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AGRICULTURAL PRODUCTION FACTORS STRUCTURES IN SELECTED EU-15 COUNTRIES AND POLAND. SIMILARITIES AND DIFFERENCES

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Abstract. This article, applying methods of statistical analysis of the structure and the Lorenz curve, compares the distribution of labor and land between farms of various size in Poland and the most similar in terms of agricultural production structures EU-15 countries – Germany, France and Denmark. Analysis of data from 2013 leads to the conclusion that the biggest discrepancy between countries occurs is labor factor, which excessive use is characteristic for Poland. The situation looks much better in terms of land productivity. In the case of agricultural structures, in Poland, they are in relative terms similar to the structures of the other analyzed countries. However, Polish farms are absolutely much considerably smaller. Finally, formulating recommendations for the Polish agriculture restructuration, it must first focus on the relocation of the resources of labor factor out of agriculture. Although, these type of changes will certainly not be neutral for the agrarian structure.

Keywords: production factors structures, agriculture, labor productivity, land productivity, comparative analysis

INTRODUCTION

Today, in developed countries, the development degree of the agriculture sector is reflected by the ability to meet the food requirements (ensure food security) while using as little as possible of productive inputs (labor, capital and land). That objective may be pursued by increasing the productivity of resources while complying with the requirements for environmental protection, food quality and socially acceptable levels of agricultural incomes. The foregoing coincides with the objectives of the 2014–2020 Common Agricultural Policy (CAP)[1]. However, they cannot be attained without optimizing the agricultural manufacturing processes which usually means relocating the productive inputs to areas of higher productivity. The progress of this process is reflected by changes in the agricultural manufacturing structures. Therefore, it could be expected that countries which largely differ in terms of productivity of agricultural inputs will also differ in terms of manufacturing structures. Poland, as a country which (compared to EU-15 countries) demonstrates relatively low productivity levels of land and labor inputs employed in agriculture (Poczta et al., 2009, p. 48), remains at the structural adjustments stage. The target of such adjustments is set by the practices used in highly developed EU countries. Therefore, a need emerges for comparative analyses, and this paper is one of them.

First, the manufacturing structures, a concept of importance for further considerations, needs to be defined.

[1] These objectives are defined as follows: 1) viable food production; 2) sustainable management of natural resources and climate action; 3) balanced territorial development (Komisja Europejska, 2010, p. 8).

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According to the most general definition, structures mean "a system together with mutual relationships between its constituting elements" (Dubisz, 2008, p. 1421). The definitions of structures, as proposed in the literature, were reviewed by Kukuła (2010, p. 17–20). Also, the author identifies three levels of analysis for the structures: (1) the relation of a specific component to the entire structure; (2) mutual relations between specific components; (3) dynamics of the relations. In the context of agricultural inputs, three dimensions of a structure are usually identified: 1) the agrarian dimension which means the number, size and diversity of farms; 2) the socio-professional profile, skills and employment of the rural population; 3) fixed assets employed in the agriculture sector (Czyżewski and Henisz-Matuszczak, 2006, p. 30). Production structures, which refer to production volumes of specific agricultural products, are another determinant of the structural diversification of the agriculture sector. Having in mind the above restrictions, the following definition may be adopted for the purposes of this paper: agricultural manufacturing structures mean "a system of, and mutual relations between, agricultural inputs and productive effects of their employment". This definition is the reason behind initiating a multidimensional study of the manufacturing structures. Today's trends in the economy suggest that economic growth should no longer be presented as a single-dimensional process based on quantitative data. That approach is replaced with a multidimensional analysis of development processes based on a properly targeted evolution of qualitative variables which are usually difficult, or even impossible, to quantify. In this very context, the studies on structures prove to be useful as their form and dynamics may be considered to be a validation engine for assertions regarding qualitative changes taking place in the economy (Kukuła, 2010, p. 16). Meanwhile, the role of studies on manufacturing structures becomes even more important in the context of the agricultural sector[2]. This is because specialization and adequate scale of production are necessary for the effective management in the agricultural sector (Sulewski, 2008, p. 134; Skarżyńska, 2011, p. 19; Czyżewski and Smędzik, 2010, p. 90). At the macro level, in turn, the studies on the area and production structure of farms allow for quantifying the scale and specialization features. In that context, the purpose of this paper is to present the manufacturing structures of the Polish agricultural sector compared to selected EU countries, and to identify major discrepancies and similarities, as reflected in the differences between the productivity of basic inputs. To perform the comparisons, the authors relied on statistical structural analysis and on Eurostat data.

MEASURING THE DIVERSIFICATION OF AGRICULTURAL MANUFACTURING STRUCTURES

Spatial differentiation of manufacturing structures in the EU agriculture sector is a topic addressed quite often in the scientific literature. One of the important papers focused on this issue is a monograph by Czyżewski and Henisz-Matuszczak (2006, p. 30–64), presenting the characteristics of the structures of all three productive inputs (land, labor and capital) in EU countries, as well as the production structures and their relationships. The agricultural production structure of EU countries, and the dynamics thereof, was also analyzed in detail in the 2004–2011 period by Nowak (2012), Nowak and Wójcik (2013). According to their studies, the Poland's share in the EU agricultural production volumes has increased. Also, the trends of changes to the production structure in Poland are consistent with those followed by the EU as a whole. In turn, the structure of farms is analyzed by Baer-Nawrocka (2006) who compares the economic size and production volumes of farms in Central and Eastern European EU member countries. However, land is the most frequent subject of studies. Recent papers addressing that topic include works by Majchrzak (2015, p. 68–182) who provides a comprehensive review and comparison or agricultural land resources and structures in EU countries, and analyzes their evolution in the 1990–2010 period. In her studies, Bożek (2010) grouped the EU countries into clusters by

[2] This field of study becomes increasingly useful in the context of the sustainable agriculture development paradigm. It assumes a harmonious development of three aspects of agricultural activity: the economic, social and environmental aspect (Zegar, 2012; Wilkin, 2011; Czyżewski and Staniszewski, 2015). The main problem of this theory is the quantification of the agriculture's environmental and social impact. A possible solution for that problem is to build upon the studies on the dynamics of manufacturing structures. An example could be the biodiversity which is one of the measures of environmental sustainability, and is defined through the cropping patterns diversification index (e.g. Jaskulska et al., 2012).

similarity of the agrarian structure. As a result, Poland was classified in a singleton demonstrating a high share of small farms (0–5 ha). Grouping was also performed by Matuszczak (2010) who used macro-regions as the basic unit. In this case, the classification criteria were a series of variables presenting the production structure and productive inputs together with their effectiveness. Meanwhile, Babiak (2010) analyzes the land concentration processes that have been taking place in EU-15 countries since the 1960s, and compares their current agrarian structure with that of countries who joined the EU in 2004 or subsequently. Wąs and Małażewska (2012) compare the dynamics of the agrarian structure to the economic performance of the agriculture sector in selected EU countries. On that basis, they suggest Poland should adopt a polarized agrarian structure. In the context of agricultural manufacturing structures, the impact of CAP on their development is a frequently discussed issue. Quantitative studies on this matter are based on the AgriPoliS model (Happe, 2004; Happe et al., 2006; Happe et al., 2008). This paper, one in a long line of works referred to above, compares the manufacturing structures of the Polish agriculture with those of selected EU countries. The analysis covered production structures, agrarian structures and the employment structure. Due to unavailability of adequately aggregated data, the authors had to exclude the capital input. This study uses the following variables[3] which is 2013 data originating from Eurostat resources:

- labor inputs in the agriculture: labor directly or indirectly employed in the farm, expressed in AWUs[4] per farm, grouped by agricultural land area[a] and by standard output[b5];
- land inputs in the agriculture: the area of agricultural land in ha per farm, grouped by used agricultural land area[c] and by standard output[d];
- number of farms: the number of farms, grouped by used agricultural land area[c] and by standard output[d];
- agricultural production value: the value of agricultural commodity produced (exclusive of the value of services delivered), at producer prices (exclusive of product subsidies and taxes), expressed in millions of local currency, grouped into various product categories[e];
- standard output volume: total standard output within a specific group, expressed in EUR, grouped by used agricultural land area[c] and by standard output[d];
- agricultural land use segment: area of agricultural land in ha per agricultural production segment[f];
- agricultural production volume: the total value of plant and animal production (exclusive of the value of services delivered), at producer prices (exclusive of product subsidies and taxes), expressed in EUR, weighted with purchasing power parity[e].

The success in attaining the objectives of this study will largely depend on the adequate selection of countries comparable to Poland in terms of manufacturing structures. The adopted selection criterion is the production structure represented by variables which reflect the share of specific production segments in the total production value and in the use of agricultural land. The rationale behind this approach is the belief that comparing manufacturing structures makes only sense in the case of farms with similar production profiles. The optimum form of structures varies depending on the prevalent production type in the economy concerned. Also, having in mind the important impact of virtually immeasurable natural variables (climate, landscape, soil quality) on the efficiency of manufacturing structures, an assumption was made that the diversification of agricultural production is a response to varied climate conditions. This is because it could be assumed that the farmers' agro-technical knowledge allows them to align the production type with natural conditions. Therefore, the resulting structures may somehow carry information on the quality of the agricultural production space. The following index, proposed by Kukuła (2010, p. 29), was used to measure the diversity of production structures in Poland and elsewhere in the EU:

$$v_{pl} = \frac{\sum_{i=1}^{k} |\alpha_i - \beta_i|}{2} \quad (1)$$

[3] Eurostat codes: [a]ef_olfaa, [b]ef_lflegecs, [c]ef_kvftaa, [d]ef_kvftecs, [e]aact_eaa01, [f]ef_oluft.

[4] Due to high shares of part-time labor and seasonal employment, the agricultural labor inputs are expressed in annual work units (AWUs). One AWU is equivalent to one person working full-time on the agricultural holding for one year. In Poland, one FTE (AWU) is assumed to be 2120 hours worked during a year (GUS, 2015, p. 50).

[5] Standard output (SO) means the 5-year average value of a specific plant or animal production per 1 ha or 1 animal during a year under average conditions for the region concerned (GUS, 2015, p. 46).

with:

α – vector of structures in a country comparable to Poland,

β – vector of structures in Poland.

In the case of this index, comparisons are based on the Manhattan distance[6]. The measure is normalized and falls within the interval (0,1), with 0 and 1 meaning, respectively, the maximum convergence and maximum divergence of structures. The resulting convergence indexes will be used to select three EU-15 countries that are most similar to Poland in terms of agricultural production structures. The subsequent comparisons will be made only within that group, and will include checking the convergence of the distribution of labor and land between farm groups with different areas and economic sizes. The distribution will be illustrated with the Lorenz curve[7]. To show the effectiveness of productive inputs employed, the measures of the relationship between effectiveness and resource consumption (Pajestka, 1981, p. 38) were used, defined as the ratio of the total production volume to the quantity of a specific productive input (the efficiency ratio), or as the inverse of that ratio (the intensity ratio). The interdependence index of labor and land inputs was defined as the ratio of total labor inputs to the area of agricultural land (Baer-Nawrocka and Markiewicz, 2013, p. 9).

COMPARATIVE ANALYSIS

The procedures described above resulted in calculating the convergence indexes for the production structure and agricultural land use structure in 28 EU countries (Fig. 1). The closer is a country to the origin of the coordinate system, the greater is the convergence with Polish production structures.

Based on the results shown in Figure 1, Germany, France and Denmark were selected for further comparisons. Note that while the greatest convergence exists between the German and Polish production structures, the other two are definitely less similar. Despite the relatively greatest convergence between the aforesaid countries and Poland, several areas may be identified where the countries significantly differ from each other. When analyzing the structures of agricultural land use, the dominating role of cereals in Poland (52%) and Denmark (55%) is noticeable. Meanwhile, in Germany and France, cereals have a definitely lower share (39% and 35%, respectively). Denmark itself stands out from the group due to clearly lower share of meadows and pastures (7%, compared to 22–30% in other countries). A similar comment applies to Poland with a 6% share of fodder plants (compared to 17–22% in other countries). Note also the relatively high (though small in relation to the total area of agricultural land) share of permanent fruit and vegetable crops in Poland (2.5% with a maximum of 0.66% in other countries) and of vineyards in France (2.86% with a maximum of 0.6% in other countries). When it comes to the structure of agricultural production value, there was a greater convergence between Poland and the aforesaid countries. However, some discrepancies could be identified too. For instance, Denmark has an outstanding share of animal production in the total production volume (38% compared to 24–28% in other countries). In turn, lower shares of animal production in the production structure are recorded in France (15% compared to 22–28% in other countries). Meanwhile, Poland demonstrates a clearly higher share of vegetables, horticultural products and fruits in the production structure (16% compared to 7–12% in other countries). In Germany, fodder plants were ranked relatively high in the production structure (16% compared to 4–9% in other countries). In France, the same is true for wine (14% compared to a maximum of 2.4% in other countries). Therefore, although the sample under consideration is a group of EU-15 countries similar to Poland to the greatest extent possible, significant discrepancies could be identified between them. Having selected the group of countries, and being aware of the structure of production profiles in their agricultural sectors, we can now move to the essential part of this paper which addresses the

[6] This means the sum of differences measured along the vertical or horizontal paths. While providing similar results to the normal Euclidean distance in most cases, it offers a certain advantage: the impact of single large differences (outliers) is suppressed (as they are not squared) (Stanisz, 2007, p. 116).

[7] The Lorenz curve (also referred to as the concentration curve) is plotted by connecting points whose coordinates are cumulative relative incidences of two variables. The diagonal of the coordinate system is referred to as the line of equality which represents a situation where the tested aspects are distributed evenly. The greater is the distance between the empirical distribution and the line of equality, the higher is the concentration (Mruk, 2003, p. 214–215).

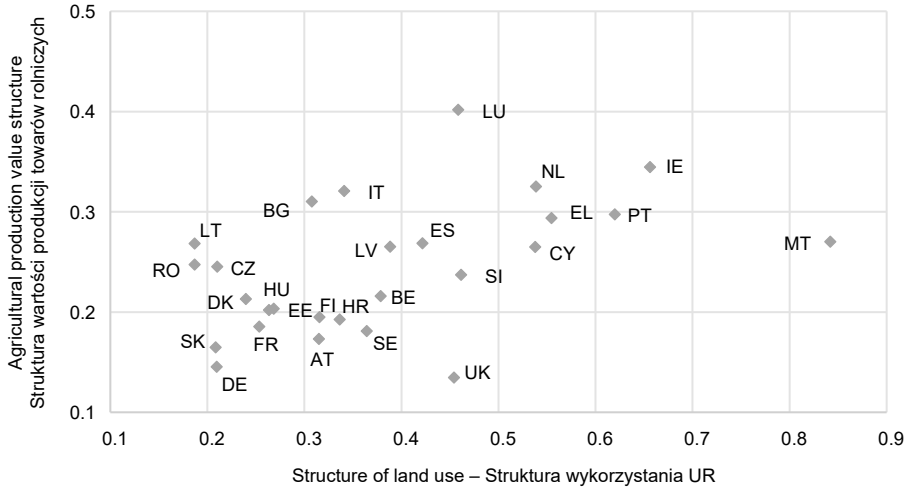

Fig. 1. Similarity of agricultural production structure and land use between Poland and the other European Union Member States in 2013. BE – Belgium, BG – Bulgaria, CZ – Czech Republic, DK – Denmark, DE – Germany, EE – Estonia, IE – Ireland, EL – Greece, ES – Spain, FR – France, HR – Croatia, IT – Italy, CY – Cyprus, LV – Latvia, LT – Lithuania, LU – Luxembourg, HU – Hungary, MT – Malta, NL – Netherlands, AU – Austria, PT – Portugal, RO – Romania, SI – Slovenia, SK – Slovakia, FI – Finland, SE – Sweden, UK – United Kingdom
Source: own elaboration based on Eurostat data.
Rys. 1. Podobieństwo struktury produkcji rolnej i wykorzystania użytków rolnych pomiędzy Polską i pozostałymi krajami Unii Europejskiej w 2013 r. BE – Belgia, BG – Bułgaria, CZ – Czechy, DK – Dania, DE – Niemcy, EE – Estonia, IE – Irlandia, EL – Grecja, ES – Hiszpania, FR – Francja, HR – Chorwacja, IT – Włochy, CY – Cypr, LV – Łotwa, LT – Litwa, LU – Luksemburg, HU – Węgry, MT – Malta, NL – Holandia, AU – Austria, PT – Portugalia, RO – Rumunia, SI – Słowenia, SK – Słowacja, FI – Finlandia, SE – Szwecja, UK – Wielka Brytania
Źródło: opracowanie własne na podstawie danych Eurostat.

diversity of manufacturing structures, as illustrated by the Lorenz curves in Figure 2.

The first noticeable difference is the definitely lower concentration of labor than land, as shown by the AWU distribution curve located much closer to the line of equality than the agricultural land distribution curve. Note however that an even distribution of labor means a relatively high share of labor employed in small farms with a low economic size. This has an adverse impact on the global productivity of the agricultural sector. When considering the above conclusion from the perspective of the first Lorenz curve (a), a structural problem of the Polish agriculture can be noticed, which is the excessive use of labor in the economically weakest farms. As shown in the graph, 10% of labor resources are absorbed by 20% of the weakest farms[8], whereas half of that share is recorded in other countries under consideration. That problem can also be interpreted from the perspective of the strongest farms. In Poland, 20% of the strongest farms absorb barely around 30% of labor, compared to 45–55% in other countries. The comparison of curves between other countries under consideration also seems interesting. While the distributions follow the same line until reaching a level of around 40% of the smallest farms, Denmark demonstrates clearly

[8] Note that all shares of the smallest and largest farms in the total labor and land resources are indicative as the underlying data used to plot the Lorenz curves is of discrete rather than continuous nature.

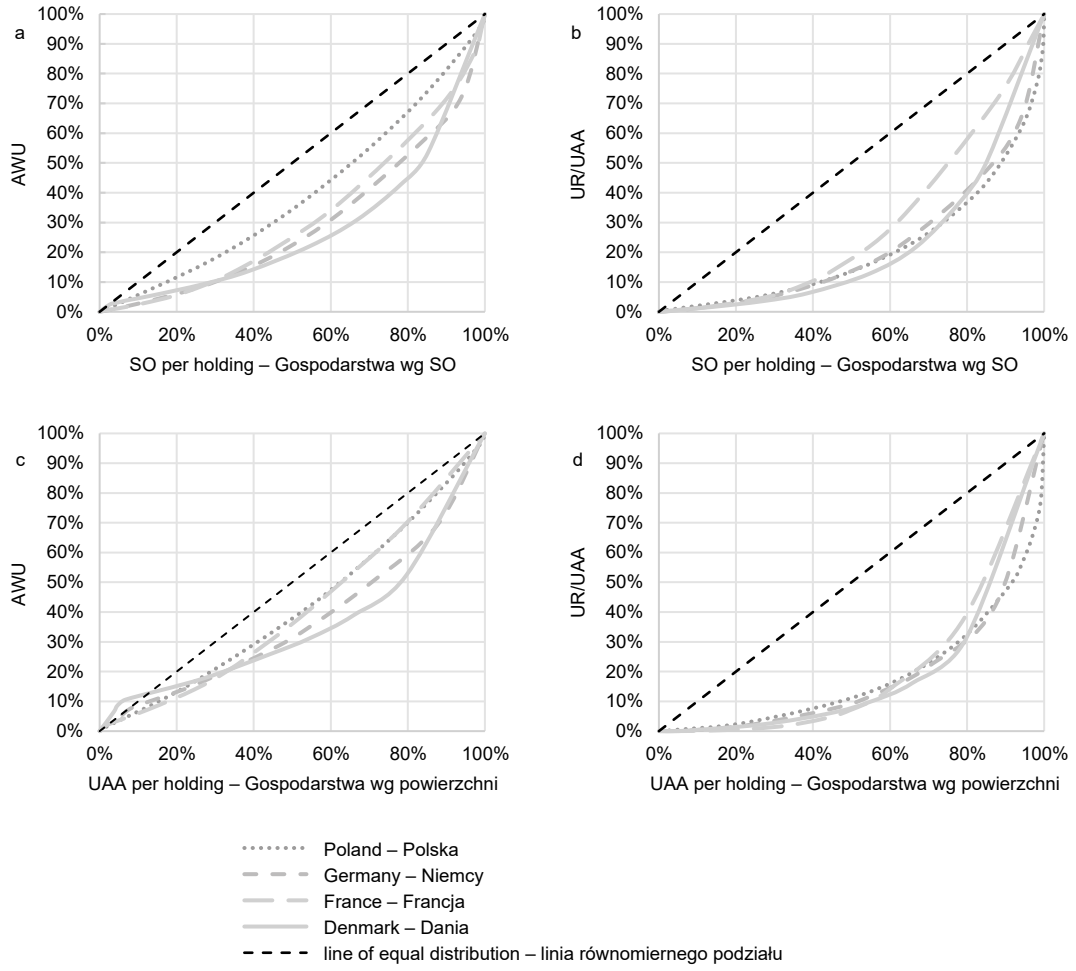

Fig. 2. Lorenz curves illustrating land and labor concentration in agriculture, in Poland, Germany, France and Denmark in 2013
Source: own elaboration based on Eurostat data.
Rys. 2. Krzywe Lorenza obrazujące stopień koncentracji czynnika pracy i ziemi w rolnictwie Polski, Niemiec, Francji i Danii w 2013 r.
Źródło: opracowanie własne na podstawie danych Eurostat.

higher concentration rates afterwards. This means the use of labor in that country is clearly dominated by the economically strongest farms. To continue this analysis, note the distribution of labor use by farm size (Fig. 2, graph c). The first difference compared to the previous curve, as discussed above, is the greater convergence of distributions between Poland and other countries, specifically France. This can be partially explained by the phenomenon observed in graph b: in Poland, Germany and Denmark, land is distributed more or less evenly while the French curve clearly stands out, especially within the 60% of the economically strongest farms with a more even distribution of land use. This means that medium farms, rather than the economically strongest ones, have the largest share in agricultural land area. Note also the specific shape of the Danish Lorentz curve in graph c: at the beginning, it climbs beyond the line of equality. This means around 10% of labor resources are employed by approximately 5% of smallest-sized farms. However, Graph d, illustrating the distribution of land among farms with various sizes, seems to be the most interesting one. The Polish agrarian structure proves to

Table 1. Land and labor factor in agriculture, in Poland, Germany, France and Denmark in 2013, in different size holdings
Tabela 1. Zasoby pracy i ziemi w rolnictwie Polski, Niemiec, Francji i Danii w 2013 r., w gospodarstwach o różnej wielkości

SO (thous. EUR – tys. euro)	0	< 2	2–4	4–8	8–15	15–25	25–50	50–100	100–250	250–500	> 500
% share in total labor input (AWU) udział % w całkowitych zasobach pracy (AWU)											
Poland – Polska	1.07	15.73	15.74	**18.34**	15.14	10.78	11.67	6.07	2.67	0.98	1.82
Germany – Niemcy	0.09	0.06	0.53	2.25	4.02	4.56	8.37	13.18	23.20	15.94	**27.82**
France – Francja	0.14	1.44	1.39	2.33	3.38	3.78	8.90	15.37	**30.26**	19.01	14.02
Denmark – Dania	2.42	0.71	0.76	1.56	3.85	4.43	8.33	8.78	11.87	10.72	**46.57**
% share in total land input (ha) udział % w całkowitych zasobach ziemi (ha)											
Poland – Polska	0.59	5.06	6.95	10.87	12.28	10.92	**16.41**	14.00	9.72	4.73	8.45
Germany – Niemcy	0.04	0.05	0.22	1.00	2.15	2.78	5.69	9.97	22.82	20.18	**35.10**
France – Francja	0.03	0.70	0.76	1.33	1.80	2.31	7.30	16.70	**39.13**	22.38	7.56
Denmark – Dania	0.21	0.35	0.35	0.68	1.98	2.74	6.45	9.02	15.09	13.91	**49.22**

UR/UAA (ha)	0	< 2	2–5	5–10	10–20	20–30	30–50	50–100	> 100
% share in total labor input (AWU) udział % w całkowitych zasobach pracy (AWU)									
Poland – Polska	0.72	14.91	26.27	**23.26**	19.02	6.27	4.42	2.35	2.77
Germany – Niemcy	0.08	0.10	0.50	2.25	4.81	6.22	12.72	22.30	**51.02**
France – Francja	2.01	5.32	6.68	6.34	8.67	6.51	10.87	23.07	**30.53**
Denmark – Dania	6.56	1.90	2.14	7.00	8.34	5.29	7.62	13.65	**47.49**
% share in total land input (ha) udział % w całkowitych zasobach ziemi (ha)									
Poland – Polska	x	3.04	10.01	15.13	20.00	10.38	10.64	9.67	**21.12**
Germany – Niemcy	x	0.07	0.20	1.95	5.31	4.30	9.94	21.26	**56.97**
France – Francja	x	0.17	0.67	1.06	2.30	2.80	6.77	24.34	**61.90**
Denmark – Dania	x	0.01	0.12	2.13	3.76	3.73	6.44	14.79	**69.02**

Legend: **mode – bold**, median – highlighted.
Source: own elaboration based on Eurostat data.
Legenda: **modalna – pogrubiona czcionka**, mediana – zakreślenie.
Źródło: opracowanie własne na podstawie danych Eurostat.

be the most polarized one because a relatively large part of land is owned by the smallest and by the largest farms whereas medium farms hold a relatively small part of land. To confirm these and earlier findings, see Table 1 data which illustrates the share of specific farm groups in labor and land inputs. Positional measures (mode and median) were used to characterize the structures of specific countries as they allow for identifying the group of "average" farms in the structure concerned.

The comparison shown in Table 1 illustrates the differences between the countries which could not be captured if the analysis was based solely on Lorenz curves.

Table 2. Labor and land productivity in agriculture, in Poland, Germany, France and Denmark in 2013
Tabela 2. Produktywność pracy i kapitału w rolnictwie Polski, Niemiec, Francji i Danii w 2013 r.

Indicator – Wskaźnik	Poland – Polska	Germany – Niemcy	France – Francja	Denmark – Dania
Labor productivity (EUR/AWU) Wydajność pracy (euro/AWU)	20 710	101 727	82 888	134 398
Labor intensity (AWU/mln EUR) Pracochłonność (AWU/mln euro)	48	10	12	7
Land productivity (EUR/ha) Produktywność ziemi (euro/ha)	2 761	3 253	2 267	3 026
Land intensity (ha/mln EUR) Ziemiochłonność (ha/mln euro)	362	307	441	330
Labor input to land input Stosunek nakładów pracy do powierzchni UR (AWU/100 ha)	13,33	3,20	2,73	2,25

Source: own elaboration based on Eurostat data.
Źródło: opracowanie własne na podstawie danych Eurostat.

This is because the curves depict a relative distribution while Table 1 provides absolute data. Accordingly, "small," "average," and "large" farms have completely different structural features in each of the countries. Also, in Poland, farms in all of these categories are clearly smaller in size and economically weaker. Furthermore, Table 1 data supports the findings made based on the analysis of Lorenz curves regarding the relatively large share of the Danish smallest farms (with no agricultural land) and weakest farms (with no marketable standard output) in the use of labor resources. This may be related to leisure agriculture which becomes increasingly popular in Western European countries. France demonstrates higher concentration of land and labor in farms with medium levels of standard output (EUR 100,000–500,000). Thus, the structure of land and labor use is what makes this country stand apart from other Western European countries under consideration. Finally, the polarization of agrarian structures in Poland also becomes noticeable. However, the economic adequacy of agricultural production structures must be ultimately verified with the resource efficiency indicators, as presented in Table 2.

Therefore, it may be confirmed that the lower concentration of productive inputs in the Polish agriculture has an adverse effect on productivity levels. Moreover, the case of Denmark, where the highest concentration rates are recorded, shows the favorable impact of such a high concentration on the local agricultural production performance. Also significant is the fact that the countries differ one from another as regards specific productive inputs. While the differences are not so significant in the case of land productivity, Poland clearly lags behind Western European countries as regards labor productivity. In turn, land productivity turns out to be even higher than in France. However, the most striking illustration of problems experienced by the Polish agriculture is the ratio of labor resources per 100 ha which is four or even five times higher than in other countries under consideration.

SUMMARY

Based on this study, several final conclusions may be drawn. Although the countries selected for comparison to Poland (Germany, France and Denmark) demonstrate quite similar production structures, there are still some significant discrepancies in that field. They become even larger if the study moves from production structures to agricultural manufacturing structures. For each of the countries under consideration, specific features may be identified that make it stand apart from other ones: in Denmark, the smallest and weakest farms have a large share in labor use which, however, does not significantly affect labor productivity; meanwhile, in France, farms of medium economic size achieve higher

rates of land and labor concentration than large farms; Poland, in turn, experiences an outstanding polarization of the agrarian structure. When comparing the agrarian structure of the selected EU-15 countries and Poland in relative terms (Lorenz curves) and absolute terms (share of specific size groups in total labor and land resources), the relative gap proves to be significantly narrower than the absolute gap. This means that in the relative sense, the Polish agrarian structure emulates those of western countries with a similar production structure, albeit on an adequately reduced scale. The surprising aspects are the minor discrepancies between the countries as regards land productivity, and especially the fact that Poland recorded a higher land productivity ratio than France. However, Poland lags far behind when it comes to labor productivity. This could be related to an excessively extensive use of labor, as demonstrated by the large number of FTEs per 100 ha of agricultural land. When formulating the recommendations for the Polish agriculture restructuring policy, it should be concluded that in the current situation, changes to the distribution of labor are more important than changes to the distribution of land. However, having in mind that many of the smallest holdings in Poland are family-run subsistence farms, it should be noted that changes to labor distribution cannot take place without changes to the agrarian structure.

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ROLNICZE STRUKTURY WYTWÓRCZE WYBRANYCH KRAJÓW UE-15 I POLSKI. PODOBIEŃSTWA I RÓŻNICE

Streszczenie. Stosując metody statystycznej analizy struktury oraz krzywą Lorenza, w pracy porównano rozkład czynnika pracy i ziemi w gospodarstwach o różnym rozmiarze w Polsce i najbardziej podobnych pod względem struktur produkcji rolnej krajach UE-15 – Niemczech, Francji i Danii. Analiza, przeprowadzona na danych pochodzących z 2013 roku, prowadzi do wniosków, że największa rozbieżność pomiędzy państwami dotyczy czynnika pracy, którego nadmiernym wykorzystaniem cechuje się głównie Polska. Dużo lepiej wypada ona na tle pozostałych badanych krajów w zakresie produktywności ziemi. Struktury agrarne w Polsce są – w ujęciu względnym – podobne do struktur porównywanych państw. Bezwzględnie jednak gospodarstwa polskie są wyraźnie mniejsze. Ostatecznie, formułując zalecenia dla restrukturyzacji polskiego rolnictwa, należy w pierwszej kolejności skupić się na relokacji zasobów czynnika pracy poza sektor rolny, choć z pewnością tego typu zmiany nie będą neutralne dla struktury agrarnej.

Słowa kluczowe: struktury wytwórcze, rolnictwo, wydajność pracy, produktywność ziemi, analiza porównawcza

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