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# Diversification of income parity among agricultural farms based on the Polish experience

# Zróżnicowanie dochodów parytetowych gospodarstw rolnych na podstawie polskich doświadczeń

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## ABSTRACT

The objective of the study was to examine the occurrence of farm income disparity in Poland on average in the study sample and in the groups of farms designated according to their economic size expressed by the standard output value from selected agricultural types and economic size classes. The results showed that farmers' income is often lower than an average income in the national economy and in some cases farmers are not reimbursed for their own labour input. However, a significant diversity in income disparity was observed between farms. In the most beneficial situation were farms in the 5th economic size class with the highest income without subsidies. The farms in the 3rd and 4th class achieved the income parity comparable to other sectors of economy but this was possible through subsidies under the CAP. On the other hand, the results of farms in the 6th economic size class were much worse. The farms often did not generate income at all or its level was very low, even with the support of subsidies. It was concluded that the CAP intervention should be better targeted in order to reduce farm disparity as overall support for all is ineffective.

**Keywords:** farm income disparity, subsidies, farm efficiency

## STRESZCZENIE

Celem było zbadanie występowania w Polsce dysparytetu w dochodach gospodarstw rolnych z wybranych typów rolniczych, średnio w próbie badawczej oraz w grupach wydzielonych według wielkości ekonomicznej. Wyniki pokazały, że dochód rolników często jest niższy niż średnie wynagrodzenie w gospodarce narodowej, a niekiedy rolnicy nie uzyskują zwrotu z tytułu poniesionych nakładów pracy. Zaobserwowano znaczne zróżnicowanie parytetu dochodów między gospodarstwami rolnymi. W najbardziej korzystnej sytuacji były gospodarstwa z 5. klasy wielkości ekonomicznej, wskazuje na to najwyższy poziom dochodu bez dopłat. Gospodarstwa z 3. i 4. klasy osiągnęły parytet dochodów porównywalny z innymi sektorami gospodarki, ale niekiedy było to możliwe dzięki dopłatom w ramach WPR. Z kolei wyniki gospodarstw z 6. klasy wielkości ekonomicznej były znacznie gorsze. Gospodarstwa te często nie generowały dochodu lub jego poziom był bardzo niski, nawet przy wsparciu przez dopłaty. Interwencja w ramach WPR powinna być lepiej ukierunkowana, aby zmniejszyć dysproporcje w dochodach gospodarstw rolnych, ponieważ wspieranie wszystkich gospodarstw jest nieskuteczne.

**Słowa kluczowe:** rolnicze dochody parytetowe, dopłaty, efektywność gospodarstw

## INTRODUCTION

The basis for intervention in agriculture is usually the assumption of the existence of income disparity, i.e. the disparity for the remuneration of the labor factor involved in agricultural production in relation to its remuneration in other sectors of the economy. According to Stiglitz (1987), this phenomenon is caused by a high level of risk in agricultural activity and inefficiency in preventing this risk. The intervention is also justified by the occurrence of the phenomenon of costs and external effects, low price elasticity of supply, low mobility of the workforce, lower level of labour productivity and the need to provide public goods. In addition, market failure of agricultural markets should be taken into account, especially in the area of realization of value generated in agriculture.

This approach is increasingly being criticized, as there is no evidence to assume a lower level in labor productivity (as a source of financing income and their increase) in agriculture in relation to other sectors of the economy. What's more, the theory of technical progress also applies to agricultural production, in the form of even biological progress. Agriculture is also not specific to other sectors when it comes to substitution technical progress related to investments, concentration and changes in production techniques as a source of labor productivity growth. In addition, the thesis about market failure as a regulator of allocation and division processes in agriculture, in particular the claim about the depreciation of agricultural income as a result of the permanent spread of the scissors of the prices paid in relation to the received, is not defended both on theoretical and empirical grounds (Hamulczuk and Rembisz, 2017).

Importantly, increasing dependence on payments generating agricultural income is observed (e.g. Matthews, 2016). According to EU statistics (DG Agri, 2016), direct payments accounted for, on average in the EU, 28% of agricultural factor income in the years 2010-2014. When including payments from the second pillar of the Common Agricultural Policy (CAP), this percentage was at a level of 33% The FADN figures show that farms are even more dependent on payments, as they include all forms of support targeted at farms by individual Member States.

The studies by some authors (e.g. Severini et al., 2016) indicate that direct payments do not play a stabilising role in agricultural income, as they are not well targeted at these farms which are subject to the greatest income volatility. Similarly, the OECD (2011) analyses allow concluding that decoupled payments are of limited importance in risk management by farmers and in reducing income volatility. Therefore, it would be desirable for a farmer, in managing the production process, to be guided by economic calculation allowing making choices while taking into account the limited resources (labour, capital, land) and possible alternatives to their application.

In the debate on income disparity in agriculture, diversity is highlighted compared to other sectors of the economy. However, little is said about the disparity that varies greatly between farms themselves. Agricultural income depends on the geographical location of farms, level of agricultural development and its role in the national economy, agricultural policy and other exogenous factors. Endogenous factors, including the production potential, economic size and agricultural type of farms, are also important determinants of the income situation of farms. The specialization of farms, i.e. the type of production conducted (crop and livestock) is also highly important. We hypothesized that incorrect targeted intervention even deepens income disparity among agricultural farms.

The objective of the study was to examine the occurrence of farm income disparity in Poland on average in the study sample and in the groups of farms designated according to their economic size expressed by the standard output value from selected agricultural types and economic size classes.

## MATERIAL AND METHODOLOGY

The empirical analysis used the data collected and processed under the EU FADN system (EC, 2020). The subject of the study were farms specialising in the cultivation of cereals, oleaginous plants and protein crops and in raising of dairy cattle, i.e. those classified as

type 15 and 45 (according to the Community Typology for Agricultural Holdings). In Poland, the situation and development potential of these farms has a major impact on agriculture as a whole, as evidenced by the share of manufactured products in the commodity production. Cereals have the largest share in the commodity structure of crop production, with 28.1% in 2017, whereas cow's milk in the commodity structure of livestock production, amounting to 30.8% in 2017 (GUS, 2018).

In the analysis data from the years 2010-2012 and 2016-2017 were used. Those years were chosen with an intention to examine the impact of the CAP on the economic situation of farms in two financial perspectives, i.e. 2007-2013 and 2014-2020. The average results from three (2010-2012) and two years (2016-2017) have been analyzed. This method eliminates the impact of fluctuations possible when taking into account yearly data and allows defining the direction of change with higher certainty. The data of 2017 is the most up-to-date and available data when conducting the study.

The results of farms during the selected periods are shown in the tables on average in the study sample and in the groups of farms designated according to their economic size expressed by the standard output value (SO). Standard output is the 5-year average production value from specific activity of crop and livestock production obtained within one year from 1 ha and from 1 animal in the average production conditions in a region (Bocian et al., 2017). The following economic size classes of farms have been adopted: (1) 2 ≤ 8 – very small, (2) 8 ≤25 – small, (3) 25 ≤ 50 – medium small, (4) 50 ≤ 100 – medium large, (5) 100 ≤ 500 – large, (6) ≥ 500 – very large.

The basic measure for assessing the economic performance was farm income. The analysis also covered the dependence of farms on support in the form of operating subsidies, thus determining the impact of the CAP on the effects of management.

According to the objective set, the so-called parity income has been calculated based on public statistics data, which corresponds to the average net salary (*ANS*) in the national economy. The calculation was carried out for each study year. To convert parity income from PLN to EUR, conversion rates by the European Central Bank were applied: in 2010, EUR 1 = PLN 3,9947, in 2011, EUR 1 = PLN 4,1206, in 2012, EUR 1 = PLN 4,1847, in 2016, EUR 1 = PLN 4,3632, and in 2017, EUR 1 = PLN 4,2570 (European Central Bank, 2019). This income was a basis for calculating the parity income ratio (*PIR*), which is reflected by the ratio of farm income (*FI*) without and with operating subsidies per family work unit – FWU (FWU – own labour input as part of operating activity of a farm, of unpaid persons, mainly family members, in Poland it amounts to 2,120 hours), expressed in family work units (Floriańczyk et al., 2018) to the net salary in the national economy:

$$PIR=((FI/FWU)/ANS)x100\% \quad (1)$$

The production efficiency was also examined, using the following ratios to measure it:

$$EPT=(GM/APV)x100\% \quad (2)$$

where:

EPT – efficiency at the production and technical level (based on Dabbert and Braun, 2012),

GM – gross margin,

APV – agricultural production value.

$$BPCEF=(CEF/VPA)x100\% \quad (3)$$

where:

BPCEF – burdening of production with the cost of external factors,

CEF– costs of external factors,

VPA – value of production achieved.

Costs of external factors, – these costs include: salaries and social security of employed persons, rents for leasing land and buildings as well as lease fees, interest and financial charges on loans contracted (Floriańczyk et al., 2018).

$$CIP=(TC/\ VPA)x100\% \quad (4)$$

where:

CIP – cost intensity of production,

TC – total costs,

VPA – value of production achieved.

## RESULTS

### *Farm income*

In the years 2010-2012, on average, farms specializing in the cultivation of cereals, oleaginous plants and protein crops (type 15) were profitable. In the groups of farms designated according to their economic size, the differences in income without operating subsidies were relatively large. On the farms in the 1st-5th classes, this income was gradually growing, while in the 6th class a decrease has been recorded. Income without subsidies implemented on the farms in the 6th class (EUR 24,796/farm) accounted only for 54.1% of the level of income achieved on the farms in the 5th class (EUR 45,842/farm). On the other hand, the economically strongest farms (6th class) had the largest share of subsidies in income with subsidies (92.9%). The lower share of subsidies was recorded on the economically weaker farms, i.e. those in the 3rd - 5th classes (58.0 to 63.0%). By contrast, in the second study period (2016-2017), on average in the sample of the farms in the 1st - 2nd and 6th economic size class, the production was unprofitable. The loss was covered by subsidies, and they also generated a certain level of income. In other groups of farms (3rd - 5th classes), subsidies contributed to an increase in income, their share in income with subsidies ranged from 77.8 to 86.7% – Table 1.

Interestingly, the situation of farms in the 6th economic size class was especially unfavorable. These farms did not receive income from production mainly due to high production costs. Their level was strongly influenced by direct costs as well as the high debt of farms. Our analysis of the financial situation shows that the indebtedness of the farms was growing as their economic size increased. The level of indebtedness of the farms analysed did not exceed the limit value, i.e. 50%, which means that the basic source of their financing was own equity. However, the debt of equity for farms in the 6th economic size class was particularly high than in the economically weaker ones. It accounted for 45.2% in the first study period and 31.7% in the second one.

Farm income determines the achievement of a competitive advantage, but at the same time its amount per 1 FWU reflects the potential amount of payment for own labour input (i.e. of the farmer and family members). Comparing this income with parity income makes it possible to determine whether payment of own labour has been paid at the level received by those employed in the national economy. The analyses show that, on average, in the years 2010-2012, income without subsidies per 1 FWU was lower than the average net salary in the national economy on the farms in the 1st and 2nd economic size class; it accounted for 10.1% and 27.8% of its level, respectively. Having taken subsidies into account, this income increased to 65.6% and 108.7%, respectively (parity income per 1 FWU on average in the years 2010-2012 was EUR 6,608).

In the second study period (2016-2017), the requirements of a farm parity at the level of income without subsidies were met by the farms in the 5th class only. For the 3rd and 4th classes, income per 1 FWU accounted for 16.7% and 49.6% of the net salary in the national economy, respectively. In other groups of farms, the labour of the farmer and family members remained unpaid. On the other hand, at the level of income calculated with subsidies, the requirements of a farm parity were met by the farms in the 3rd - 6th classes. For the 1st and 2nd class, income with subsidies per 1 FWU was 17.5% and 57.5% of the net salary in the national economy, respectively (parity income per 1 FWU in 2016-2017 was EUR 7,728) – Table 1.

When analyzing the income situation of farms specializing in raising dairy cattle (type 45), it was concluded that those farms were profitable in both study periods (Table 2). Income was growing as the economic size of farms increased, with the highest income recorded in the entities in the 5th class (i.e. the economically strongest farms in this study sample). Subsidies are an important factor as regards the growth of farm income. This is particularly evident for the economically weaker farms. The largest share of subsidies in income with subsidies was recorded on the farms in the 2nd economic

size class (61.5 and 76.3%, respectively, in the both study periods). Interestingly, the farms in the 5th class had the lowest share of subsidies in income (30.4 and 27.7%, respectively).

The analysis of payment for own labour at the parity level showed that in both study periods, income without subsidies per 1 FWU exceeded the average net salary in the national economy only on the farms in the 4th and 5th economic size class. After taking account of subsidies, the requirements of farm parity were met by the farms in the 3rd - 5th classes. In the remaining groups of farms, the labour of the farmer and family members has been paid only partially – Table 2.

**Table 1.** Income of the farms specializing in the cultivation of cereals, oleaginous plants and protein crops (type 15)

| Specification | | Average in sample | Economic size classes of farms, thous. of EUR SO | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | (1) 2 ≤ 8 | (2) 8 ≤ 25 | (3) 25 ≤ 50 | (4) 50 ≤ 100 | (5) 100 ≤ 500 | (6 ) ≥ 5 00 |
| | | | | | **average in 2010-2012** | | | |
| Economic size of farms | thous. EUR | 25.37 | 7.00 | 13.83 | 36.37 | 69.70 | 199.27 | 914.43 |
| Utilised agricultural area (UAA) | ha | 37.23 | 12.60 | 21.77 | 54.84 | 101.98 | 289.97 | 1,181.44 |
| Total production value | EUR/ha UAA | 922 | 752 | 782 | 861 | 904 | 992 | 1,169 |
| Farm income without subsidies | EUR/farm | 5,157 | 717 | 2,286 | 10,242 | 21,706 | 45,842 | 24,796 |
| | EUR/FWU | 4,251 | 670 | 1,839 | 6,920 | 13,426 | 33,957 | 232,466 |
| Farm income with subsidies | EUR/farm | 15,896 | 4,640 | 8,932 | 26,445 | 51,623 | 124,011 | 347,744 |
| | EUR/FWU | 13,101 | 4,336 | 7,184 | 17,868 | 31,932 | 91,860 | 3,260,097 |
| The share of subsidies in farm income with subsidies | proc. | 67.6 | 84.6 | 74.4 | 61.3 | 58.0 | 63.0 | 92.9 |
| Parity income ratio without subsidies | proc. | 64.3 | 10.1 | 27.8 | 104.7 | 203.2 | 513.9 | 3,517.9 |
| Parity income ratio with subsidies | proc. | 198.3 | 65.6 | 108.7 | 270.4 | 483.2 | 1,390.1 | 49,334.0 |
| | | | | | **average in 2016-2017** | | | |
| Economic size of farms | thous. EUR | 22.10 | 6.65 | 15.80 | 36.15 | 70.20 | 198.85 | 1,020.10 |
| Utilised agricultural area (UAA) | ha | 26.87 | 9.69 | 19.96 | 42.35 | 80.20 | 229.27 | 1,010.33 |
| Total production value | EUR/ha UAA | 814 | 582 | 709 | 831 | 880 | 961 | 1,085 |
| Farm income without subsidies | EUR/farm | -666 | -1,461 | -400 | 1,825 | 5,967 | 15,496 | -202,827 |
| | EUR/FWU | -584 | -1,432 | -332 | 1,289 | 3,837 | 11,352 | -2,386,194 |
| Farm income with subsidies | EUR/farm | 6,504 | 1,382 | 5,354 | 13,715 | 27,027 | 69,679 | 31,825 |
| | EUR/FWU | 5,705 | 1,354 | 4,443 | 9,692 | 17,381 | 51,047 | 374,406 |
| The share of subsidies in farm income with subsidies | proc. | 100.2 | 205.8 | 107.5 | 86.7 | 77.9 | 77.8 | 737.3 |
| Parity income ratio without subsidies | proc. | -7.6 | -18.5 | -4.3 | 16.7 | 49.6 | 146.9 | -30,875.4 |
| Parity income ratio with subsidies | proc. | 73.8 | 17.5 | 57.5 | 125.4 | 224.9 | 660.5 | 4,844.5 |

* Income parity has been determined by the ratio of farm income without operating subsidies and with subsidies per 1 FWU to the average salary in the national economy.

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

**Table 2.** Income of the farms specializing in raising dairy cattle (type 45)

| Specification | | Average in sample | Economic size classes of farms, thous. of EUR SO | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | (1) 2 ≤ 8 | (2) 8 ≤ 25 | (3) 25 ≤ 50 | (4) 50 ≤ 100 | (5) 100 ≤ 500 | (6 ) ≥ 5 00 |
| | | | | | **average in 2010-2012** | | | |
| Economic size of farms | thous. EUR | 31.13 | 6.90 | 16.57 | 36.33 | 67.80 | 146.10 | - |
| Utilised agricultural area (UAA) | ha | 20.87 | 6.84 | 12.65 | 23.84 | 42.23 | 90.41 | - |
| Total production value | EUR/ha UAA | 1,556 | 1,208 | 1,124 | 1,518 | 1,866 | 2,071 | - |
| Farm income without subsidies | EUR/farm | 8,564 | 2,047 | 2,581 | 10,114 | 24,414 | 56,064 | - |
| | EUR/FWU | 4,875 | 1,488 | 1,543 | 5,314 | 11,948 | 24,698 | - |
| Farm income with subsidies | EUR/farm | 14,831 | 4,602 | 6,704 | 17,183 | 36,392 | 80,553 | - |
| | EUR/FWU | 8,443 | 3,347 | 4,006 | 9,028 | 17,810 | 35,486 | - |
| The share of subsidies in farm income with subsidies | proc. | 42.3 | 55.5 | 61.5 | 41.1 | 32.9 | 30.4 | - |
| Parity income ratio without subsidies | proc. | 73.8 | 22.5 | 23.3 | 80.4 | 180.8 | 373.7 | - |
| Parity income ratio with subsidies | proc. | 127.8 | 50.6 | 60.6 | 136.6 | 269.5 | 537.0 | - |
| | | | | | **average in 2016-2017** | | | |
| Economic size of farms | thous. EUR | 36.85 | - | 18.30 | 37.70 | 68.90 | 148.30 | - |
| Utilised agricultural area (UAA) | ha | 20.86 | - | 12.44 | 21.42 | 35.79 | 72.47 | - |
| Total production value | EUR/ha UAA | 1,693 | - | 1,086 | 1,534 | 2,026 | 2,533 | - |
| Farm income without subsidies | EUR/farm | 8,511 | - | 1,461 | 7,606 | 20,735 | 55,836 | - |
| | EUR/FWU | 4,891 | - | 902 | 4,111 | 10,316 | 25,438 | - |
| Farm income with subsidies | EUR/farm | 16,037 | - | 6,152 | 15,929 | 33,569 | 77,207 | - |
| | EUR/FWU | 9,217 | - | 3,798 | 8,610 | 16,701 | 35,174 | - |
| The share of subsidies in farm income with subsidies | proc. | 46.9 | - | 76.3 | 52.3 | 38.2 | 27.7 | - |
| Parity income ratio without subsidies | proc. | 63.3 | - | 11.7 | 53.2 | 133.5 | 329.1 | - |
| Parity income ratio with subsidies | proc. | 119.3 | - | 49.1 | 111.4 | 216.1 | 455.1 | - |

* Income parity has been determined by the ratio of farm income without operating subsidies and with subsidies per 1 FWU to the average salary in the national economy

[-] – means that the phenomenon concerned did not occur

Source: own study based on the FADN EU (EC, 2020)

***Production efficiency***

The efficiency at the production and technical level is reflected by the ratio of share of gross margin in the agricultural production value. On average, this ratio in the sample of farms classified as type 15 and 45 was similar. In the years 2010 and 2012 it was 64.4% and 63.4%, while in the years 2016-2017 accounted for 58.9 and 62.7%, respectively. On the farms of both agricultural types and in both study periods, the higher production and technical efficiency was recorded on the farms belonging to lower economic size classes, i.e. economically weaker. On the economically stronger farms, the efficiency in question went down, which means that the share of gross margin in the value of production achieved was lower, mainly due to relatively high direct costs incurred – Tables 3 and 4.

In the manufacturing process, production costs are an important decision-making element and their level depends on the farmer to a large extent. The results show that burdening of production with the cost of external factors advanced along with the increase in the economic size of farms. On the farms specializing in the cultivation of cereals, oleaginous plants and protein crops (type 15), this burden was higher than that of the farms specializing in raising dairy cattle (type 45). The reason was the much higher costs of external factors in farms of type 15 (it concerns all components, i.e. remuneration of hired employees, rents and interest on loans). Their share in the total cost of farms was also higher, on average in the sample on farms of type 15 was 11.7%, while when on farms of type 45 only 4.4%.

It is worth to emphasize that on the farms in the 6$^{th}$ class of type 15 burdening of production with the cost of external factors was the highest, in the first study period it accounted for 23.8 %, while in the second one for 31.1%. By comparison, in type 45, on the farms in the 5$^{th}$ class, this ratio was 5.4 and 4.6%, respectively, in the above-mentioned study periods. Burdening of production with the cost of external factors had a significant impact on cost intensity.

The cost intensity of production reflects the economic efficiency of management. The lower is the value of this ratio, the more favourable the financial situation of a farm is. The analysis shows that the cost intensity of production on the farms of type 15 was higher than that of type 45. Such an observation can be deduced based on the average results in the whole study sample of the farms and in the groups designated according to the economic size. On average, in the sample of the farms of type 15, the cost intensity of production was 83.0 and 100%, respectively, in the both study periods, while on the farms of type 45 accounted for 73.7 and 75.6%, respectively.

In the groups of farms designated according to the economic size, the cost intensity of production was subject to fluctuations. The much more favourable situation occurred on the farms specializing in raising dairy cattle (type 45). In the first study period, those costs accounted for 69.7 - 80.8% of revenues (production value) and in the second period from 69.9 to 87.4%, respectively. The highest cost intensity of production was recorded on farms in the 2$^{nd}$ economic size class. These were relatively small entities in terms of their area and had the smallest income per 1 ha of utilized agricultural area.

The cost intensity of production on the farms specializing in the cultivation of cereals, oleaginous plants and protein crops (type 15) was higher than on the farms of type 45. In the first study period, the highest cost intensity, i.e. 96.1% was characteristic for the economically strongest farms (6$^{th}$ class). In contrast, in the second study period, the economically inefficient production was recorded on the farms in the 1$^{st}$ and 6$^{th}$ classes (the ratio defining the cost intensity of production accounted for 118.3 and 114,0%, respectively). This means that farmers suffered a loss, as the costs were higher than revenues achieved – Tables 3 and 4.

The results show that the production efficiency in the economically strongest farms (6$^{th}$ class) compared to other farms was weaker, which is evidenced by the indicator showing the share of gross margin in the production value. The economic results of these farms were also influenced by the fact that to a large extent hired workers, land leases and long-term and short-term

**Table 3.** Production efficiency on the farms specializing in the cultivation of cereals, oleaginous plants and protein crops (type 15)

| Specification | | Average in sample | Economic size classes of farms, thous. of EUR SO | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | (1) 2 ≤ 8 | (2) 8 ≤ 25 | (3) 25 ≤ 50 | (4) 50 ≤ 100 | (5) 100 ≤ 500 | (6 ) ≥ 5 00 |
| | | | | | **average in 2010-2012** | | | |
| Share of gross margin in the value of production | proc. | 64.4 | 70.0 | 66.8 | 64.6 | 63.5 | 62.4 | 60.0 |
| Relation of costs of external factors to the value of production | proc. | 9.7 | 2.8 | 3.4 | 5.3 | 6.4 | 13.7 | 23.8 |
| Relation of total costs to the value of production | proc. | 83.0 | 88.3 | 83.7 | 77.0 | 75.8 | 82.9 | 96.1 |
| | | | | | **average in 2016-2017** | | | |
| Share of gross margin in the value of production | proc. | 58.9 | 64.8 | 62.1 | 58.2 | 57.6 | 57.2 | 53.4 |
| Relation of costs of external factors to the value of production | proc. | 11.0 | 2.5 | 4.7 | 6.6 | 7.7 | 13.7 | 31.1 |
| Relation of total costs to the value of production | proc. | 100.0 | 118.3 | 98.7 | 93.1 | 90.9 | 91.5 | 114.0 |

Source: own study based on the FADN EU (EC, 2020)

**Table 4.** Production efficiency on the farms specialising in raising dairy cattle (type 45)

| Specification | | Average in sample | Economic size classes of farms, thous. of EUR SO | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | (1) 2 ≤ 8 | (2) 8 ≤ 25 | (3) 25 ≤ 50 | (4) 50 ≤ 100 | (5) 100 ≤ 500 | (6 ) ≥ 5 00 |
| | | | | | **average in 2010-2012** | | | |
| Share of gross margin in the value of production | proc. | 63.4 | 78.0 | 64.0 | 64.1 | 62.9 | 61.9 | - |
| Relation of costs of external factors to the value of production | proc. | 3.2 | 0.6 | 1.5 | 2.5 | 3.4 | 5.4 | - |
| Relation of total costs to the value of production | proc. | 73.7 | 72.8 | 80.8 | 72.0 | 69.7 | 71.1 | - |
| | | | | | **average in 2016-2017** | | | |
| Share of gross margin in the value of production | proc. | 62.7 | - | 63.3 | 63.0 | 62.9 | 62.0 | - |
| Relation of costs of external factors to the value of production | proc. | 3.1 | - | 1.8 | 2.6 | 3.0 | 4.6 | - |
| Relation of total costs to the value of production | proc. | 75.6 | - | 87.4 | 76.3 | 71.9 | 69.9 | - |

[-] – means that the phenomenon concerned did not occur

Source: own study based on the FADN EU (EC, 2020)

loans were used (in the first study period short-term loans were 36.2% and the second study period – 35.7%) .

## DISCUSSION

The study results showed that, despite the support provided by direct payments, there are still farms which economic situation is poor. Income of the agricultural population is often lower than the average income in the national economy, and in some cases farmers are not reimbursed for their own labour input.

However, the lower income parity on average in the sample of the farms analysed, in relation to other sectors of the economy does not mean that individual entities achieve the same effect equally. In the study conducted, the most favourable situation, in both study periods, was that of the farms in the 5th economic size class, as evidenced by the highest level of income without subsidies. The farms in the 3rd and 4th classes, as well as in the 5th class, achieved the income parity comparable to that in other sectors of the economy, but this was possible through support of CAP subsidies. Subsidies recorded at the farm level have a direct impact on the level of income. However, their poignancy is determined by the value of economic surpluses from production and amounts of subsidies received.

Interesting cases are the farms in the 6th economic size class of type 15. These farms, as the largest in terms of area and the economically strongest, in the first study period achieved income without subsidies which was by nearly 50% lower than that of the farms in the 5th class, while in the second period they suffered a loss amounting to EUR 202,800. The economic efficiency of these farms was therefore much worse According to T. Kotarbiński (1972) the form of efficiency are effectiveness and cost-effectiveness; effectiveness determines to what extent the actions taken allow to achieve a goal. On the other hand, cost-effectiveness is boiled down to the assessment of saving and performance, i.e. the ratio of resource consumption to the measure of intended achievements.

Farm income is an economic effect of activities carried out and its amount is significantly determined by the production efficiency. Favourable production results do not always mean the equally favourable economic performance, if the production is unprofitable, its increase will result in deterioration in the economic situation. On the farms in the 6th economic size class, the production value per 1 ha was the highest, but its cost intensity was also very high. It is worth noting that these farms achieved a high rate of parity income with subsidies, which confirms the fact that these farms function well not through efficient management, but through CAP subsidies. The situation of the farms in the 1st and 2nd economic size class of type 15 was completely different; the farms often did not generate income at all or its level was very low, even with the support of operating subsidies.

So, the question arises: how efficient are the instruments of the Common Agricultural Policy in terms of guaranteeing farm income at the optimal level? It can even be concluded that farmers are increasingly dependent on the effects of agricultural policy at the expense of seeking to improve the production efficiency as a basic factor of income growth. Political rent becomes more and more useful for farmers, thus it replaces economic rent. This is confirmed by numerous studies on the subject literature. Minviel and Latruffe (2014) have identified the negative impact of subsidies on the technical efficiency of farms. In turn, Rizov et al. (2013) demonstrated a clear negative effect of partially-coupled payments on the farm productivity. The studies by these authors based on decoupled payments showed a zero or slightly positive effect on the farm productivity. The latest studies analysing the second pillar of the CAP in the years 2007-2013 show that rural development payments also have a negligible impact on productivity (Dudu and Smeets-Kristkova, 2017).

This study confirms the large variety of payments quantity among farms which is still present under the CAP. Moreover, income disparity among farms seems to be even wider than among farms in general. The farms, which are the largest in terms of area and economically efficient, receive the largest envelope of payments. This stems from the adopted historical payment model, when

support for farmers was determined during the reference period as compensation for reduced market prices. The introduction of a regional model seems more justified, however, inspires significant resistance in many EU countries. Similarly, the attempt to introduce an upper annual limit of payments per farm has been inefficient so far. It could be stated that intervention through the CAP should be better targeted in order to reduce farm disparity as overall support for all is ineffective.

## CONCLUSIONS

The analyses carried out lead to a conclusion that support by subsidies under the CAP will not eliminate the phenomenon of income disparity of the agricultural population in relation to those employed in non-agricultural sectors. However, subsidies are an important factor in improving the income situation of farms and contribute significantly to reducing the scale of this phenomenon.

A significant diversity in income disparity is still observed among agricultural farms. The farms, which are the largest in terms of area and economically efficient, receive the largest envelope of payments. However, the level of support does not result from the improved agricultural production efficiency. Each agricultural producer strives for a certain balance between the involvement of a given factor and its remuneration. This is due to the assumption that the agricultural producer behaves rationally and, above all, maximizes his objective function, which is agricultural income. Thus, the level of direct transfers to the agricultural sector should take into account the efficiency of production factors, and in particular labour, in relation to their remuneration, so as not to disturb the processes of achieving balance by agricultural producers, which is endogenous and is the basis for improving efficiency.

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