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HIDDEN UNEMPLOYMENT IN POLISH AGRICULTURE IN 1995–2015

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Abstract. The aim of the paper is to investigate the scale of changes in the labour market in Poland, assuming that the number of persons employed in agriculture would amount to 5% of the total number of people employed in the national economy, i.e. when we eliminate the potential surplus of employment in individual farms. The study was conducted on the basis of the BAEL data from the years 1995–2015. It was shown that there was a steady improvement in the labour market and a reduction of the level of potential hidden unemployment in agriculture, mainly due to economic growth and the absorption of labour force by the non-agricultural sectors. Research results let us assume that achieving the level of employment in the agriculture similar to that specified in the study is possible within a period of several years.

Key words: hidden unemployment, labour resources, people employed in agriculture

INTRODUCTION

Hidden unemployment is a major problem, which still needs to be solved in the course of modernization of Polish agriculture. This pertains almost exclusively to individual farms, which share in employment in the agricultural sector for at least the last twenty years has exceeded 95%. Initially inefficiency of labour resources in the private sector in agriculture may have resulted from obsolete technologies and production methods. However, with time in view of the tremendous technological and organizational breakthrough after 2004 in connection with the adaptation of Polish agriculture to the EU standards, excess workforce on farms was becoming redundant not only in terms of its participation in the division of income from the operations of these farms, but also because it was not involved in production processes. The authors of the report on "Rural Poland 2014" stated that in 2011 income of inhabitants of rural areas *per capita* was equivalent to as little as 51% income of inhabitants of cities with a population of min. 500 thousand[1]. At the same time they also indicated that in view of the inevitable decrease in the importance of agriculture as the primary source of maintenance for the rural population, structural transformations in rural areas are an inevitable process, caused – among other things – by ageing of farmers and a lack of their successors to take over farms, migration of the young generation to cities in search for a more comfortable life and a lack of opportunities to reach income parity in agriculture due to the predominance of small farms (Polska wieś…, 2014). Despite positive changes agriculture continued to be a reserve pool of workforce, which is not indispensable in that sector and for which the opportunities of

[1] Employment in agriculture was the only source of maintenance for 964 thousand rural inhabitants (6.4% rural population and 17.5% rural working population). Work in agriculture constituted an additional source of income for 423 thousand rural inhabitants, working in non-agricultural sectors or gaining their maintenance from unearned sources (7.7% total number of employed in rural areas) (Polska wieś…, 2014).

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employment outside agriculture are insufficient (Frenkel, 1998; Frenkel, 2003; Frenkel, 2013; Frenkel and Rosner, 2001).

Thus we need to consider the scale of hidden unemployment in agriculture during the structural transformation period and this scale in view of the successive business cycles, assuming arbitrarily the share of employment in that sector in other EU countries as a reference point. Such a simulation provides a picture of the distance separating Polish agriculture from the agriculture of well-developed EU countries and it indirectly shows the current progress in the convergence of economic development, manifested in the decreasing share of agriculture in the division of labour between Poland and the other EU countries.

The aim of this paper is to determine the scale of changes on the labour market in Poland in a situation when the number of employed in agriculture would be close to 5% total number of employed in the national economy, while the 5% value is the approximate mean for the UE-27 countries[2]. The level of released surplus employment may be understood also as an approximate level of demand for new jobs in the economy[3], which may be presented in simple terms as a situation, in which in order to make such changes in reality would require the creation of at least as many jobs as would be eliminated in agriculture.

REMARKS ON METHODOLOGY

Hidden unemployment in agriculture needs to be understood as surplus workforce found among the population statistically treated as working on individual farms (Frenkel, 2002). Hidden unemployment may be current, i.e. determined in relation to the currently existing conditions of agricultural production (farm structure, the level of production and mechanization, development of the service zone in agriculture, the condition of rural infrastructure, etc.), or potential (i.e. possibly occurring in the future), determined by surplus workforce found as a result of changes in agricultural production conditions connected with mechanization of production and technical change as well as organizational changes, which typically leads to a considerable reduction of demand for labour in agriculture (thanks to the implementation of more advanced, less labour-intensive production technologies and introduction of more efficient machines) (Frenkel, 2002).

The paper describes the scale of changes on the labour market in Poland in a situation when the number of employed in individual farms would be close to 5% total number of employed in the national economy. For this reason the following data were presented:

- for aggregate values, the values and changes in the years 1995–2015: the share of employed in agriculture in the total number of employed in the national economy, unemployment rate, workforce exclusion rate and GDP growth rate

[2] Amounting to 4.9% in 2014 (Komisja Europejska, n.d.). The greatest share of workforce employed in agriculture in the total number of employed in the national economy was recorded in Romania (29.0%), followed by (also high, although approx. 50% lower than in Romania) in Croatia (13.7%), Greece (13.0%) and in Poland (12.6%). Around 10% or slightly below that level of the total number of employed in the economy work in Portuguese, Lithuanian, Latvian, Slovenian and Bulgarian agriculture. The lowest share of the population employed in agriculture was found in economically strong countries of Western Europe: in Belgium, Great Britain, Luxemburg, Germany and Sweden, and in Malta in the south of Europe. A slightly higher level was recorded in Holland (due to the specific character of agricultural production with a high share of horticultural farms), in Denmark, France, Cyprus, the Czech Republic and Slovakia. In terms of the value of this parameter most similar levels to the mean for EU-27 (4.8%) were found in Austria, Ireland and Estonia.

[3] In view of this simplification an objection could be presented that the potential release of workforce from agriculture is determined to a considerable extent by structural factors and not only the number of vacancies. It is obviously true; however, long-term business cycle determinants modify structural determinants and vice versa (see Layard et al., 1991; Kołodziejczak and Wysocki, 2013). In order to create new jobs it is not enough to provide even the best qualitative adaptation of demand and supply of labour. Only the demand for labour, expressed in the existence of a certain number of vacancies may permanently and adequately stimulate marginalization of structural barriers. Entrepreneurs may employ workers only when they need them. Artificial, excessive regulation of this process may be harmful and lead to pathologies (e.g. firing currently employed workers to gain subsidies for hiring new personnel provided by job centres). In a broader context it needs to be asked who eventually finances such actions and whether such interventionism is advantageous on a macroscale, particularly in relation with the thus generated additional demand for public funds. The author does not negate the justification for intervention as such, particularly in underprivileged areas (e.g. due to the closure of industrial plants or state-owned farms in the transformation period); however, a lack of cohesion of these actions and their inefficiency on the macroscale are frequently indicated. See also: Tyrowicz (2011).

- in the case of an analysis of the situation in individual voivodeships for the years 2005, 2010 and 2015: employment in the national economy and in agriculture as well as its changes, the number of unemployed and the economically inactive population in the baseline, as well as changes in the scale of exclusion in the baseline and in the simulation of the level of employment in agriculture, amounting to 5% total number of employed in the national economy as well as the distance to the 5% level.

Labour resources, released after the adopted simulation assumptions were met, *ceteris paribus* would change the status of the economic activity to unemployment or economic inactivity. However, proportions of their allocation in such states may not be precisely determined. From the point of view of GDP generation it is not crucial, since each status except for working instead of contributing to an increase in wealth – burdens the economy with costs of livelihood for the resident population and costs of the required intervention actions. For this reason, instead of estimating the unemployment rate and the rate of economic inactivity, a measure referred to as the workforce exclusion rate was used, calculated as a ratio of the total number of unemployed and economically inactive to the total number of economically active individuals (or as 100% minus the value of the employment rate)[4].

The study was based on information coming from the Labour Force Survey (LFS, Polish BAEL), conducted in the years 1995–2015. For aggregate data on the national level quarterly data from the entire period were used, while for the description of the situation in individual voivodeships the situation in the years 2005, 2010 and 2015 was presented[5]. In order to illustrate the situation in individual voivodeships, thanks to the availability of data the LFS (BAEL) data were used concerning the total number of employed in the agriculture sector.

THE INITIAL STATUS IN THE SIMULATION – BASELINE VARIANT

Figure 1 presents changes in the share of employed in individual farms in the population working in the national economy, the unemployment rate according to BAEL and the GDP growth rate in the years 1995–2016[6]. It may be stated that in the years 1995–1999 values of the first two parameters among the analyzed indexes decreased.

Starting from 2000 a change in the trend was observed. In relation with the rapid increase in unemployment, an increase was recorded in the share of individual farms in the structure of absorbed labour resources. This was caused primarily by a decrease in the number of jobs outside agriculture as a consequence of the slowing economic growth in the years 2000–2002. Starting from 2003 the share of the population employed in individual farms started to decrease again and the GDP growth rate started to increase. High unemployment rate was still recorded in 2005, despite the rapidly increasing GDP growth rate in the years 2003–2004. The share of employment in individual farms was decreasing, showing marked seasonal fluctuations (related with employment in seasonal field works). From 2005 the unemployment rate was decreasing

[4] The measure referred to as workforce exclusion rate was applied to stress the total rate of unused labour resources, which in the simulation would become the reserve workforce described by Marks (1960). Obviously the employment rate may be used interchangeably; however, in the opinion of the author in relation with the proposed aim of the study and for practical reasons in the described case it is more justified to analyse the exclusion rate.

- 5 Individual sectors of the economy comprise the following PKD sections:
- sector I: A – Agriculture, hunting and forestry; section B – Fishing and aquaculture;
- sector II: section C – Mining and extraction; section D – Industrial processing; section E – Generation and supply of electric energy, gas and water; section F – Construction industry;
- sector III: section G – Trade and repairs; section H – Hotels and restaurants; section I – Transport, warehousing services and telecommunications; section J – Financial intermediation; section K – Management of real estate and firms; section L – Public administration and defence activities, compulsory social security and health care benefits system; section M – Education; section N – Health care and welfare activities; sections O+P+Q – Other services, utility, social and individual service activities. Hidden unemployment in agriculture concerns almost exclusively individual farms. However, it was decided to analyse data concerning employment in the entire sector of agriculture, since differences between the number of employed in individual farms and the total number of employed in that sector are relatively small in Poland. According to BAEL data, employment in individual farms accounts for approx. 95% total employment in agriculture (GUS, 2015).

[6] In 1999 there was a gap in the Labour Force Survey (BAEL) conducted by the Central Statistical Office (GUS).

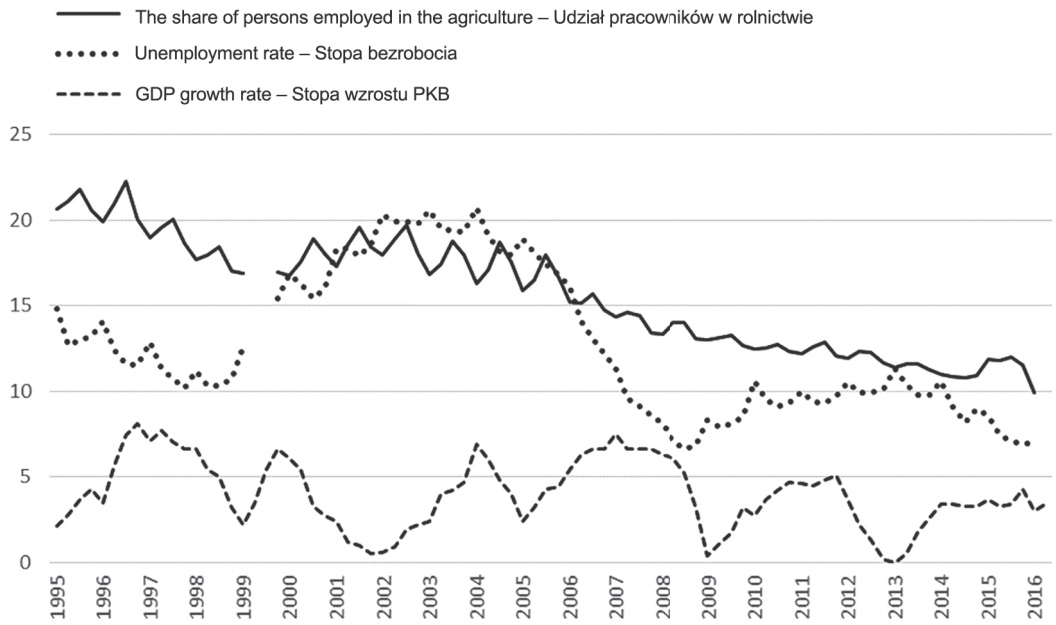

Fig. 1. The share of persons employed in individual farms in total number of people employed in the national economy, the BAEL unemployment rate and the GDP growth rate in 1995–2015
Source: own elaboration based on GUS (2003, 2010, 2016), Saczuk (2014).
Rys. 1. Udział pracujących w indywidualnych gospodarstwach rolnych w zbiorowości pracujących w gospodarce narodowej, stopa bezrobocia BAEL oraz stopa wzrostu PKB w latach 1995–2015
Źródło: opracowanie własne na podstawie GUS (2003, 2010, 2016), Saczuk (2014).

rapidly to fall to the lowest level in 2009. Its growth after 2009 may be connected with the effects of the financial crisis, which indirectly affected also Polish economy. The rapid reduction in the GDP growth rate caused by lower demand and hindered access to credits implied adverse phenomena, e.g. a repeated increase in the unemployment rate. In the years 2010–2012 the economy was recovering, but unemployment was not decreasing. When the GDP growth rate was decreasing, the unemployment rate reached the highest values in the since 2007. Only the economic recovery starting from 2013 made possible a further reduction of unemployment levels. In contrast to the unemployment rate, the share of employment in individual farms showed no marked changes in trends and it was not visibly affected by changes in the business cycle. It was decreasing systematically, with certain seasonal fluctuations, but they were much milder than before 2007. Starting from the years 2005–2009 it should not be connected with economic inactivity, since in those years the value of the activity rate and the employment rate started to grow at the simultaneous increase in the number of economically active individuals (GUS, 2010).

POTENTIAL HIDDEN UNEMPLOYMENT IN POLAND IN THE YEARS 1995–2015 – 5% VARIANT

The value of potential hidden unemployment in agriculture was decreasing in the successive years along with economic development and structural changes in rural areas. The developing economy created new jobs, which in combination with labour migration facilitated a systematic increase in the number of employed persons. In this general trend it was easier to search for employment outside agriculture. A factor additionally stimulating a decrease in employment in farms was connected with greater mobility of the young generation (gaining education outside their hometowns and emigrating to cities or abroad in search of employment), as well as gradual inactivity of the older generation living on farms, retiring or going to be a pensioner (Chmieliński, 2013).

Table 1. Employed persons in Poland in total and in the agriculture, the workforce exclusion rate and a decrease in employment in individual farms in 1995–2015 – the baseline and the results of "5%" simulation
Tabela 1. Pracujący w Polsce ogółem i w rolnictwie, stopa wykluczenia i zmniejszenie zatrudnienia w gospodarstwach rolnych w latach 1995–2015 – stan wyjściowy i wyniki symulacji „5%"

Specification – Wyszczególnienie	1995	2000	2005	2010	2015
Baseline – Stan wyjściowy					
Employed persons – Pracujący	14 426	14 230	13 940	15 627	15 073
including the employed in the agriculture w tym w rolnictwie	3 024	2 589	2 411	1 917	1 736
The workforce exclusion rate – Stopa wykluczenia	49.0	52.6	54.5	49.3	47.6
Scenario "5%" – Wariant „5%"					
Employed persons – Pracujący	12 123	12 353	12 226	14 491	14 091
including the employed in the agriculture w tym w rolnictwie	7 21.3	711.5	697.0	781.4	753.7
The workforce exclusion rate – Stopa wykluczenia	57.1	58.8	60.1	53.0	50.7
A decrease in employment in individual farms Zmniejszenie zatrudnienia w gospodarstwach	2 302.7	1 877.5	1 714.0	1 135.7	982.4

Source: Bank Danych Lokalnych (n.d.) and own calculations.
Źródło: Bank Danych Lokalnych (b.d.) i obliczenia własne.

This characteristic generation change frequently resulted in the elimination of smaller, low-income farms and purchase of their land by economically stronger farms, less burdened by surplus workforce.

The scale of potential hidden unemployment in agriculture was decreasing in the successive years (Table 1). The number of employed in agriculture in the case of the 5% simulation variant would decrease on the national scale from 2302.7 thousand individuals in 1995 to 982.4 thousand in 2015. With time the realization of the 5% variant would thus have fewer negative social and economic consequences. Its implementation at the beginning of that period would cause an increase in the workforce exclusion rate from 49.0% to 57.1%, in 2005 from 54.5% to 60.1%, while in 2015 it would be from 47.6% to 50.7%, i.e. by as little as 3.1% percentage points more than in the baseline variant. Based on data presented in Figure 1 and Table 1 it may thus be stated that an improvement in the general situation on the labour market facilitated a considerable release of surplus employment in agriculture. It also needs to be remembered that its modernization and increased aggregation of land ownership, resulting in lower actual demand for labour, additionally stimulated processes of releasing labour resources from individual farms. As a result it was necessary to absorb labour resources released from agriculture by non-agricultural sectors (pull factors), while on the other hand it was important to establish technological and organizational foundations stressing the disadvantages of maintaining surplus workforce on farms (push factors).

DIVERSIFICATION IN POTENTIAL HIDDEN UNEMPLOYMENT IN INDIVIDUAL VOIVODESHIPS

The simple inference presented above is far from comprehensive. Kołodziejczak and Wysocki (2015) indicated the internal heterogeneity of the labour market and the need for specific treatment of individual micromarkets in the spatial approach and of characteristics of economically active population, whereas Tyrowicz (2011) was of an opinion that generally it is not possible to infer on the nature of changes in employment and unemployment on the macroscale due to the frequently contrasting characteristics of individual micromarkets, as well

as the limited usefulness of data collected at the county level. For this reason we need to focus on the diversification in the discussed phenomena in relation to smaller labour markets. Due to the structure of BAEL data used in the survey the potential for regional disaggregation is limited to mesomarkets (i.e. the level of voivodeships).

Table 2 presents employment in the national economy and in agriculture in the years 2005, 2010 and 2015 in Poland on the national scale and in individual voivodeships. Total employment in Poland was increasing in that period and the share of employment in agriculture was decreasing – on the one hand as a result of the general increase in employment on the national scale, but primarily thanks to the gradual reduction of employment in that sector. On the national scale the reduction of employment in agriculture was fastest in the years 2005–2010 (by 5.3 percentage points in relation to the baseline, i.e. by 21.9%, which accounts for 4.1% total number of employed in the national economy) and this trend was continued, but on a much slower pace in the years 2010–2015 (when it decreased by 1.6 percentage points, i.e. by 8.9% in relation to the baseline, which was equivalent to 1.2% total employed population). Causes for such a fluctuation in the scale of changes in the period of 2005–2010 may be attributed to the adaptation to market conditions and ceased production in subsistence farms or farms with a very low sold production potential, as well as economic inactivity of some participants (e.g. due to their age). After 2004, when Polish agriculture was included in the CAP system of direct payments this process was slowed down. This was first of all because some economically weaker farms had been taken over by economically stronger entities before that time, but it was also because direct payments also served a social role, guaranteeing a small, but relatively reliable source of income to owners of agricultural land. The simultaneously operating programmes supporting modernization of farms and land concentration obviously had a positive effect on the condition of agriculture, but they may not have promoted a reduction of employment (apart from the social role they opened new prospects for smaller farms, which after modernization had a better chance for further, efficient operations). However, in order to modify the rate of changes in employment in agriculture a crucial role was played by the rate of creation of new jobs outside agriculture. In the years 2005–2009 unemployment on the national scale was decreasing rapidly (Fig. 1). In 2009 this trend was reversed, mainly as a result of the global financial crisis, which also resulted in a certain slowing of absorption of surplus workforce involved in agriculture by non-agricultural sectors.

The labour market in Poland varies greatly between individual voivodeships (Table 2). We need to focus particularly on the volume of labour resources in individual voivodeships, the structure of their use and relations with agriculture. The greatest number of individuals in all the analysed years worked in the Mazowieckie voivodeship (from 1937 thousand in 2005 to 2827 thousand in 2015), followed by the Śląskie voivodeship (from 1663 thousand in 2005 to 1768 thousand in 2010), the Małopolskie, Wielkopolskie, Łódzkie and Dolnośląskie voivodeships. The lowest numbers of people were employed in the Opolskie, Lubuskie, Podlaskie, Warmińsko-mazurskie, Świętokrzyskie and Zachodniopomorskie voivodeships. The highest share of employment in agriculture was recorded in 2005 in the Lubelskie voivodeship (38.5%), Świętokrzyskie (37.5%) and Podlaskie voivodeships (34.8%), while it was lowest in the Śląskie (5.6%), Zachodniopomorskie (10.0%) and the Dolnośląskie voivodeships (10.2%). The greatest reduction in the share of employment in agriculture in the years 2005–2015 was observed in the Śląskie voivodeship (by 60.2% in relation to the level from 2005), followed by the Lubuskie (57.1%), Małopolskie (50.9%) and the Dolnośląskie voivodeships (49.5%). The share of employment in agriculture decreased the least in the Warmińsko-mazurskie (by 13.6% in relation to the baseline), Łódzkie (19.1%), Podlaskie (20.1%), Mazowieckie (21.1%) and the Kujawsko-pomorskie voivodeships (22.1%). This process varied between voivodeships not only in terms of the total scale of changes, but also their intensity in the years 2005–2010 and 2010–2015. Despite the general adverse change in the entire economy, connected with the international financial crisis of 2009, after 2010 the rate of reduction in employment in agriculture increased in the Śląskie, Lubuskie, Podkarpackie, Lubelskie and the Wielkopolskie voivodeships. A decrease in the intensity of release of surplus workforce from agriculture was recorded in the Dolnośląskie, Zachodniopomorskie, Małopolskie, Opolskie, Świętokrzyskie and the Pomorskie voivodeships. The situation was even more difficult in the other voivodeships: in the Mazowieckie voivodeship employment in agriculture in the years 2010–2015 increased by 25.7% in relation to the level in 2010 (i.e. by 0.9 percentage

Kołodziejczak, W. (2016). Hidden unemployment in Polish agriculture in 1995–2015. J. Agribus. Rural Dev, 4(42), 545–556. DOI: 10.17306/JARD.2016.81

Table 2. Employment in the national economy and in the agriculture and its changes in 2005–2015
Tabela 2. Zatrudnienie w gospodarce narodowej i w rolnictwie oraz jego zmiany w latach 2005–2015

Specification Wyszczególnienie	2005			2010			2015			Change in the share of persons employed in the agriculture in the years Zmiana udziału zatrudnienia w rolnictwie w latach			Change in the employment in the agriculture compared with the baseline Zmiana zatrudnienia w rolnictwie względem stanu wyjściowego			Change in the employment in the agriculture compared with the total number of people employed in the national economy in the baseline Zmiana zatrudnienia w rolnictwie względem ogólnej liczby pracujących w gospodarce w stanie wyjściowym		
	Total – Ogółem	Agriculture – Rolnictwo	The share of persons employed in the agriculture Udział zatrudnienia w rolnictwie	Total – Ogółem	Agriculture – Rolnictwo	The share of persons employed in the agriculture Udział zatrudnienia w rolnictwie	Total – Ogółem	Agriculture – Rolnictwo	The share of persons employed in the agriculture Udział zatrudnienia w rolnictwie	2005–2010	2010–2015	2005–2015	2005–2010	2010–2015	2005–2015	2005–2010	2010–2015	2005–2015
	thous. persons tys. osób		%	thous. persons tys. osób		%	thous. persons tys. osób		%	p.p.			%			%		
Polska	14 359	2 674	18.6	15 681	2088	13.3	16 234	1 903	11.7	–5.3	–1.6	–6.9	–21.9	–8.9	–28.8	–4.1	–1.2	–5.4
Dolnośląskie	1 052	107	10.2	1 113	69	6.2	1 092	54	4.9	–4.0	–1.3	–5.2	–35.5	–21.7	–49.5	–3.6	–1.3	–5.0
Kujawsko-pomorskie	764	149	19.5	786	113	14.4	847	116	13.7	–5.1	–0.7	–5.8	–24.2	2.7	–22.1	–4.7	0.4	–4.3
Lubelskie	935	360	38.5	1 035	295	28.5	1 036	221	21.3	–10.0	–7.2	–17.2	–18.1	–25.1	–38.6	–7.0	–7.1	–14.9
Lubuskie	416	56	13.5	438	38	8.7	412	24	5.8	–4.8	–2.9	–7.6	–32.1	–36.8	–57.1	–4.3	–3.2	–7.7
Łódzkie	1 102	188	17.1	1 185	150	12.7	1 254	152	12.1	–4.4	–0.5	–4.9	–20.2	1.3	–19.1	–3.4	0.2	–3.3
Małopolskie	1 347	346	25.7	1 283	191	14.9	1 292	170	13.2	–10.8	–1.7	–12.5	–44.8	–11.0	–50.9	–11.5	–1.6	–13.1
Mazowieckie	1 937	299	15.4	2 426	288	11.9	2 827	362	12.8	–3.6	0.9	–2.6	–3.7	25.7	21.1	–0.6	3.1	3.3
Opolskie	353	59	16.7	365	45	12.3	403	42	10.4	–4.4	–1.9	–6.3	–23.7	–6.7	–28.8	–4.0	–0.8	–4.8
Podkarpackie	780	218	27.9	869	189	21.7	800	131	16.4	–6.2	–5.4	–11.6	–13.3	–30.7	–39.9	–3.7	–6.7	–11.2
Podlaskie	443	154	34.8	497	122	24.5	500	123	24.6	–10.2	0.1	–10.2	–20.8	0.8	–20.1	–7.2	0.2	–7.0
Pomorskie	702	91	13.0	833	67	8.0	991	66	6.7	–4.9	–1.4	–6.3	–26.4	–1.5	–27.5	–3.4	–0.1	–3.6
Śląskie	1 663	93	5.6	1 768	62	3.5	1 749	37	2.1	–2.1	–1.4	–3.5	–33.3	–40.3	–60.2	–1.9	–1.4	–3.4
Świętokrzyskie	546	205	37.5	599	137	22.9	601	131	21.8	–14.7	–1.1	–15.7	–33.2	–4.4	–36.1	–12.5	–1.0	–13.6
Warmińsko-mazurskie	484	88	18.2	553	70	12.7	588	76	12.9	–5.5	0.3	–5.3	–20.5	8.6	–13.6	–3.7	1.1	–2.5
Wielkopolskie	1 273	206	16.2	1 353	205	15.2	1 303	157	12.0	–1.0	–3.1	–4.1	–0.5	–23.4	–23.8	–0.1	–3.5	–3.8
Zachodniopomorskie	561	56	10.0	578	45	7.8	539	40	7.4	–2.2	–0.4	–2.6	–19.6	–11.1	–28.6	–2.0	–0.9	–2.9

Source: Bank Danych Lokalnych (n.d.) and own calculations.
Źródło: Bank Danych Lokalnych (b.d.) i obliczenia własne.

points in relation to the total number of employed in the economy of the voivodeship), in the Warmińsko-mazurskie voivodeship it increased by 8.6% (0.3 percentage point), in the Łódzkie voivodeship it was by 1.3% (and thanks to the increase in the total employed workforce its share decreased by 0.5 percentage point), whereas in the Podlaskie voivodeship it was by 0.8% (it increased by 0.1 percentage points). In relation to the total number of employed, employment in agriculture decreased the most in the Lubelskie voivodeship (by 14.9% in relation to the initial status in the years 2005–2015), the Świętokrzyskie (13.6%), the Małopolskie (13.1%) and the Podkarpackie (11.2%), whereas it was lowest in the Warmińsko-mazurskie (2.5%), Zachodniopomorskie (2.9%) and the Łódzkie voivodeships (3.3%); in contrast, it increased in the Mazowieckie voivodeship (by 3.3%).

Table 3 presents the distance between the level of employment in agriculture from the level of 5% total population employed in the national economy, adopted for this simulation variant. On the national scale reaching the 5% level would require a reduction of employment in agriculture in 2005 by 73.2% total number employed in that sector and 13.6% total population employed in the national economy. In 2010 these values were 62.4% and 8.3%, respectively, while in 2015 they were 57.3% and 6.7%. In absolute numbers in 2005 it was slightly over 1956 thousand people, in 2010 much less at 1304 thousand, whereas in 2015 it was 1091.3 thousand. Again a marked diversification may be observed between individual voivodeships. First of all we need to focus on the Śląskie voivodeship, in which the level of employment in agriculture is lower than the suggested 5%. An extremely different situation is found in the following voivodeships: the Lubelskie, Świętokrzyskie, Podlaskie, Podkarpackie and the Małopolskie, in which to reach the simulated level it would be necessary to release from that sector over 80% employed in 2005 and over 76.6% in 2015 (except form the Małopolskie and Podkarpackie voivodeships, where these values were 62.0% and 69.5%, respectively). The situation in all the above-mentioned voivodeships was aggravated by the fact that the release of surplus workforce from agriculture strongly affects the general situation on the labour market due to the considerable share in the total number of employed. Thus it is obvious that it is not feasible to execute a reform connected with the removal of more than ten or e.g. around 50% of the total population employed in the economy of individual voivodeships (Table 2) without their adequate management by employment outside agriculture.

Table 4 presents the initial number of unemployed economically inactive and excluded from workforce as well as workforce exclusion rate in the years 2005, 2010, 2015, and the number of excluded and exclusion rate for the 5% simulation variant. In the discussed period the situation on the labour market was systematically improving, which was first of all manifested in the decrease in the number of unemployed: from 3017 thousand in Poland in 2005, through 1576 thousand in 2010 to 1232 thousand in 2015. Within the same period the number of economically inactive decreased slightly, and as a result changes in the total number of excluded from workforce were determined by changes in the number of unemployed. On the national scale a total of 16 858 thousand people were excluded from workforce in 2005, 15 282 thousand in 2010 and 14 728 thousand in 2015. In the simulation these numbers would increase to 18 814, 16 586 and 15 819 thousand people, respectively. The initial workforce exclusion rate amounted to 54.0% in 2005, 49.4% in 2010 and 47.6% in 2015. In the case of the simulation variant these values would increase to 60.3%, 53.6% and 51.1%, respectively. In 2005 the value of the exclusion rate exceeded 50% in all the voivodeships except for the Małopolskie voivodeship, in which it was 50.0%, and in the Lubelskie (49.9%) and Podlaskie voivodeships (49.4%). The situation on the labour market was improving gradually and the workforce exclusion rate in 2010 was min. 50% only in seven voivodeships (the Zachodniopomorskie, Śląskie, Dolnośląskie, Opolskie, Kujawsko-pomorskie, Warmińsko-mazurskie and the Świętokrzyskie). In 2015 the number of such voivodeships dropped to four (the Zachodniopomorskie, Warmińsko-mazurskie, Podkarpackie and Śląskie). Assuming the 5% simulation variant, the workforce exclusion rate in 2005 would range from 57.1% in the Mazowieckie voivodeship to 68.4% in the Świętokrzyskie voivodeship. In 2010 it was be below 50% only in the Mazowieckie voivodeship (48.5%), while in the Lubelskie, Podlaskie and Świętokrzyskie voivodeships it would reach values close to 60%. In 2015 in four voivodeships, i.e. the Lubelskie, Podlaskie, Podkarpackie and the Świętokrzyskie voivodeships, it would be min. 57%, while in the Warmińsko-mazurskie slightly less, i.e. 55.4%.

Table 3. Distance to the level of "5%" simulation in 2005, 2010 and 2015 in Poland in total and by voivodeship
Tabela 3. Dystans do poziomu symulacji „5%" w latach 2005, 2010 i 2015 w Polsce ogółem i poszczególnych województwach

Specification Wyszczególnienie	Distance to the "5%" level in the year – Dystans do poziomu „5%" w roku								
	thous. persons tys. osób			as % of total number of persons employed in the agriculture in the baseline* jako % ogółu pracujących w rolnictwie w stanie wyjściowym*			as % of total number of people employed in the national economy in the baseline* jako % ogółu zatrudnionych w gospodarce narodowej w stanie wyjściowym*		
	2005	2010	2015	2005	2010	2015	2005	2010	2015
Polska	1 956.1	1 304.0	1 091.3	73.2	62.4	57.3	13.6	8.3	6.7
Dolnośląskie	54.4	13.4	–0.6	50.8	19.3	–1.1	5.2	1.2	–0.1
Kujawsko-pomorskie	110.8	73.7	73.7	74.4	65.2	63.5	14.5	9.4	8.7
Lubelskie	313.3	243.3	169.2	87.0	82.5	76.6	33.5	23.5	16.3
Lubuskie	35.2	16.1	3.4	62.9	42.4	14.2	8.5	3.7	0.8
Łódzkie	132.9	90.8	89.3	70.7	60.5	58.8	12.1	7.7	7.1
Małopolskie	278.7	126.9	105.4	80.5	66.4	62.0	20.7	9.9	8.2
Mazowieckie	202.2	166.7	220.7	67.6	57.9	61.0	10.4	6.9	7.8
Opolskie	41.4	26.8	21.9	70.1	59.4	52.0	11.7	7.3	5.4
Podkarpackie	179.0	145.6	91.0	82.1	77.0	69.5	22.9	16.7	11.4
Podlaskie	131.9	97.2	98.0	85.6	79.6	79.7	29.8	19.5	19.6
Pomorskie	55.9	25.4	16.5	61.4	37.8	24.9	8.0	3.0	1.7
Śląskie	9.8	–26.4	–50.5	10.6	–42.6	–136.4	0.6	–1.5	–2.9
Świętokrzyskie	177.7	107.1	101.0	86.7	78.1	77.1	32.5	17.9	16.8
Warmińsko-mazurskie	63.8	42.4	46.6	72.5	60.5	61.3	13.2	7.7	7.9
Wielkopolskie	142.4	137.4	91.9	69.1	67.0	58.5	11.2	10.2	7.0
Zachodniopomorskie	28.0	16.1	13.1	49.9	35.8	32.6	5.0	2.8	2.4

* Negative values mean that real employment in the agriculture was lower than 5% of total number of people employed in the national economy. Negative values higher than 100% show that the employment in the agriculture in the baseline was lower than 2.5% (a half of share assumed in the simulation).
Source: Bank Danych Lokalnych (n.d.) and own calculations.
* Wartości ujemne oznaczają, że rzeczywiste zatrudnienie w rolnictwie było niższe niż 5% ogółu zatrudnionych w gospodarce narodowej. Wartości ujemne przekraczające 100% świadczą, że zatrudnienie w rolnictwie w stanie wyjściowym było niższe niż 2,5% (połowa udziału przyjętego w symulacji).
Źródło: Bank Danych Lokalnych (b.d.) i obliczenia własne.

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Table 4. Unemployed persons and inactive population in the baseline, as well as the scale of changes in the workforce exclusion both in the baseline and in the conditions of "5%" simulation in 2005, 2010 and 2015
Tabela 4. Bezrobotni i bierni zawodowo w stanie wyjściowym oraz zmiany skali wykluczenia w stanie wyjściowym i w warunkach symulacji „5%" w latach 2005, 2010 i 2015

Specification Wyszczególnienie	Unemployed people in the baseline Bezrobotni w stanie wyjściowym			Inactive population in the baseline Bierni w stanie wyjściowym			Labour excluded population in the baseline Ogółem wykluczeni w stanie wyjściowym			Labour excluded population in the conditions of "5%" simulation Ogółem wykluczeni w warunkach symulacji 5%			Labour exclusion ratio in the baseline Stopa wykluczenia siły roboczej w stanie wyjściowym			Labour exclusion ratio in the conditions of "5%" simulation Stopa wykluczenia siły roboczej w warunkach symulacji 5%		
	2005	2010	2015	2005	2010	2015	2005	2010	2015	2005	2010	2015	2005	2010	2015	2005	2010	2015
Polska	3 017	1 576	1 232	13 841	13 706	13 496	16 858	15 282	14 728	18 814	16 586	15 819	54.0	49.4	47.6	60.3	53.6	51.1
Dolnośląskie	305	142	79	1 060	1 102	935	1 365	1 244	1 014	1 419	1 257	1 013	56.5	52.8	48.1	58.7	53.3	48.1
Kujawsko-pomorskie	189	91	70	719	739	746	908	830	816	1 019	904	890	54.3	51.4	49.0	60.9	55.9	53.5
Lubelskie	153	104	102	778	836	902	931	940	1 004	1 244	1 183	1 173	49.9	47.6	49.2	66.7	59.9	57.5
Lubuskie	98	42	25	397	372	363	495	414	388	530	430	391	54.3	48.6	48.5	58.2	50.5	48.9
Łódzkie	238	116	95	1 070	997	995	1 308	1 113	1 090	1 441	1 204	1 179	54.3	48.4	46.5	59.8	52.4	50.3
Małopolskie	228	118	88	1 120	1 139	1 126	1 348	1 257	1 214	1 627	1 384	1 319	50.0	49.5	48.4	60.4	54.5	52.6
Mazowieckie	303	170	185	1 802	1 792	1 906	2 105	1 962	2 091	2 307	2 129	2 312	52.1	44.7	42.5	57.1	48.5	47.0
Opolskie	76	34	24	364	354	357	440	388	381	481	415	403	55.4	51.5	48.7	60.6	55.1	51.4
Podkarpackie	149	102	101	743	708	751	892	810	852	1 071	956	943	53.3	48.2	51.6	64.1	56.9	57.1
Podlaskie	67	54	31	366	431	408	433	485	439	565	582	537	49.4	49.4	46.8	64.5	59.3	57.2
Pomorskie	155	86	64	738	708	756	893	794	820	949	819	836	56.0	48.8	45.3	59.5	50.4	46.2
Śląskie	394	193	140	1 892	1 801	1 632	2 286	1 994	1 772	2 296	1 968	1 722	57.9	53.0	50.3	58.1	52.3	48.9
Świętokrzyskie	116	73	55	502	527	507	618	600	562	796	707	663	53.1	50.0	48.3	68.4	59.0	57.0
Warmińsko-mazurskie	117	47	53	546	539	574	663	586	627	727	628	674	57.8	51.4	51.6	63.4	55.2	55.4
Wielkopolskie	274	130	78	1 140	1 082	1 002	1 414	1 212	1 080	1 556	1 349	1 172	52.6	47.3	45.3	57.9	52.6	49.2
Zachodniopomorskie	155	73	44	606	581	537	761	654	581	789	670	594	57.6	53.1	51.9	59.7	54.4	53.0

Source: Bank Danych Lokalnych (n.d.) and own calculations.
Źródło: Bank Danych Lokalnych (b.d.) i obliczenia własne.

CONCLUDING REMARKS

The conducted analysis provides grounds for the following remarks and conclusions:

1. The situation on the labour market on the national scale in the years 1995–2015 changed following business cycles (although not always an increase in the GDP growth rate led to a direct increase in employment and a decrease in unemployment). Despite the cyclic fluctuations and seasonal character connected with the character of agricultural production, employment in agriculture was decreasing systematically, similarly as unemployment in the entire economy. A decisive, positive effect of economic growth on these phenomena is indicated by a simultaneous increase in employment in the national economy, which not only could absorb the increasing number of economically active individuals, but also employ in non-agricultural sectors a considerable number of individuals no longer involved in agricultural production.

2. Advantageous changes in values of indexes characterizing the labour market and decreasing burden of hidden unemployment in agriculture indicate that the 5% level adopted in the simulation seems increasingly realistic within 1–2 decades. While in 2010 the time frame for such an adaptation would be several decades, results obtained for 2015 suggest such an opportunity within more or less a decade.

3. Hidden unemployment in agriculture in the investigated years varied in individual voivodeships. Baselines, changes with time and the level of employment in agriculture as well as the scale of surplus labour resources indicate the continued strong effect of structural factors. Apart from the consequences of the transformation period, the diverse development paths and transformations observed in individual voivodeships were equally important. The considerable diversification of the investigated characteristics indicates that no uniform stimulation scheme may be applied in different voivodeships to reduce hidden unemployment in agriculture.

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BEZROBOCIE UKRYTE W POLSKIM ROLNICTWIE W LATACH 1995–2015

Streszczenie. Celem artykułu jest określenie skali zmian na rynku pracy w Polsce, w sytuacji gdy liczba osób pracujących w rolnictwie byłaby zbliżona do 5% ogólnej liczby pracujących w gospodarce narodowej, a więc w przypadku wyeliminowania potencjalnych nadwyżek zatrudnienia z indywidualnych gospodarstw rolnych. Badania przeprowadzono na podstawie danych BAEL z lat 1995–2015. Uzyskane wyniki wskazują na systematyczną poprawę sytuacji na rynku pracy i zmniejszanie poziomu potencjalnego bezrobocia ukrytego w rolnictwie, głównie na skutek wzrostu gospodarczego i absorbcji siły roboczej przez sektory pozarolnicze. Uzyskane wyniki skłaniają do sformułowania przypuszczenia, że osiągnięcie poziomu zatrudnienia w rolnictwie zbliżonego do określonego w celu badania jest możliwe w ciągu kilku lub kilkunastu lat.

Słowa kluczowe: bezrobocie ukryte, zasoby pracy, pracujący w rolnictwie

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