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DETERMINANTS OF FARM INCOME DIVERSIFICATION AMONG THE EUROPEAN UNION COUNTRIES

ALDONA SKARŻYŃSKA
RENATA GROCHOWSKA

Abstract

The aim of the article is to indicate the main factors influencing the diversification of farm income in the European Union countries. The analysis involved the production potential, production costs, and the impact of subsidies on income under the Common Agricultural Policy. The research covered farms keeping agricultural accounting in the EU-28 countries. The analysis used data for 2015-2017 and 2018, collected and processed under the FADN EU system.

The analyses show that farms in the EU differed significantly in terms of the agricultural land area, the value of assets, technical equipment of work, and production intensity. It was estimated that the intensity was related to the production direction and land productivity. The income situation of farms was also significantly influenced by production efficiency. On average, from 2015-2017, the cost of EUR 1 production ranged between EUR 0.64 and 1.32, and in 2018 it was between EUR 0.64 and 1.28. As a consequence, in many countries farm income depended solely on subsidies to operating activities.

The research shows that subsidies eliminate the differences between countries at the level of income from production (without subsidies), which suggests a further need to continue to equalize the level of subsidies among the EU countries.

Keywords: farm income, production costs, efficiency, subsidies.

JEL codes: D33, Q12, Q14.

Aldona Skarżyńska, PhD, DSc, Assoc. Prof. of IAFE-NRI, Institute of Agricultural and Food Economics – National Research Institute, Department of Economics of Agricultural and Horticultural Holdings; ul. Świętokrzyska 20, 00-002 Warsaw, Poland (aldona.skarzynska@ierigz.waw.pl). ORCID iD: 0000-0003-0912-0837.
Renata Grochowska, PhD, DSc, Assoc. Prof. of IAFE-NRI, Institute of Agricultural and Food Economics – National Research Institute, Department of Agribusiness and Bioeconomy; ul. Świętokrzyska 20, 00-002 Warsaw, Poland (renata.grochowska @ierigz.waw.pl). ORCID iD: 0000-0002-0102-953X.

Introduction

The issue of farm income diversification is very important for both economic and social reasons. The income generated by farmers is not only a measure of the economic efficiency of management, but also the means of living for farmers and their families (Nowak, Kijek, and Krukowski, 2019). The changing conditions for the operation of farms require farmers to make frequent changes in both the organization and the intensity of agricultural production. Therefore, the pursuit of agricultural activities places high demands on agricultural producers who bear full responsibility and risk for their produce.

Of great importance for the evolution of income are endogenous conditions, which contribute to improved production efficiency and are dependent on the producer (Rembisz, 2006). Gołębiewska (2008) is of the same opinion, claiming that under certain geographical conditions, it is internal forces which largely determine market success. This attests to the important role of the enterprise's internal potential, including in particular production resources directly determining the amount of generated income (Poczta, Średzińska, and Standar, 2008). However, the production results, and consequently, the economic and financial situation of farms are also influenced by exogenous (external) factors which remain beyond the control of the farm manager (Soliwoda, Kulawik, and Góral, 2016). They include, inter alia: legal and institutional regulations (e.g., in the field of environmental protection), state policy on agriculture and other economic sectors, and the market along with the prices formed therein. This does not apply only to changes in production on a local scale. Owing to the process of globalization, the situation in world agriculture is becoming increasingly important, mainly for the leading exporters and importers of agricultural products (Hill and Bradley, 2015). Some authors (Majewski, Wąs, Guba, and Dalton, 2007; Runowski, 2010) point to the increasing impact of the common agricultural policy (CAP) among the factors resulting in the diversification of farm income. Agriculture is also highly dependent on climate change and other natural factors which may result in fluctuations in the agricultural production volume, and thus also in income (Hergrens, Hill, and Linem, 2001; Phimister, Roberts, and Gilbert, 2004).

Income should be considered as a measure which determines the development opportunities of the farm, but, at the same time, it also allows for the achievement of other objectives (e.g., social transformation in the countryside). According to the European Commission's forecasts, nominal agricultural income will continue to increase, but at a slower rate than in the last decade, i.e., from 19% between 2010 and 2020 to 11% between 2020 and 2030. Similarly, nominal income per employee is expected to increase by 2.1% a year (European Commission, 2020).

The buffer mitigating the diversification of agricultural income among the farms are the mechanisms of the CAP, of which one of the objectives is to ensure an adequate standard of living for the agricultural population by increasing the individual income of agricultural workers. However, significant differences in the amount of EU support can be observed among the EU Member States. This stems from

the allocation of a different pool of subsidies based on historical data regarding the individual agricultural production in the EU-15 and the results of the accession negotiations for the EU-13. In 2017, the average support per ha of area declared by farmers amounted to EUR 257, including payments for cotton and national top-ups, with the average subsidies ranging from EUR 132/ha in Lithuania to EUR 645/ha in Malta. Just like in Lithuania, a low level of payments per ha of area is received by the farms in the other Baltic states and Romania, while the highest, apart from Malta, are received by Dutch and Greek farms (European Commission, 2019).

From 2013-2020, an attempt was made to reduce the differences in support per ha of area among the EU countries by bringing them closer to the EU average (the so-called external convergence). In the next reform of the CAP 2021-2027, it was proposed to further equalize the level of subsidies among the countries by reducing 50% of the gap between the level of support per 1 ha and 90% of the EU average. All Member States participate in this mechanism, which results in a decrease in subsidies in the countries above the EU average. For example, the change in the rules for the distribution of subsidies resulted in their reduction for Dutch farmers according to the LEI estimates (2013) from 440 to 389 EUR/ha.

The legitimacy of applying external convergence in the EU is a highly controversial issue. According to Hamulczuk and Rembisz (2009), the belief that there is a need to equalize the level of subsidies is wrong. The analysis they carried out indicates that this issue should be considered in terms of the allocation and distribution, which means that the level of subsidies cannot be separated from the efficiency of the labor factor. Severini and Tantari (2015) consider this issue in a different way. According to them, subsidies based on historical data on production do not reflect the fact that important environmental public goods are often delivered by farms with lower yields. These farms are also more economically sensitive and, therefore, need more support.

Materials and methods

The aim of the research was to identify the major factors determining farm income diversification in the European Union countries. The analysis concerned mainly the diversification of the production potential of the farms, production costs, and the extent to which subsidies influence farm income under the EU Common Agricultural Policy.

The subject of the research were farms keeping agricultural accounts in the EU-28 countries. For the analysis, data for 2015-2017 and 2018 collected and processed under the FADN EU system (Farm Accountancy…, 2020) were used. The objective was to show the changes in the results of the farms, observed in 2018 when compared to the three-year period of 2015-2017. 2018 was the last year for which the data were available at the moment of commencing the research work. The results were presented in the tabular format, on average, from 2015-2017 and in 2018. The study used the horizontal and vertical analysis, comparing the parameters characteristics of the farms during the research periods adopted and in the individual countries.

The analysis covered the productive potential of the farms, i.e., the utilized agricultural area (UAA), the labor input expressed by the number of full-time employees (AWU[1]), and the total assets[2]. In order to determine the relationships between the factors of production, the following aspects were evaluated:

- technical equipment of work– fixed assets without land per 1 AWU,
- technical equipment of land – fixed assets without land per 1 ha of UAA,
- land/labor ratio – the area of UAA per 1 AWU.

The basic measure for evaluating the economic results was farm income, but the research also covered revenues (production value) and the costs of production[3]. Using the selected statistical measures, i.e., minimum, maximum, median, and positional coefficient of variation, the level of diversification of selected variables describing the productive potential of farms in the EU countries was analyzed. The evaluation also covered the variability of farm income with and without subsidies among the farms in the EU-28, EU-15, and EU-13 countries.

An analysis of the land profitability was conducted (the measure was farm income with subsidies per ha of UAA) and the potential amount of payment for labor of the farmer and their family members; for this purpose, farm income with subsidies per one full-time employed member of the farmer's family (FWU[4]) was calculated. The production efficiency was evaluated with the use of an indicator which shows the total costs incurred to produce EUR 1 of production (i.e., relative cost index taken as a ratio). The dependence of the farms on the support of subsidies for their operating activities was also examined by determining the impact of the CAP on their economic effects.

[1] Total labor input (AWU) – the total labor input as part of the farm's operating activities expressed in work units, i.e., in full-time employees (in Poland, this is 2,120 hours a year) (Floriańczyk, Osuch, and Płonka, 2019).

[2] Farm assets (means of production) are divided into fixed and current assets. Fixed assets include: agricultural land, permanent crops and production quotas, farm buildings and their permanent equipment, machinery, equipment, and means of transport, as well as female animals of livestock. Current assets include: the value of all production animals (excluding animals of the breeding herd), stocks of agricultural products, value of standing crops, farm's shares in agricultural entities, short-term receivables, and cash in hand and in the bank account in an amount necessary for the daily operation of the farm (Floriańczyk et al., 2019).

[3] According to the methodology of the Polish FADN system, the total costs include: direct costs (of crop, livestock, and other production) and indirect costs. Among the latter are: overhead costs (e.g., the cost of ongoing maintenance of buildings and machinery, energy, services, motor insurance, and others), depreciation of fixed assets, and the cost of external factors (salaries of hired workers, rents for additionally leased land and buildings, and interest on liabilities). Taxes related to the functioning of farms are not included in the total costs, but are taken into account in calculating the balances of subsidies and taxes related to operating and investment activities (Floriańczyk et al., 2019).

[4] Family labor input (FWU) – the labor input as part of the farm's operating activities expressed in family work units, i.e., in full-time employed family members (in Poland, this is 2,120 hours a year) (Floriańczyk et al., 2019).

Diversification of the production potential of farms in the EU countries

Each economic activity involves specific resources. According to the definition (Woś (ed.), 1996), resources deliberately incorporated into the production process and actively involved in it are called production factors. This term covers labor (human resources), land, and capital. The production capacity of agriculture depends on the number and interrelations among the resources of production factors (Poczta, 2003), but is also shaped by external conditions.

The results of the research show that the utilized agricultural area (UAA) of the farms in the EU countries was very diversified, the coefficient of variation, on average, from 2015-2017 was 69.6% and in 2018 it accounted for 69.0% (Table 1). In more than half of the EU countries, the utilized agricultural area was less than 50 ha, while in several countries it was more than 100 ha (Denmark, Sweden, the United Kingdom, the Czech Republic, Estonia, and Slovakia). On average, from 2015-2017 and in 2018, the largest land resources were characteristic of the farms in Slovakia while the smallest ones were typical of the farms in Malta. The total labor input was characterized by the significantly lower variation, the coefficient was 18.8 and 20.6%, respectively. In both research periods, the largest labor input per farm was observed in Slovakia and the smallest in Greece. On the other hand, the variation of the farm asset value was very strong, the coefficient of variation, on average, =from 2015-2017 amounted to 99.1% and in 2018 accounted for 97.0%. This means that the dispersion of this characteristic was very large. The total asset value on the farms in the EU countries in the first research period ranged from EUR 36.9 to 2,544.1 thousand (in Romania and Denmark, respectively) and in the second period from EUR 55.4 to 3,123.0 thousand (in Romania and the Netherlands, respectively).

Table 1

Basic statistics of the selected variables describing the production potential of farms in the EU countries

Specification	Area of UAA, ha/farm		Total labor input, AWU/ farm		Total assets, EUR/ farm		Land/labor ratio, UAA/ AWU		Technical equipment of land, EUR/ha of UAA		Technical equipment of work, EUR/ AWU	
	2015--2017	2018	2015--2017	2018	2015--2017	2018	2015--2017	2018	2015--2017	2018	2015--2017	2018
Minimum	2.75	2.61	1.06	1.02	36,934	55,379	2.03	2.06	869	872	16,598	20,406
Median	48.22	49.12	1.64	1.62	394,431	410,216	29.29	29.38	2,662	2,585	63,912	68,728
Maximum	518.20	445.04	12.28	10.59	2,544,109	3,123,033	71.52	77.35	38,377	34,974	299,256	291,347
Coefficient of variation, %	69.6	69.0	18.8	20.6	99.1	97.0	50.8	51.1	53.8	66.0	72.1	67.0

Source: own study based on FADN EU (Farm Accountancy..., 2020).

Many authors (Wasilewski and Mądra, 2006; Baer-Nawrocka and Mrówczyńska-Kamińska, 2007) point to the importance of land as a production factor; therefore, the analysis used two indicators describing the level of equipping farms with land resources. The first one shows UAA per one full-time employee (AWU). In both research periods, the best equipped with this factor of production were farmers from the United Kingdom, Sweden, Denmark, and Estonia (more than 56 ha of UAA per one AWU), while the least – farmers from Malta, Cyprus, Slovenia, and Greece (up to 10 ha of UAA per one AWU). The variation of this feature was high, the coefficient of variation was around 51%. The higher variation is characteristic of technical equipment of land, which describes the value of fixed assets without land per 1 ha of UAA. The variation of this feature in 2018 was, on average, higher than from 2015-2017, with the coefficient of variation standing at 66.0 and 53.8%, respectively. The results of the analyses point to large differences among the countries as regards the saturation of land with capital. The largest share of capital per 1 ha of agricultural area was in the case of Maltese farms (on average, from 2015-2017 – EUR 38.4 thousand and in 2018 – EUR 35.0 thousand, while the smallest was in Bulgaria (in both research periods, approximately EUR 0.9 thousand).

Technical equipment of work, which refers to the value of fixed assets without land per one full-time employee (AWU), was characterized by the highest variation (in the analyzed periods, the coefficient of variation was 72.1 and 67.0 %, respectively). This value, on average from 2015-2017, ranged from EUR 16.6 thousand (in Bulgaria) to EUR 299.3 thousand (in Denmark) and in 2018 – from EUR 20.4 thousand (in Bulgaria) to EUR 291.3 thousand (in Luxembourg). The countries with the lowest labor/capital ratio were the Central and Eastern European countries (with the exception of Estonia in 2018), which joined the EU in 2004 and in the subsequent years. On the other hand, the situation of the farms in Sweden, Denmark, and Luxembourg was the most favorable in this regard; in these countries – in both research periods – the value of fixed assets (without land) held on average by one full-time employee was more than EUR 200 thousand. In Poland, on average, from 2015-2017, this was EUR 39.4 thousand and in 2018, it was EUR 42.9 thousand; thus, technical equipment of work increased by 8.9% in 2018. This direction of change was observed in almost all EU-13 countries, except Malta, where a decrease of 7.7% was observed. However, among the EU-15 countries, a decrease in the value of fixed assets (without land) per 1 AWU was observed in five countries (Denmark, Greece, Luxembourg, Spain, and Sweden).

Among the EU countries, there is also a high diversification

in terms of the economic size of the farms. In both research periods, the farms in the EU-15 countries were characterized by the much higher economic strength than those in the EU-13 countries. Among the EU-15 countries, in eight (Belgium, Denmark, France, Germany, Luxembourg, Netherlands, Sweden, and the United Kingdom) the economic size of the farms exceeded EUR 100 thousand (ranging from EUR 160.7 thousand in Sweden to EUR 430.6 thousand in the Netherlands), while among the EU-13 countries this situation occurred only on the farms of two

countries (in the Czech Republic, it was EUR 252.0 thousand and in Slovakia it accounted for EUR 478.7 thousand). In 2018, the economic strength of the farms in most countries increased, with a decrease observed only by the Greek, Slovak, and Maltese farms.

Diversification of production costs in the EU countries

In the production process, the level of costs is an important decision-making element, and their level depends mainly on the farmer. The choice made by the farmer consists in using the production factors at their disposal in such a way that the production generates the greatest benefit for them.

By comparing the total costs with the value of production produced using these costs, we can obtain information that is useful in managing the production process. The results of the analyses show that the total costs of producing EUR 1 of production on the farms in the EU countries were highly differentiated. On average, from 2015-2017 and in 2018, the highest costs were incurred by farmers in Finland: EUR 1.32 and EUR 1.28, respectively. The limit of profitability in both research periods was also exceeded by the costs incurred by farmers in Denmark, Luxembourg, Sweden, Bulgaria, the Czech Republic, Estonia, Latvia, and Slovakia. It should be noted that the farms in the majority of these countries (Denmark, Luxembourg, Sweden, the Czech Republic, Slovakia) are entities which are very strong in economic terms; their economic size was over EUR 100 thousand (Table 2).

The lowest costs of producing EUR 1 of production were observed on the Italian farms, in both research periods they amounted to EUR 0.64. Relatively low costs, approximately EUR 0.72-0.80, were incurred by farmers in Spain, Portugal, Romania, and Malta. The farms in these five countries were much weaker in economic terms (the economic size was between EUR 9.6 and 93.0 thousand), but are characterized by a fairly high economic efficiency of management. As regards the farms in other countries, they were competitive in terms of the costs incurred.

It is estimated that the cost of depreciation of fixed assets held and the cost of involving foreign production factors in the production (these costs include remuneration for wage labor, rents, and interest on loans) had a significant impact on the diversification of the cost intensity of production. The share of these two cost aggregates in the total costs of the farm in some countries was quite high. The analysis of the share of the cost of depreciation shows that this indicator was the highest on the farms operating in Austria, Luxembourg, Slovenia, and Lithuania – it exceeded 20%. This can attest to excessively developed production facilities (buildings, machinery). The high rate of land saturation with capital is not always favorable; it may indicate overinvestment which leads to worse management effectiveness.

Table 2

Production costs on the farms in the EU countries

Country	Total costs, EUR/ha of UAA		Cost of depreciation in the total costs, %		Costs of external factors in the total costs, %		Total costs of EUR 1 production	
	2015-2017	2018	2015-2017	2018	2015-2017	2018	2015-2017	2018
UE-15								
Austria	2,562	2,638	24.0	24.4	8.6	9.1	0.91	0.88
Belgium	4,354	4,588	14.3	13.1	13.0	12.4	0.87	0.83
Denmark	4,183	4,152	10.6	10.2	23.4	23.8	1.02	1.07
Finland	2,309	2,244	18.3	17.8	11.9	12.1	1.32	1.28
France	2,183	2,176	17.0	16.3	17.2	16.5	0.98	0.94
Germany	2,735	2,885	13.2	12.6	19.8	19.6	0.98	0.99
Greece	1,779	1,842	20.0	18.0	15.0	16.0	0.78	0.83
Ireland	1,239	1,450	9.8	8.9	9.1	9.0	0.86	0.92
Italy	2,168	2,284	11.9	12.5	18.3	18.7	0.64	0.64
Luxembourg	2,629	2,862	26.9	24.9	12.0	11.4	1.11	1.07
Netherlands	12,146	12,530	11.9	11.2	19.0	19.6	0.88	0.88
Portugal	1,057	1,264	14.3	13.4	15.6	18.2	0.77	0.73
Spain	1,197	1,284	9.0	8.3	20.4	21.9	0.73	0.72
Sweden	2,224	2,001	12.8	15.0	16.1	16.8	1.08	1.17
the United Kingdom	1,646	1,676	12.3	11.7	16.7	16.7	1.01	0.99
UE-13								
Bulgaria	1,056	1,090	13.4	12.6	31.0	32.3	1.05	1.01
Croatia	1,333	1,448	19.6	17.8	12.2	14.2	0.91	0.87
Cyprus	3,069	3,262	9.8	8.5	15.8	13.6	0.88	0.85
Czech Republic	1,769	1,943	11.0	10.7	23.0	24.3	1.16	1.19
Estonia	1,033	1,053	13.4	13.2	17.8	18.1	1.15	1.20
Hungary	1,503	1,571	9.0	9.4	18.5	18.4	0.94	0.92
Latvia	953	1,098	15.6	15.9	14.4	15.9	1.05	1.14
Lithuania	778	830	22.7	23.5	11.7	13.2	1.00	1.11
Malta	12,517	11,529	8.3	8.8	7.7	7.9	0.80	0.79
Poland	1,318	1,328	20.0	19.4	8.8	9.1	0.89	0.89
Romania	938	913	15.9	11.4	12.5	15.1	0.74	0.75
Slovakia	1,436	1,522	12.8	13.3	25.6	27.0	1.19	1.12
Slovenia	2,608	2,684	30.3	30.1	3.6	3.7	1.06	0.97

Source: own study based on FADN EU (Farm Accountancy…, 2020).

On the other hand, the large share of the cost of foreign production factors in the total costs (more than 20%) was observed on the Danish, Spanish, Bulgarian, Czech, and Slovak farms. However, in each of these countries the impact of the components of this cost was different. The Danish farms are characterized by a very high level of debt which entailed the high cost of interest. On average, from 2015-2017 the ratio which determines the level of debt (total liabilities/total assets)

amounted to 58.8% and in 2018 it accounted for 59.5%. Therefore, it exceeded the limit value, i.e. 50% (Goraj and Kulawik, 1995, Zieliński, 2009). It is estimated that the high level of debt may lead to many negative effects, inter alia, the loss of financial liquidity of the farms. These farms also made significant use of wage labor, its share in the total labor input was 53.0 and 57.4%, respectively in the research periods. This means that the involvement of external labor force (expressed in AWU) was higher than of family labor force (i.e., the farmer and their family members). In turn, on the Spanish farms the utilized agricultural area was dominated by leased land, on average, its share from 2015-2017 was 60.0% and in 2018 it accounted for 58.7%. Similarly, on the farms in Bulgaria, the Czech Republic, and Slovakia, the vast majority of land in use was leased land (more than 70%). When increasing the production scale, producers often lease land. Compensation for lending and using land is lease rent. Farmers in these countries were also quite willing to use loans (the level of debt was between 23.2 and 40.1%) and wage labor (its share in the total labor input, in the case of the Bulgarian and Czech farms, ranged from 51.4% to 76.2%, and in the case of the Slovak farms it was from 92.6% to 94.1%).

The total costs per 1 ha of UAA determine the production intensity. On the farms in the EU-15 countries, the Dutch farms demonstrated the highest production intensity, while the Portuguese farms demonstrated the lowest. On average, from 2015--2017, the diversification was 11.5-fold and in 2018 it was 9.9-fold. On the other hand, among the EU-13 countries, the highest production intensity was that of the Maltese farms, while the lowest was that of the Lithuanian farms. Its diversification in the research periods was 16.1- and 13.9-fold, respectively. It is estimated that the size and diversification of intensity is related to the type of production conducted and corresponds to the land productivity (Table 2).

Farm income and the impact of subsidies on its amount in the EU countries

Farm income is an economic result of decisions made by the farmer and thus a measurable effect of the activities pursued. Its amount determines the level of satisfaction of the farmer's family's consumption needs and the development opportunities of the farm.

In the EU countries, farm income with subsidies was characterized by a great spread. On average, from2015-2017 it ranged from EUR 4,894 in Romania to EUR 75,033 in the Netherlands while in 2018 it ranged from EUR 5,162 in Denmark to EUR 82,296 in the Netherlands. The median of this characteristic in the first research period amounted to EUR 20.9 thousand; its level was not higher than income generated by the farms in the majority of the EU-13 countries (except the Czech Republic and Slovakia) and by the Greek, Finnish, and Portuguese farms. By contrast, in the second research period, median farm income with subsidies was EUR 19.7 thousand. This value was not higher than income generated by the majority of the EU-13 countries (except Hungary, the Czech Republic, and Slovakia) and by four EU-15 countries (i.e., Denmark, Sweden, Greece, and Portugal). Income generated by Polish farms in the analyzed years amounted to EUR 8,388 and EUR 8,943, respectively, thus occupying the third and fourth position among the EU-28 countries in terms of its growing amount (Table 3).

Table 3

Farm income and the land and labor profitability on the farms in the EU countries

Country	Farm income with subsidies, EUR/farm		Farm income with subsidies, EUR/ha of UAA		Farm income with subsidies, EUR/FWU		Ratio of subsidies to farm income with subsidies	
	2015--2017	2018 2015-2017, %	2015--2017	2018 2015-2017, %	2015--2017	2018 2015-2017, %	2015--2017	2018
UE-15								
Austria	24,840	130.2	834	116.9	16,708	141.3	0.72	0.63
Belgium	55,211	128.7	1,095	124.9	35,697	126.7	0.40	0.32
Denmark	23,901	21.6	236	19.7	28,341	21.9	1.52	7.74
Finland	16,179	132.1	266	120.7	16,737	135.9	3.11	2.52
France	32,249	122.0	372	120.1	23,090	124.4	0.88	0.71
Germany	40,207	95.6	454	92.8	30,850	96.6	0.89	0.99
Greace	10,984	95.7	1,080	101.2	12,723	102.0	0.59	0.63
Ireland	27,473	90.4	562	90.6	25,360	95.1	0.65	0.73
Italy	32,289	114.6	1,578	108.7	32,075	112.0	0.27	0.27
Luxembourg	48,700	119.9	590	115.5	35,120	117.1	1.05	0.91
Netherlands	75,033	109.7	2086	100.4	52,965	107.9	0.23	0.21
Portugal	16,331	113.8	673	122.5	13,206	119.3	0.52	0.42
Spain	33,541	104.3	697	108.1	32,046	106.0	0.37	0.33
Sweden	21,757	42.4	200	43.4	19,141	44.2	1.87	4.30
the United Kingdom	35,441	119.8	223	120.4	28,278	124.1	1.10	0.93
UE-13								
Bulgaria	12,073	156.9	253	110.4	9,923	156.5	1.08	0.99
Croatia	7,699	131.9	477	125.4	5,371	136.0	0.79	0.70
Cyprus	9,271	107.3	850	109.5	8,611	114.4	0.56	0.48
Czech Republic	39,618	109.6	193	116.8	30,014	112.2	2.24	2.26
Estonia	8,424	100.9	66	92.0	10,893	102.7	2.95	3.53
Hungary	20,096	102.0	416	109.9	30,603	103.1	0.83	0.73
Latvia	14,326	68.2	227	65.2	11,711	69.0	1.11	1.72
Lithuania	12,283	77.5	259	74.2	9,121	82.8	0.87	1.17
Malta	11,755	89.8	4269	94.7	9,906	93.4	0.22	0.21
Poland	8,388	106.6	448	101.7	5,879	109.4	0.66	0.71
Romania	4,894	184.9	524	97.5	4,994	169.4	0.39	0.46
Slovakia	41,709	168.5	80	196.2	57,135	157.7	3.74	2.03
Slovenia	5,217	193.8	533	181.4	4,372	197.7	1.33	0.64

Source: own study based on FADN EU (Farm Accountancy…, 2020).

The results of the analyses show that in 2018, in the majority of the EU countries, farm income with subsidies was significantly higher than the income from 2015-2017. A decrease in income was observed on the farms in five EU-15 countries (Denmark, Greece, Ireland, Sweden, and Germany) and in three EU-13 countries (Malta, Lithuania, and Latvia).

Subsidies recorded at the farm level have a significant impact on the final amount of income. Their impact is determined by the value of economic surpluses from the production and the levels of subsidies received. On average, from 2015-2017 and in 2018, on the farms in six countries (Malta, the Netherlands, Italy, Spain, Belgium, and Romania), the share of subsidies to operating activities in farm income with subsidies was below 50%. The smallest share of subsidies was observed on the Maltese, Dutch, and Italian farms. On the other hand, on the farms in seven countries (Latvia, Sweden, the Czech Republic, Estonia, Finland, Slovakia, and Denmark) subsidies to operating activities covered the loss from production and their surplus which remained generated a certain level of farm income. This means that subsidies received were much higher than farm income with subsidies: from 11.0% on the Latvian farms to 674.4% on the Danish farms. The situation of the Polish farms, compared to other EU countries, was quite good: the share of subsidies in income was 66.4 and 71.5%, respectively, during the research periods.

Table 4

Coefficient of variation (%) of farm income without and with subsidies in the EU countries

Specification	Farm income without subsidies, EUR/farm		Farm income with subsidies, EUR/farm	
	2015-2017	2018	2015-2017	2018
EU-28	172.7	160.0	53.7	72.9
EU-15	202.0	120.9	23.3	29.9
EU-13	141.8	235.1	25.3	46.6

Source: own study based on FADN EU (Farm Accountancy…, 2020).

The coefficient of variation calculated for farm income shows that the dispersion of income with subsidies was much smaller than that of income without subsidies (Table 4). This means that subsidies reduced the difference among the countries as regards the level of income from production (without subsidies). The much lower variation of income with subsidies is evident both among the EU-28 countries, the EU-15, and the EU-13 countries. In addition, on average, from 2015--2017 among the EU-15 countries attention is drawn to the strong dispersion of income without subsidies (202.0%), much higher than among the EU-13 countries (141.8%), while in the case of income with subsidies this dispersion was lower. The variation of farm income with subsidies among the EU-28 countries can be regarded as strong, while among the EU-15 and EU-13 countries it can be described as average (Coefficient of variation, 2020).

Farm income with subsidies per 1 ha of utilized agricultural area (land profitability) also shows a significant spread in the EU countries. On average, from 2015-2017 the highest income was observed on the farms in Malta (EUR 4,269) and the Netherlands (EUR 2,086) and the lowest in Estonia (EUR 66) and Slovakia (EUR 80). The high land profitability on the Maltese and Dutch farms results from the high land productivity (EUR 15,612 and 13,818 of the production value per 1 ha of UAA, respectively) and the moderately high, compared to other countries, cost intensity of the production (EUR 0.80 and 0.88 of total costs per EUR 1 of the production value, respectively). On the other hand, in Estonia and Slovakia the land productivity was rather low (EUR 897 and 1,211), while the level of encumbering the production with the costs of its production was high (EUR 1.15 and EUR 1.19).

Farm income determines the achievement of a competitive advantage of the farms. At the same time, its amount per 1 full-time employed member of the farmer's family (FWU) shows the potential amount of payment for labor of the farmer and their family members (labor profitability). The studies show that on average, from2015-2017 the highest income per full-time employed family member was earned by farmers in Slovakia and the Netherlands (EUR 57.1 and 53.0 thousand, respectively) and the lowest by farmers from Slovenia and Romania (EUR 4.4 and 5.0 thousand, respectively), as shown in Table 3. The amount of this income, regardless of incurred total labor input (family and external), is significantly determined by the share of family labor which in Slovakia and the Netherlands was much smaller (amounting to 5.9 and 50.8%, respectively) than in Slovenia and Romania (amounting to 96.2 and 91.0%, respectively).

The results show that the importance of subsidies in generating farm income in the EU countries was differentiated. It should be noted that subsidies to operating activities of the farms per 1 ha of UAA were, on average, nearly equal in the EU-28 countries in both research periods, i.e., from 2015-2017 they amounted to EUR 420 and in 2018 they accounted for EUR 421. According to the analyses, subsidies received by farmers in 11 countries (among the EU-15 countries: Austria, Belgium, Finland, Greece, Italy, Luxembourg, and the Netherlands; among the EU-13 countries: Slovenia, the Czech Republic, Malta, and Cyprus) were higher than their average level in the EU in both research periods. Thus, subsidies received by farmers in the remaining 17 countries were lower; these countries in the EU-28 accounted for 60.7%. Among the EU-15 countries, those where the average level of subsidies per 1 ha of UAA was lower than the EU average accounted for 53.3% and among the EU-13 countries 69.2%.

Conclusions

The results of the research show that the farms in the EU are highly differentiated in terms of the production potential, and particularly in terms of the utilized agricultural area and the asset value, as well as the technical equipment of work. Significant differences were also found in terms of the economic size of the farms. When comparing the maximum value with the minimum value, on average, from

2015-2017, the diversification was 49.9-fold (in Slovakia EUR 478.7 thousand and in Romania EUR 9.6 thousand) and in 2018, it was 29.4-fold (in the Netherlands EUR 504.9 thousand and in Romania EUR 17.2 thousand).

The income situation of the farms was strongly influenced by production efficiency. On average, from 2015-2017, the cost of EUR 1 production ranged from EUR 0.64 to 1.32, and in 2018 from EUR 0.64 to 1.28 (in both cases, the lowest cost was observed in Italy and the highest in Finland). In the first research period, the costs of production exceeded the profitability limit on the farms in 11 countries and in the second period, in 10 countries. In many countries, the situation was very unfavorable; as a result, farm income consisted only of subsidies to operating activities (this was the surplus of subsidies which remained after covering the loss which occurred during the production process).

Farm income is highly diversified among the EU countries. In general, EU-15 farmers – when compared to the EU average – are more affluent than EU-13 farmers. The measure used was income with subsidies per full-time employed member of the farmer's family (FWU). From 2015-2017, the EU average of this income was EUR 21.5 thousand. The income generated in five EU-15 countries did not exceed this level (Austria, Finland, Greece, Portugal, and Sweden). On the other hand, among the EU-13 countries, income exceeding the "EU average" was generated in only three countries (Slovakia, the Czech Republic, and Hungary). Large income disparities also exist within the "old" EU; Dutch farmers earn the most, i.e. 1.7 times more than Italian and Spanish farmers, and over twice more than Irish and French farmers.

In 2018, on average, in the EU-28 countries, income with subsidies per full-time employed member of the farmer's family was 11.3% higher than on average from 2015-2017, amounting to EUR 23.9 thousand. When comparing the amount of this income with the level achieved in the individual countries, it was found that in six EU-15 countries (Austria, Finland, Greece, Portugal, Sweden, and Denmark) this income was lower than the EU average. On the other hand, among the EU-13 countries, the vast majority did not receive income in the amount of EUR 23.9 thousand; only in three countries, similarly to the first research period, the income with subsidies per full-time employed farmer's family was higher than the EU average.

The research shows that subsidies reduce differences among the countries as regards the level of income from production (without subsidies). The coefficient of variation calculated for farm income shows that the dispersion of income with subsidies was much smaller than that of income without subsidies. These results suggest a further need to continue the external convergence in the EU by equalizing the level of subsidies among the countries.

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UWARUNKOWANIA ZRÓŻNICOWANIA DOCHODÓW GOSPODARSTW ROLNYCH MIĘDZY KRAJAMI UNII EUROPEJSKIEJ

Abstrakt

Celem artykułu było wskazanie głównych czynników wpływających na zróżnicowanie dochodów gospodarstw rolnych w krajach Unii Europejskiej (UE). Analiza dotyczyła potencjału produkcyjnego, kosztów produkcji oraz oddziaływania dopłat na dochody w ramach wspólnej polityki rolnej. Badaniami objęto gospodarstwa prowadzące rachunkowość rolną w 28 krajach UE. Do analizy wykorzystano dane za lata 2015-2017 oraz z 2018 roku, zebrane i przetworzone w ramach systemu FADN EU.

Z analiz wynika, że gospodarstwa rolne w UE szczególnie silnie różniły się pod względem powierzchni użytków rolnych, wartości aktywów, technicznego uzbrojenia pracy oraz intensywności produkcji. Ocenia się, że intensywność miała związek z kierunkiem produkcji oraz z produktywnością ziemi. Na sytuację dochodową gospodarstw w znaczącym stopniu wpływała efektywność produkcji. Średnio w latach 2015-2017 koszt wytworzenia 1 EUR produkcji zawierał się w przedziale 0,64-1,32 EUR, a w 2018 roku – 0,64-1,28 EUR. W konsekwencji, w wielu krajach dochód z gospodarstwa stanowiły wyłącznie dopłaty do działalności operacyjnej.

Wyniki badań wskazują, że dopłaty niwelują różnice między krajami w poziomie dochodu uzyskanego z produkcji (bez dopłat), co sugeruje dalszą potrzebę kontynuacji wyrównywania wielkości dopłat między krajami w UE.

Słowa kluczowe: dochód z gospodarstwa, koszty produkcji, efektywność, dopłaty.

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