, Mazowieckie, Małopolskie, Opolskie, Pomorskie and Wielkopolskie. These are urbanised voivodeships whose capitals are the largest Polish cities.

In the years 2013–2018, the level of economic activity in individual voivodeships varied (see Map 2)[2]. As a measure of economic activity, the eco-

[2] Three groups of voivodeships were distinguished in the following way. The group with the lowest level of economic activity indicators includes the voivodeships in which the economic activity rate was lower than the arithmetic mean minus half of the standard deviation. The voivodeships with the highest level of economic activity encompass the voivodeships in

nomic activity rate was adopted. The highest rates of economic activity in the entire period were recorded for the following voivodeships: Mazowieckie, Pomorskie, Wielkopolskie and Łódzkie. Hence, with the exception of the Łódzkie Voivodeship, they are the regions with the lowest unemployment rates. The lowest level of economic activity in the same period was recorded in the following voivodeships: Śląskie, Warmińsko-Mazurskie, and Zachodniopomorskie. The low level of economic activity in these voivodeships can be partially explained by the relatively low level of economic activity among women compared to all voivodeships[3].

MAP 1: *Differentiation of unemployment rates in Poland according to voivodeship in the years 2013–2018 (%)*

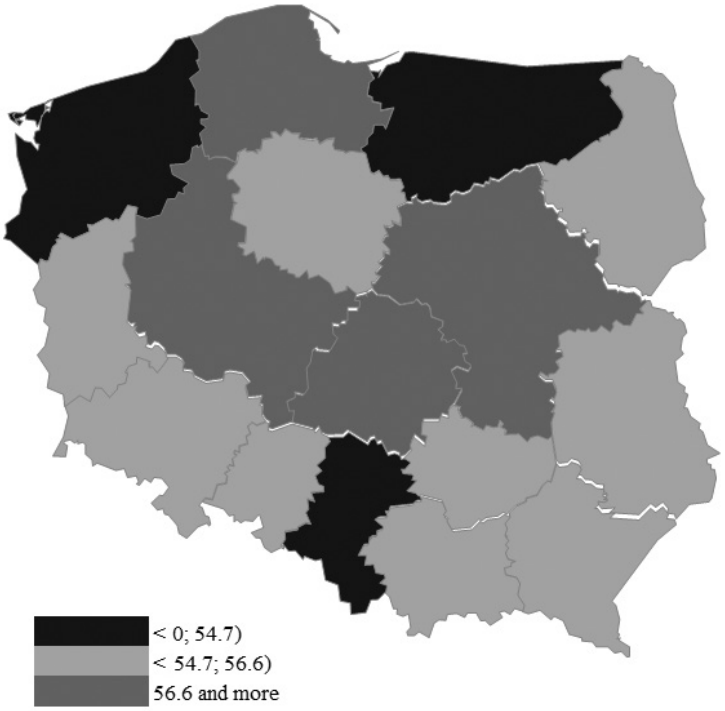


S o u r c e: created by the author based on *Aktywność ekonomiczna ludności Polski*, *2014–2019.*

which the rate of activity was higher than the arithmetic mean with half the standard deviation. The remaining voivodeships were included in the third group.

[3] See: *Aktywność ekonomiczna ludności Polski. IV kwartał 2018*, GUS, Warszawa 2019, p. 107.

MAP 2: *Differentiation of economic activity rates in Poland according to voivodeship in the years 2013–2018 (%)*

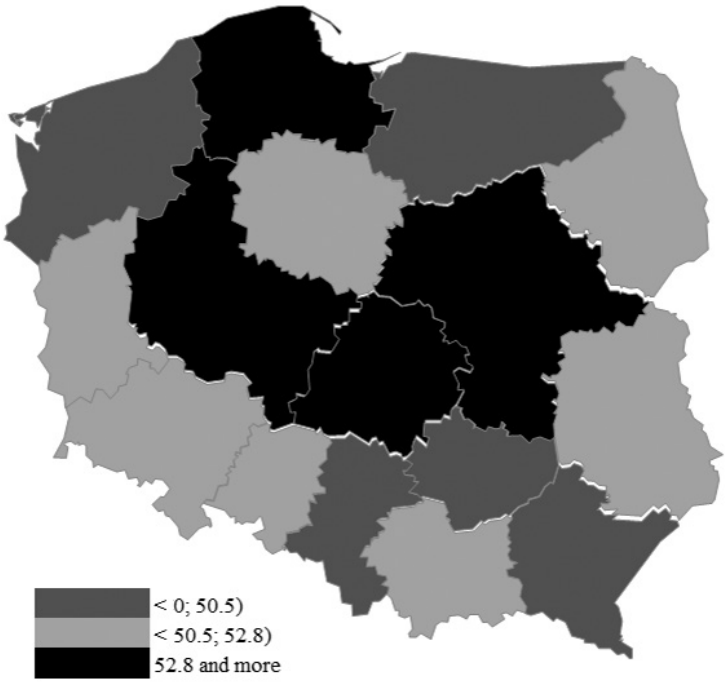


S o u r c e: created by the author based on *Aktywność ekonomiczna ludności Polski*, *2014–2019.*

Let us move on to the analysis of the differentiation of employment rates across voivodeships (see Map 3)[4]. As can be seen in Map 3, the group of voivodeships with the highest employment rates includes the same voivodeships which were characterised by the highest level of economic activity. The lowest employment rates in the analysed period were recorded in the following voivodeships: Podkarpackie, Śląskie, Świętokrzyskie, Zachodniopomorskie, and Warmińsko-Mazurskie. Thus, also in this group were the same three voivodeships in which the lowest level of economic activity was observed.

[4] Individual groups of voivodeships were distinguished on the basis of the same criteria as those shown in Map 2.

MAP 3: *Differentiation of employment rates in Poland according to voivodeship in the years 2013–2018 (%)*



S o u r c e: created by the author based on *Aktywność ekonomiczna ludności Polski*, *2014–2019.*

In this part of the study, economic activity rates and employment rates are considered the determinants of unemployment related to labour supply and labour demand. Table 1 shows changes in unemployment rates in all voivodeships and throughout the country in the years 2013–2018. In addition to changes in individual years, their changes were presented in the years 2013–2018 and in two separate sub-periods (2013–2015 and 2015–2018). The first of the subperiods was marked by slower GDP growth. Between 2013 and 2015, Poland's GDP increased (in constant prices of 2010) by 7.2%, and from 2015 to 2018 by 13.7%[5].

The data in Table 1 lead to the following conclusions. First of all, in the years 2013–2018 and in both sub-periods (i.e. 2013–2015 and 2015–2018), there was a decline in unemployment rates throughout the country and in all

[5] Calculated by the author based on: https://stat.gov.pl/wskazniki-makroekonomiczne/; accessed 22.02.2020.

voivodeships. However, the drop was quite varied. The improvement of the economic situation in the analysed years affected the situation in the voivodeship labour markets to a different extent. In nine voivodeships, the decline in unemployment rates in the years 2013–2018 was stronger than in the whole country. In contrast, in seven voivodeships, the decline was lower than in the entire Polish economy. Secondly, the strongest decline in unemployment rates in the entire analysed period occurred in the following voivodeships: Podkarpackie (9.4 p.p.), Kujawsko-Pomorskie (7.8 p.p.) and Pomorskie (7 p.p.). Thirdly, the smallest decrease occurred in the following voivodeships: Lubelskie (3.7 p.p.), Opolskie (4 p.p.), Warmińsko-Mazurskie (4.1 p.p.) and Mazowieckie (4.5 p.p.). Declines in unemployment rates were also recorded in most voivodeships in individual years. They varied, however, which indicates the diversified sensitivity of labour markets in individual voivodeships to an improvement in the economic situation. In addition, it should be emphasised that between 2017 and 2018, there was a slowdown in the downward trend in unemployment rates in most voivodeships.

TABLE 1: *Changes in unemployment rates by voivodeship in the years 2013–2018 (p.p.)*

Description	2014	2015	2016	2017	2018	2013–2015	2015–2018	2013–2018
1	2	3	4	5	6	7	8	9
Poland	–1.7	–1.2	–1.4	–1.0	–0.7	–2.9	–3.1	–6.0
Dolnośląskie	–0.3	–3.7	–1.7	–1.3	0.8	–4.0	–2.2	–6.2
Kujawsko-Pomorskie	–1.5	–3.4	–0.3	–2.1	–0.5	–4.9	–2.9	–7.8
Lubelskie	–0.1	–0.4	–1.9	1.0	–2.3	–0.5	–3.2	–3.7
Lubuskie	–2.2	–0.9	–2.2	–0.7	–0.4	–3.1	–3.3	–6.4
Łódzkie	–2.2	–0.9	–2.2	–0.6	0.0	–3.1	–2.8	–5.9
Małopolskie	–2.9	–0.4	–1.7	0.1	–0.9	–3.3	–2.5	–5.8
Mazowieckie	–1.5	–0.4	–1.3	–1.1	–0.2	–1.9	–2.6	–4.5
Opolskie	–1.0	–0.9	–1.5	–0.5	–0.1	–1.9	–2.1	–4.0
Podkarpackie	–1.4	–2.1	–2.7	–1.7	–1.5	–3.5	–5.9	–9.4
Podlaskie	–2.1	–0.6	–1.9	–1.1	–0.6	–2.7	–3.6	–6.3
Pomorskie	–2.4	–1.6	–0.1	–1.6	–1.3	–4.0	–3.0	–7.0

Table 1 (cont.)

1	2	3	4	5	6	7	8	9
Śląskie	–2.2	–1.1	–1.2	–1.4	–0.6	–3.3	–3.2	–6.5
Świętokrzyskie	–1.4	0.0	–1.5	–0.8	–2.8	–1.4	–5.1	–6.5
Warmińsko--Mazurskie	–2.3	1.1	0.2	–1.2	–1.9	–1.2	–2.9	–4.1
Wielkopolskie	–1.4	–2.2	–0.4	–1.1	–0.5	–3.6	–2.0	–5.6
Zachodniopo-morskie	–1.5	–0.8	–0.9	–3.4	0.2	–2.3	–4.1	–6.4

S o u r c e: calculated by the author based on *Aktywność ekonomiczna ludności Polski, 2014–2019.*

The changes in unemployment rates by voivodeship described above may have been caused by the impact of factors on the demand side (i.e. employment rates) and the supply side of regional labour markets (economic activity rates).

Table 2 contains data on the changes in economic activity rates across Poland and in individual voivodeships in the years 2013–2018. It shows that the trends of changes in economic activity rates were heterogeneous across the voivodeships. Only in half of the voivodeships did the level of economic activity increase. It should be noted here that in the same period, the level of economic activity rate in the Polish economy did not change. Interestingly, in the years between 2013 and 2015, there was a slight increase in the economic activity rate (0.4 p.p.). However, in the next sub-period, the rate of economic activity in Poland decreased by 0.4 p.p.

In the first of the sub-periods, economic activity decreased in six voivodeships, and in the second sub-period in eight.

TABLE 2: *Changes in economic activity rates by voivodeship in the years 2013–2018 (p.p.)*

Description	2014	2015	2016	2017	2018	2013–2015	2015–2018	2013–2018
1	2	3	4	5	6	7	8	9
Poland	0.2	0.2	–0.2	–0.1	–0.1	0.4	–0.4	0.0
Dolnośląskie	0.0	0.7	1.5	–0.5	1.3	0.7	2.3	3.0
Kujawsko--Pomorskie	1.1	–0.5	–0.9	–0.3	0.1	0.6	–1.1	–0.5
Lubelskie	–0.2	–0.5	–1.3	–0.1	–0.1	–0.7	–1.5	–2.2

1	2	3	4	5	6	7	8	9
Lubuskie	0.4	–0.3	0.7	0.1	–0.5	0.1	0.3	0.4
Łódzkie	–0.8	–0.2	0.1	1.1	–0.6	–1.0	0.6	–0.4
Małopolskie	–0.1	0.4	1.2	–0.7	–1.6	0.3	–1.1	–0.8
Mazowieckie	2.5	0.3	–2.2	–0.4	0.8	2.8	–1.8	1.0
Opolskie	1.0	0.3	1.1	0.8	–0.4	1.3	1.5	2.8
Podkarpackie	–2.7	0.3	1.6	0.8	–1.4	–2.4	1.0	–1.4
Podlaskie	–0.2	–1.0	0.5	–1.0	0.7	–1.2	0.2	–1.0
Pomorskie	–1.0	1.6	0.4	–0.1	0.2	0.6	0.5	1.1
Śląskie	0.5	–0.5	0.0	–0.7	–0.8	0.0	–1.5	–1.5
Świętokrzyskie	0.3	1.6	–3.1	0.3	–2.2	1.9	–5.0	–3.1
Warmińsko-Mazurskie	–0.5	1.7	0.8	0.2	–1.9	1.2	–0.9	0.3
Wielkopolskie	–1.0	0.3	0.2	–0.7	1.5	–0.7	1.0	0.3
Zachodniopomorskie	–0.5	–1.1	0.6	1.1	1.3	–1.6	3.0	1.4

S o u r c e: calculated by the author based on *Aktywność ekonomiczna ludności Polski, 2014–2019.*

Lower levels of economic activity from 2015 to 2018 can be attributed to two main factors. The first was the law that increased the retirement age on 1 January 2013 and which remained effective until 1 Oct. 2017. The other factor that could have had a discouraging effect on economic activity in that period was the introduction of the Family 500+ programme. Studies have shown that it was followed by a decrease in the aggregate economic activity of women aged 25–44 and an increase in the number of women becoming economically inactive due to childcare[6].

The largest decrease in the level of economic activity rates in the years 2013–2018 occurred in the voivodeships of Świętokrzyskie (3.1 p.p.), Lubelskie (2.2 p.p.) and Śląskie (1.5 p.p.). The voivodeships with the biggest increases in economic activity rates were Dolnośląskie (by 3 p.p.), Opolskie (2.8 p.p.), and Zachodniopomorskie (1.4 p.p.) voivodeships.

[6] See: **I. Magda**, **M. Brzeziński**, **A. Chłoń-Domińczak**, **I.E. Kotowska**, **M. Myck**, **M. Najsztub**, **J. Tyrowicz**, *Rodzina 500+ – ocena programu i propozycje zmian*, https://for.org.pl/pl/publikacje/raporty-for/raport-rodzina-500-plus-ocena-programu-i-propozycje-zmian; accessed 23.07.2019, p. 11.

TABLE 3: *Changes in employment rates by voivodeship in the years 2013–2018 (p.p.)*

Description	2014	2015	2016	2017	2018	2013–2015	2015–2018	2013–2018
Poland	1.1	0.9	0.6	0.5	0.3	2.0	1.4	3.4
Dolnośląskie	0.1	2.7	2.4	0.2	0.8	2.8	3.4	6.2
Kujawsko-Pomorskie	1.8	1.3	–0.5	0.8	0.4	3.1	0.7	3.8
Lubelskie	–0.2	–0.3	–0.1	–0.6	1.2	–0.5	0.5	0.0
Lubuskie	1.7	0.0	2.1	0.4	–0.2	1.7	2.3	4.0
Łódzkie	0.6	0.3	1.2	1.5	–0.6	0.9	2.1	3.0
Małopolskie	1.5	0.6	2.1	–0.7	–1.0	2.1	0.4	2.5
Mazowieckie	3.1	0.5	–1.2	0.4	0.7	3.6	–0.1	3.5
Opolskie	1.5	0.7	1.7	1.2	–0.3	2.2	2.6	4.8
Podkarpackie	–1.4	1.3	2.9	1.7	–0.4	–0.1	4.2	4.1
Podlaskie	0.9	–0.5	1.5	–0.4	1.0	0.4	2.1	2.5
Pomorskie	0.4	2.4	0.5	0.8	0.9	2.8	2.2	5.0
Śląskie	1.7	0.2	0.6	0.0	–0.4	1.9	0.2	2.1
Świętokrzyskie	1.1	1.4	–2.0	0.8	–0.6	2.5	–1.8	0.7
Warmińsko-Mazurskie	0.6	1.0	0.7	0.7	–0.7	1.6	0.7	2.3
Wielkopolskie	–0.2	1.6	0.4	0.0	1.8	1.4	2.2	3.6
Zachodniopomorskie	0.2	–0.5	1.0	2.8	1.3	–0.3	5.1	4.8

S o u r c e: calculated by the author based on *Aktywność ekonomiczna ludności Polski, 2014–2019.*

Changes in the level of employment rates in the years 2013–2018 are presented in Table 3. It shows that both on the scale of the whole country and in the majority of voivodeships (with the exception of the Lubelskie Voivodeship), there was an increase in employment. Therefore, it can be hypothesised that changes in employment (the demand side of the labour market) were the main determinant of changes in unemployment rates in that period.

A similar conclusion arises from the analysis of data in the two separate sub-periods. In the years 2013–2015, in only three voivodeships was there

a slight decrease in employment rates. However, in the years 2015–2018, only in the Mazowieckie and Świętokrzyskie Voivodeships did employment rates decrease.

The strongest increase in employment rates in the entire analysed period occurred in the following voivodeships: Dolnośląskie (6.2 p.p.), Pomorskie (5 p.p.), Zachodniopomorskie (4.8 p.p.) and Opolskie (4.8 p.p.). In the Lubelskie Voivodeship, the employment rate remained unchanged across the whole period. The smallest increase in the employment rates occurred in the Świętokrzyskie (0.7 p.p.), Śląskie (2.1 p.p.), Warmińsko-Mazurskie (2.3 p.p.), as well as Małopolskie and Podlaskie (2.5 p.p.) voivodeships.

3. Results of estimations of the impact of economic activity and employment rates on changes in unemployment according to the voivodeships

Two formulas for decomposing unemployment rates can be found in the economic literature. The first of these formulas was proposed by de Beer (2007), while the other one was presented by (2010). In this paper, we make use of the latter formula[7].

The formula for decomposing Elsby, Hobijn, and Sahin's unemployment rate can be derived using the differential calculus. We assume that time is a continuous variable. It is possible, therefore, to determine the increment of each of the resources functioning in the labour market at any point in time.

The number of unemployed (B) in each economy is equal to the difference between the number of economically active people (A_z) and working people (Z), which can be described by the formula:

$$B = A_z - Z \tag{1}$$

We assume that the unemployment rate is described by the following equation:

$$u = \frac{B}{A_z} \tag{2}$$

[7] The results of the decomposition of unemployment rates based on each of the proposed formulas are the same. Therefore, both formulas differ only in their analytical form.

where:
u – unemployment rate,

By substituting equation (1) into equation (2), we obtain:

$$u = \frac{A_z - Z}{A_z} \tag{3}$$

After transformations, it takes the form:

$$u = 1 - \frac{Z}{A_z} \tag{4}$$

The increase in the unemployment rate in the time described by equation (4) caused by the simultaneous change in the number of unemployed and economically active people is:

$$\frac{du}{dt} = \frac{\frac{dZ}{dt}A_z - Z\frac{dA_z}{dt}}{(A_z)^2} = \frac{Z\frac{dA_z}{dt} - \frac{dZ}{dt}A_z}{(A_z)^2} \tag{5}$$

where:
t – time,
$\frac{du}{dt}$ – increase in the unemployment rate over time,
$\frac{dZ}{dt}$ – increase in the employment rate over time,
$\frac{dA_z}{dt}$ – increase in the number of economically active people over time.

Equation (5), after subsequent transformations, takes the following form:

$$\frac{du}{dt} = \frac{Z}{A_z}\left(\frac{\frac{dA_z}{dt}}{A_z} - \frac{\frac{dZ}{dt}}{Z}\right) \tag{6}$$

It is known that: $\frac{Z}{A_z} = (1-u)$, and therefore after the substitution and subsequent transformations, equation (6) takes the form:

$$\frac{du}{dt}=(1-u)\left(\left(\frac{\frac{dA_z}{dt}}{A_z}-\frac{\frac{dL_{wp}}{dt}}{L_{wp}}\right)-\left(\frac{\frac{dZ}{dt}}{A_z}-\frac{\frac{dL_{wp}}{dt}}{L_{wp}}\right)\right) \tag{7}$$

Equation (6.16) after transformations takes the form[8]:

$$\frac{du}{dt}=(1-u)\left(\Delta\ln\left(\frac{A_z}{L_{wp}}\right)-\Delta\ln\left(\frac{Z}{L_{wp}}\right)\right) \tag{8}$$

Expression $\frac{AZ}{L_{wp}}$ is the economic activity rate (a_z), while $\frac{P}{L_{wp}}$ is the employment rate (z). After substituting into equation (8), we obtain the formula for Elsby, Hobijn, and Sahin's decomposition of the unemployment rate[9]:

$$\frac{du}{dt}=(1-u)(\Delta\ln(a_z)-\Delta\ln(z)) \tag{9}$$

Equation (9) shows that an increase (decrease) in the economic activity rate (i.e. labour supply) leads to an increase (decrease) in the unemployment rate. The increase in the unemployment rate due to the change in the level of economic activity is: $(1-u)(\Delta\ln(a_z))$. In turn, an increase (decrease) in the employment rate (i.e. demand for labour) leads to a decrease (increase) in the unemployment rate. The increase in the unemployment rate due to the change in the employment rate is: $(-(1-u)(\Delta\ln(z)))$.

It should be emphasised that equation (9) only takes into account the supply and demand determinants of unemployment. It does not take into consideration

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[8] Expression $\Delta\ln\left(\frac{A_z}{L_{wp}}\right)$ is the first differential increment of the natural logarithm of the economic activity rate, while $\Delta\ln\left(\frac{Z}{L_{wp}}\right)$ is the first differential increment of the natural logarithm of the employment rate.

[9] **M.W. Elsby**, **M. Hobijn**, **A. Sahin**, *The Labor Market in the Great Recession*, Brooking Papers on Economic Activity 2010/Spring, pp. 5–6.

changes in the level of structural mismatches in the labour market or the impact of government policy on the labour market.

The decomposition of unemployment rates was performed using equation (9).

In the first step, **the temporal changes** in unemployment rates were estimated assuming that $\frac{du}{dt} = \Delta u$; following that, changes in unemployment rates caused by variations in economic activity rates and unemployment rates were determined.

Table 4 presents the results of the decomposition of unemployment rates in Poland and individual voivodeships in the years 2013–2018. It indicates the following conclusions.

Both in individual years and the distinguished sub-periods, an increase in employment rates had a dominant impact on the level of unemployment rates in Poland. Thus, the demand side of the labour market exerted a dominant influence on the situation in the labour market in Poland during the period under consideration. However, on the scale of the whole country, the impact of the increase in employment rates on the decline in unemployment rates was slightly stronger in the years 2015–2018. As a result of the increase in the employment rate, the unemployment rate in Poland in the years 2013–2015 decreased by 2.9 p.p., and in the years 2015–2018 by 3.1 p.p. Also, in the majority of voivodeships, the impact of the increase in employment rates on the decline in unemployment rates was stronger between 2015 and 2018.

TABLE 4: *Changes in unemployment rates and their decomposition in Poland and according to voivodeship in the years 2013–2018 (p.p.)*

Description		2014	2015	2016	2017	2018	2013–2015	2015–2018	2013–2018
1		2	3	4	5	6	7	8	9
Poland	change in the unemployment rate	–1.7	–1.2	–1.4	–1.0	–0.7	–2.9	–3.1	–6.0
	impact of change a_z	0.3	0.4	–0.3	–0.2	–0.1	0.6	–0.7	0.0
	impact of change z	–2.0	–1.6	–1.1	–0.8	–0.6	–3.5	–2.4	–6.0

1		2	3	4	5	6	7	8	9
Dolnośląskie	change in the unemployment rate	–0.3	–3.7	–1.7	–1.3	0.8	–4.0	–2.2	–6.2
	impact of change a_z	0.0	1.2	2.6	–0.9	2.2	1.1	3.9	5.1
	impact of change z	–0.3	–4.9	–4.3	–0.4	–1.4	–5.1	–6.1	–11.3
Kujawsko-Pomorskie	change in the unemployment rate	–1.5	–3.4	–0.3	–2.1	–0.5	–4.9	–2.9	–7.8
	impact of change a_z	1.8	–0.8	–1.5	–0.6	0.2	1.0	–1.9	–0.9
	impact of change z	–3.3	–2.6	1.2	–1.5	–0.7	–5.9	–1.0	–6.9
Lubelskie	change in the unemployment rate	–0.1	–0.4	–1.9	1.0	–2.3	–0.5	–3.2	–3.7
	impact of change a_z	–0.3	–0.9	–2.2	–0.1	–0.2	–1.2	–2.5	–3.8
	impact of change z	0.2	0.5	0.3	1.1	–2.1	0.7	–0.7	0.0
Lubuskie	change in the unemployment rate	–2.2	–0.9	–2.2	–0.7	–0.4	–3.1	–3.3	–6.4
	impact of change a_z	0.8	–0.6	1.2	0.3	–0.8	0.2	0.6	0.9
	impact of change z	–3.0	–0.3	–3.4	–1.0	0.4	–3.3	–3.9	–7.3
Łódzkie	change in the unemployment rate	–2.2	–0.9	–2.2	–0.6	0.0	–3.1	–2.8	–5.9
	impact of change a_z	–1.3	–0.3	0.0	1.9	–1.0	–1.6	0.9	–0.7
	impact of change z	–0.9	–0.6	–2.2	–2.5	1.0	–1.5	–3.7	–5.2

TABLE 4 (cont.)

1		2	3	4	5	6	7	8	9
Małopolskie	change in the unemployment rate	–2.9	–0.4	–1.7	0.1	–0.9	–3.3	–2.5	–5.8
	impact of change a_z	–0.1	0.7	1.9	–1.1	–2.7	0.6	–2.0	–1.4
	impact of change z	–2.8	–1.1	–3.6	1.2	1.8	–3.9	–0.5	–4.4
Mazowieckie	change in the unemployment rate	–1.5	–0.4	–1.3	–1.1	–0.2	–1.9	–2.6	–4.5
	impact of change a_z	3.8	0.4	–3.4	–0.6	1.2	4.2	–2.8	1.6
	impact of change z	–5.3	–0.8	2.1	–0.5	–1.4	–6.1	0.2	–6.1
Opolskie	change in the unemployment rate	–1.0	–0.9	–1.5	–0.5	–0.1	–1.9	–2.1	–4.0
	impact of change a_z	1.7	0.7	1.9	1.4	–0.7	2.4	2.6	5.0
	impact of change z	–2.7	–1.6	–3.4	–1.9	0.6	–4.3	–4.7	–9.0
Podkarpackie	change in the unemployment rate	–1.4	–2.1	–2.7	–1.7	–1.5	–3.5	–5.9	–9.4
	impact of change a_z	–4.2	0.4	2.7	1.3	–2.3	–3.9	1.8	–2.3
	impact of change z	2.8	–2.5	–5.4	–3.0	0.8	0.4	–7.7	–7.1
Podlaskie	change in the unemployment rate	–2.1	–0.6	–1.9	–1.1	–0.6	–2.7	–3.6	–6.3
	impact of change a_z	–0.4	–1.6	0.8	–1.8	1.3	–2.0	0.3	–1.8
	impact of change z	–1.7	1.0	–2.7	0.7	–1.9	–0.7	–3.9	–4.5

1		2	3	4	5	6	7	8	9
Pomorskie	change in the unemployment rate	–2.4	–1.6	–0.1	–1.6	–1.3	–4.0	–3.0	–7.0
	impact of change a_z	–1.6	2.7	0.6	–0.2	0.2	1.1	0.7	1.8
	impact of change z	–0.8	–4.3	–0.7	–1.4	–1.5	–5.1	–3.7	–8.8
Śląskie	change in the unemployment rate	–2.2	–1.1	–1.2	–1.4	–0.6	–3.3	–3.2	–6.5
	impact of change a_z	0.8	–0.8	0.0	–1.3	–1.5	0.0	–2.8	–2.7
	impact of change z	–3.0	–0.3	–1.2	–0.1	0.9	–3.3	–0.4	–3.8
Święto-krzyskie	change in the unemployment rate	–1.4	0.0	–1.5	–0.8	–2.8	–1.5	–5.1	–6.5
	impact of change a_z	0.5	2.4	–5.1	0.6	–4.0	2.9	–8.6	–5.5
	impact of change z	–1.9	–2.4	3.6	–1.4	1.2	–4.4	3.5	–1.0
Warmińsko--Mazurskie	change in the unemployment rate	–2.3	1.1	0.2	–1.2	–1.9	–1.2	–2.9	–4.1
	impact of change a_z	–0.9	2.9	1.5	0.3	–3.5	2.0	–1.6	0.5
	impact of change z	–1.4	–1.8	–1.3	–1.5	1.6	–3.2	–1.3	–4.6
Wielkopol-skie	change in the unemployment rate	–1.4	–2.2	–0.4	–1.1	–0.5	–3.6	–2.0	–5.6
	impact of change a_z	–1.6	0.6	0.3	–1.2	2.5	–1.1	1.6	0.5
	impact of change z	0.2	–2.8	–0.7	0.1	–3.0	–2.5	–3.6	–6.1

TABLE 4 (cont.)

1		2	3	4	5	6	7	8	9
Zachodniopomorskie	change in the unemployment rate	–1.5	–0.8	–0.9	–3.4	0.2	–2.3	–4.1	–6.4
	impact of change a_z	–0.9	–1.9	1.0	2.0	2.4	–2.8	5.5	2.6
	impact of change z	–0.6	1.1	–1.9	–5.4	–2.2	0.5	–9.6	–9.0

S o u r c e: calculated by the author based on *Aktywność ekonomiczna ludności Polski, 2014–2019.*

It should be emphasised that while in the years 2013–2015 an increase in the economic activity rate contributed to an increase in the unemployment rate in Poland, a decline in the level of this indicator in the years 2015–2018 led to a decrease in the level of unemployment in Poland in that period. The reasons for the decline in the economic activity rate in that period may be seen in the lowering of the retirement age in 2017.

In almost all voivodeships (with the exception of Świętokrzyskie and Lubelskie), changes on the supply side of the labour market contributed greatly to a decreasing rate of unemployment in the years 2013–2018. In the Lubelskie Voivodeship, as mentioned in Section 2, the employment rate in 2018 remained unchanged in comparison to 2013. Therefore, the decline in the unemployment rate in this voivodeship in that period was caused by a decrease in the economic activity rate.

The strongest impact of the increase in employment rates on the decline in unemployment rates was recorded in the following voivodeships: Dolnośląskie, Zachodniopomorskie, Opolskie and Pomorskie. Due to the increase in employment rates, the unemployment rate decreased in the Dolnośląskie Voivodeship by 11.3 p.p., in the Zachodniopomorskie Voivodeship by 9 p.p., in the Opolskie Voivodeship by 9 p.p., and in the Pomorskie Voivodeship by 8.8 p.p.

The weakest impact of the increase in employment rates on the decline in unemployment rates in the entire analysed period was observed in the Świętokrzyskie and Śląskie Voivodeships (an increase in the employment rate caused a drop in the unemployment rate in the Świętokrzyskie Voivodeship of only 1 p.p., while in the Śląskie Voivodeship the was a drop of 3.8 p.p.).

The impact of changes in the level of economic activity on changes in unemployment rates both in the entire economy and in individual voivodeships was

varied in the analysed years. The strongest impact of the decline in economic activity rates on the increase in the unemployment rate in the years 2013–2018 was observed in the Świętokrzyskie, Lubelskie and Śląskie Voivodeships (due to the decline in the economic activity rate, in the analysed period the unemployment rate in the Świętokrzyskie Voivodeship decreased by 5.5 p.p., in the Lubelskie Voivodeship by 3.8 p.p., and in the Śląskie Voivodeship by 2.7 p.p.). It should be emphasised, however, that such a significant decrease in the unemployment rate in the Świętokrzyskie Voivodeship in the years 2013–2018 resulted from the decline in economic activity in the years 2015–2018. As indicated in Table 4, in the years 2013–2015, an increase in the level of economic activity contributed to an increase in the unemployment rate in the Świętokrzyskie Voivodeship by 3 p.p. Also, in the Śląskie Voivodeship, the decline in the unemployment rate in the years 2013–2018 was caused by the weakening of economic activity in the years 2015–2018.

The greatest impact of the increase in economic activity rates on the increase in unemployment rates in the years 2013–2018 was recorded in the Dolnośląskie, Opolskie and Zachodniopomorskie Voivodeships (an increase in economic activity rates caused an increase in the unemployment rate of 5.1 p.p. in the Dolnośląskie Voivodeship, 5 p.p. in the Opolskie Voivodeship, and 2.6 p.p. in the Zachodniopomorskie Voivodeship).

4. Conclusions

The following conclusions can be drawn from the analysis carried out. First of all, the level of unemployment in the economy depends to a large extent on factors related to the supply and demand side of the labour market. In the analysed period, both groups of factors influenced the rates of unemployment in the voivodeships studied.

Secondly, in the years 2013–2018, an increase in employment rates had a decisive influence on the decline in unemployment rates observed in most voivodeships. However, the increase in employment rates in individual voivodeships varied.

Thirdly, only in the Świętokrzyskie and Lubelskie Voivodeships did a decline in economic activity rates have a decisive impact on the decline in the unemployment rates observed in those voivodeships. A strong decrease in the level of economic activity in those voivodeships occurred in the years 2015–2018, i.e. in the period in which the retirement age was lowered.

Fourthly, also in both separate sub-periods (2013–2015 and 2015–2018), an increase in employment rates had a dominant influence on the observed decline in unemployment rates. However, it was slightly stronger in the years 2015–2018 due to the fact that during that period, the Polish economy experienced an acceleration of economic growth, which increased labour demand.

Fifthly, the decline in unemployment rates throughout the country and in some voivodeships was strengthened by processes occurring on the supply side of the labour market due to, among others, the lowering of the retirement age in 2017, which is indicated by the drop in the level of economic activity rates in Poland and in seven voivodeships in the years 2015–2018. Although the cessation of economic activity contributed to the observed decline in unemployment rates, in the long term, due to unfavourable demographic forecasts, it may lead to a shortage of labour force. Also, the introduction of the Family 500+ programme could have contributed to reducing the economic activity of women aged 25–44. In view of the fact that the population outlook for Poland is hardly optimistic, a return to the discussion of extending the retirement age seems necessary.

Sixthly, because only two factors affecting unemployment rates were considered in the study, it is advisable that future research should also address the impacts of other factors associated with labour supply and demand (e.g. changes in aggregate labour demand, real wages, or the productivity of labour).

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Leszek KUCHARSKI

DEKOMPOZYCJA STÓP BEZROBOCIA W POLSCE W PRZEKROJU WOJEWÓDZTW W LATACH 2013–2018

Abstrakt

Przedmiot badań: Bezrobocie jest zjawiskiem występującym z różnym natężeniem w każdej gospodarce rynkowej. Na jego poziom oddziałuje jednocześnie wiele czynników leżących po stronie popytowej i podażowej rynku pracy, jak również niedopasowania strukturalne między podażą pracy a popytem na pracę, efektywność funkcjonowania rynku pracy, charakter polityki makroekonomicznej oraz instytucje rynku pracy.
Cel badawczy: Celem opracowania jest określenie znaczenia czynników popytowych i podażowych w kształtowaniu zmian stóp bezrobocia w przekroju województw w Polsce w latach 2013–2018.
Metoda badawcza: W oparciu o dane agregatowe o stopach bezrobocia, wskaźnikach zatrudnienia oraz współczynnikach aktywności zawodowej opublikowanych przez GUS dokonano dekompozycji stóp bezrobocia w Polsce oraz w przekroju województw w oparciu o formułę zaproponowaną przez M.W. Elsby'ego, M. Hobijna i A. Sahina (2010).
Wyniki: Z przeprowadzonych rozważań wynika, iż w latach 2013–2018 decydujący wpływ na spadek stóp bezrobocia w większości województw miał wzrost wskaźników zatrudnienia. Jedynie w woj. lubelskim i świętokrzyskim dezaktywizacja zawodowa miała decydujący wpływ na spadek stóp bezrobocia. W latach 2015–2018 spadek stóp bezrobocia w Polsce jak i w niektórych województwach był wspierany przez procesy zachodzące po podażowej stronie rynku pracy.

Słowa kluczowe: region, bezrobocie, zatrudnienie, współczynnik aktywności zawodowej.