Regional Diversification of Financial Situation of the Horticultural Farms in European Union Countries

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Abstract:

Purpose: *This article aims to identify the financial situation of the horticultural farms in Poland compared to their counterparts in other European Union countries in 2012-2017 in the synthetic context.*
Design/Methodology/Approach: *To achieve this purpose, the data from the FADN database on horticultural farms from macro-regions in EU countries in 2012-2017 were used. To assess the financial situation, a synthetic measuring instrument of development was used, and the non-pattern method was employed to construct it.*
Findings: *The results of the conducted research show that the horticultural farms are characterised by differentiation of economic effects. These results affect their financial situation, which in turn determines their possibility of further market development, that is the economic safety of farm families, as well as the supply safety of food consumers.*
Practical implications: *Obtained studies results can be used by EU agricultural policymakers and the horticultural farm owners. The results indicate in which regions the horticultural farms have more development opportunities and in which the economic safety of farm families is in danger.*
Originality/value: *The results of the conducted analysis are complementary to the previous studies on the financial situation of the horticultural farms. Additionally, the article proposed the straight-line ordering method to assess the financial situation of the horticultural farms.*

Keywords: *Horticultural farms, FADN, synthetic characteristic, EU, financial situation.*

JEL Classification: *O52, Q12, Q14.*

Paper Type: *Research study.*

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1. Introduction

Horticultural production, despite the small part in agricultural areas (AA), is very important for the Polish and European Union (EU) food economy. In the case of horticultural crops, Poland is the main or important producer in the EU (Matyka, 2009). In Poland, there is a territorial division of horticultural crops, however, in the case of vegetables, it is not as visible as in the case of the orchard, plantations of berry bushes and walnuts (Gunerka *et al.,* 2014).

Farms in Poland that practice horticultural production are characterised by significant production potential. The potential of agricultural, especially horticultural, production is determined not only by the AA but also by the share of irrigated lands. However, in this respect, the Polish potential is definitively low (Ziętara and Sobierajewska, 2012).

The amount of horticultural production is the sum of vegetables and fruit production[1]. The share of vegetables in the value of goods in plants production in Poland in 2017 was about 8% (Vegetable market..., 2018). Moreover, the share of fruit in the value of goods in plants production in 2017 was about 12% (Fruit market..., 2018). Thus, it can be indicated that the share of horticultural production in Poland in goods plants production in recent years was 20% on average. Horticultural production is an object of business activity for many farms.

In Poland approx. 75 thousand farms grow outdoor vegetables and around 10 thousand vegetables are grown under cover (Vegetable market..., 2018, Fruit market..., 2018). Fruit trees and berries orchards are also grown by a significant number of farms. In the last five years, fruit trees in orchards were grown by nearly 110 thousand farms and another 80 thousand farms grew fruit shrubs. Poland is one of the leading producers of fruit, vegetables, and nursery plants in EU countries (Kierczyńska, 2008, Jabłońska and Olewnicki, 2011).

Fruit and vegetable production is an important direction of the agricultural sector in Poland; however, it is most often an activity that in farms is done on a small scale. The area of horticultural crops attests to this fact quite clearly. The average area of outdoor vegetables was slightly more than 2.5 ha and 0.5 ha of vegetables grown under cover (Vegetable market…, 2018). On the contrary, the average area of fruit trees in orchards was less than 2.5 ha and 1.4 ha in the case of fruit shrubs (Fruit market…, 2018).

Fragmented land and farm ownership are noted in most countries in the world (Villanueva and Colombo, 2017). The condition of farm fragmentation in a certain country is significantly influenced by conditions of geographic location, as well as by the system of farms succession (Bentley, 1987; Graefen, 2002; Pietrzykowski, 1990; Klank, 2006; Popa and Dinu, 2015; Marciniuk, 2017; Ntihinyurwa and de Vries, 2021). Typically, in European Union countries, small farms are a dominant agricultural model (European Parliament, 2014; Guiomar *et al.,* 2018).

This issue is especially seen in Central and Eastern European countries (Czyżewski and Stępień, 2013; European Parliament, 2015; Hartvigsen, 2016; European Commission, 2021).

Despite the significant fragmentation of horticultural production in Poland, the important factor that stimulates the development of domestic fruit and vegetable production is their export, and export sales revenues have an impact on farm financial situation. Since Poland became a member of the European Union, the export of both fruit and vegetables in the following years has been increasing dynamically in terms of volume and quality. Fresh fruits and vegetables are most often exported from Poland.

Exporting fruits and vegetables from Poland to foreign markets is necessary because their production significantly exceeds the needs arising from domestic consumption (Szuk *et al.,* 2016). In the following years, there has been an increase in the importance of export in the terms of volume, regarding the harvest of both fruit and vegetables.

More dynamic changes characterised the fruit market than the vegetable market because between 2014 and 2017 fruit export doubled their share compared to their harvest, whereas in the case of vegetables the share increased by less than 1/3. At the same time, the export sales revenue was rapidly increasing. The value of fresh vegetable export from Poland in 2017 was €259 million, 167% higher than in 2004. In the same period, the value of fresh fruit export from Poland was €624 million, almost 200% higher than in 2004. Export of processed fruit and vegetable also developed dynamically at this time. In particular, the export of processed vegetables between 2014 and 2017 increased from 425 thousand tonnes to 715 thousand tonnes.

The sales of frozen food had a dominant position in export, although their share in the structure of export sales tended to decrease because in 2004 it was more than 77%, and in 2017 it was less than 65%. The sales of processed vegetables in the terms of value developed dynamically, increasing by two and a half times, from €207 million to €553 million (Vegetable market…, 2018).

Production volumes achieved in Poland in the horticultural sector allow it to be in the group of the largest producers among EU countries. In the case of fruit production, in the following years until 2020, Poland was ranked third among the largest EU producers, after Spain and Italy, with a production volume of 5.5 million tonnes. It is worth noting that the volume of fruit production in Poland compared to the volume of fruit production in both Spain and Italy was almost twice as low (European Statistic Handbook, 2018; 2019; 2020). The situation was very similar in the case of vegetable production.

Also, in the following years until 2020, Poland, with the volume production of around 5.4-5.5 million tonnes, was ranked third or fourth among the largest producers, switching the position with France, and behind Spain and Italy. It should be noted that

in the case of vegetables, only in Spain their production volume was almost twice higher than in Poland (European Statistic Handbook, 2018; 2019; 2020).

During the first decade of Poland's membership in the European Union, the fruit and vegetable sector developed dynamically. This was due to both the market economic situation and a strong competitive position within the community market (Filipiak and Maciejczak, 2008; Bieniek-Majka, 2015). However, as noted by Grzelak (2013), in the first years of Poland's membership in the European Union structure, in the case of horticultural farms, their variable profitability combined with the high capital intensity of production, hindered their development.

The condition of further horticultural production development in Poland, as well as whole agriculture, is to develop and hold a strong competitive position on the single European and global market. In earlier years, the horticultural farms in Poland compared to farms in other EU countries had certain competitive advantages resulting mainly from lower production costs, but over the years, because of rising production costs, especially costs of work, these advantages gradually decreased or completely disappeared.

As a result of these processes, the financial situation of production units is changing. It seems that to limit negative changes in the financial situation of many horticultural farms, investments as well as an increase in the scale of production and productivity of production factors will be necessary for the next years (Grochowska and Mańko, 2014), especially in comparison to the farms in other EU countries (Jabłońska *et al.,* 2017).

Vegetable farms in Poland have made significant progress in the production and economic results, compared to the years before the period of transformation. There has been an improvement in results, in contrast to the period before accession to the EU in relation to many partners and economic competitors. However, in comparison to leading counties and horticultural farms involved in vegetable production, there is still a significant development gap, especially in the terms of productivity (Ziętara and Sobierajewska, 2012; 2013).

The aim of this article is to define the financial situation in horticultural farms in Poland compared to their counterparts in other EU countries in 2012-2017 in the synthetic context. The assessment of the financial situation of horticultural farms, including vegetable farms, reflects their economic situation, which in the long run, determines the development possibilities of business entities in certain production and market conditions. The choice of the period between 2013 and 2017 is intentional because it is the time almost after 10 years of membership in the EU structures, which was quite beneficial for the Polish horticultural sector, especially for vegetable producers. This was the result of the community market opening for vegetable supply from the new member countries, a breakthrough moment from the perspective of the future of the horticultural sector in global, regional and local terms.

2. Materials and Methods

To achieve the purpose, data from FADN database (Farm Accountancy Data Network) on horticultural farms in FADN macro-regions in 2012-2017 were used. The synthetic measuring instrument of development was used to assess the financial situation. A synthetic feature characterises a directly non-measurable feature and is a real function of a simple feature. The non-pattern method was employed to construct a synthetic measuring instrument of the financial situation of horticultural farms in macro-regions in EU countries in 2012-2017.

The values of simple features calculated from the average of the years studied were used for the calculations. The value of synthetic measuring instruments of financial situation can be ordered linearly by non-increasing values. Based on this ordering, the typological classes of units are distinguished using the arithmetic average and standard deviation of calculated values of the synthetic measuring instrument (Wysocki and Lira, 2005). Based on the financial values, the synthetic measuring instrument was determined according to the following stages (Wysocki and Lira, 2005):

Stage 1: Selection of the set of simple features that constituted partial determinants of the considered complex phenomenon, and designation of their value,
Stage 2: Normalisation of simple feature values,
Stage 3: Designation of synthetic feature values,
Stage 4: Designation of typological classes.

Based on substantive reasons, the following features were selected to assess the financial situation:

- current ratio,
- quick ratio,
- total assets debt ratio,
- equity debt ratio,
- return on total assets ratio,
- return on equity ratio,
- return on sales ratio,
- assets productivity ratio,
- family farm income to farm production value ratio,
- labour efficiency ratio,
- own labour efficiency ratio,
- income per farm.

Statistical analysis was used to properly select simple features. Based on correlation analysis, that is, an analysis of the matrices of diagonal elements in inverse relation to the matrices of R correlation, excessively correlated features were eliminated. If the diagonal elements of R^{-1} matrices are significantly higher than 10, it means that the

feature is excessively correlated with others, and it indicates poor numerical conditioning of the R matrices (Wysocki and Lira, 2005).

On this basis, the following ratios were eliminated, current ratio, total assets debt ratio, and return on total assets ratio. Then the coefficient of variation was analysed. Its value for each feature exceeded 20%. Therefore, the discriminatory ability of the selected ratios was found to be satisfactory. Finally, nine simple features were adopted for the analysis, with the quick liquidity and equity debt ratio adopted as nominants[2] and the others as stimulants of financial position.

The normalisation of simple feature values was performed using unitarisation. The nominants were converted into stimulants and the values of all features were converted into comparable units. Unitarisation was performed based on the following formulas (Wysocki and Lira, 2005):

for stimulants:

$$z_{ij} = \frac{x_{ij} - \min_i\{x_{ij}\}}{\max_i\{x_{ij}\} - \min_i\{x_{ij}\}} \qquad (1)$$

for nominants:

$$z_{ij} = \frac{x_{ij} - \min_i\{x_{ij}\}}{nom\{x_{ij}\} - \min_i\{x_{ij}\}}, \qquad x_{ij} \leq nom\{x_{ij}\} \qquad (2)$$

$$z_{ij} = \frac{\max_i\{x_{ij}\} - x_{ij}}{\max_i\{x_{ij}\} - nom\{x_{ij}\}}, \qquad x_{ij} > nom\{x_{ij}\} \qquad (3)$$

After normalising the values of the simple features, the value of the synthetic feature was calculated using the model-free method, which is averaging the normalised values of simple features (Wysocki and Lira, 2005):

$$\bar{q}_i^{(1)} = \frac{\sum_{j=1}^m z_{ij}}{m}, \qquad (i = 1, 2, \dots, n) \qquad (4)$$

The highest possible value of the synthetic measure for assessing the financial condition of the agricultural farms of the region is desired. The lower the value of the synthetic measure of development $\tilde{q}_i$, the worse the financial situation of the farms of the region. The utilised value of the synthetic feature is usually in the range of (0,1) (Wysocki and Lira, 2005). Based on this value, four typological classes were distinguished, using the arithmetic mean $\bar{q}$ and standard deviation (Table 1) s_q, according to the following rules:

- class I: $\tilde{q}_i \geq \bar{q} + s_q$,

- class II: $\bar{q} + s_q > \tilde{q}_i \geq \bar{q}$,
- class III: $\bar{q} > \tilde{q}_i \geq \bar{q} - s_q$,
- class IV: $\tilde{q}_i < \bar{q} - s_q$.

Table 1. *The division of horticultural farms of FADN macro-regions into typological groups (based on 2012-2017 averaged data)*

Typological groups			
Group I	**Group II**	**Group III**	**Group IV**
(0020) Hamburg	(0010) Schleswig-Holstein	(0205) Guadeloupe	(0500) Galicia
(0050) North Rhine-Westphalia	(0030) Lower Saxony	(0291) Lazio	(0535) Catalonia
(0080) Baden-Wurttemberg	(0070) Rhineland-Palatinate	(0292) Abruzzo	(0615) North and Centre
(0116) Thuringia	(0090) Bavaria	(0413) England - West Region	(0755) Estonia
(0121) Ile-de-France	(0114) Saxony	(0480) The Aegean Islands	(0833) Severoiztochen
(0134) Centre	(0162) Pays de la Loire	(0550) Madrid	(0834) Yugozapaden
(0135) Lower Normandy	(0163) Brittany	(0565) Murcia	(0835) Yuzhen Tsentralen
(0203) Provence-Alps-French Riviera	(0182) Aquitaine	(0580) Canary Islands	(0840) Nord-Est
(0360) The Netherlands	(0192) Rhone-Alpes	(0630) Ribatejo and Oeste	(0841) Sud-Est
(0370) Denmark	(0201) Languedoc-Roussillon	(0640) Alentejo and Algarve	(0843) South-West Oltenia
(0520) Navarra	(0207) Réunion	(0650) Azores and Madeira	(0844) Vest
(0525) La Rioja	(0243) Veneto	(0670) Southern Finland	(0861) Adriatic Croatia
(0710) Slattbyggdslan	(0244) Friuli-Venezia Giulia	(0745) Czech Republic	(0862) Continental Croatia
	(0270) Tuscany	(0768) Transdanubia	
	(0281) The Marches	(0770) Latvia	
	(0341) Flanders	(0775) Lithuania	
	(0411) England - North Region	(0780) Malta	
	(0412) England - East Region	(0785) Pomerania and Masuria	
	(0515) Basque Country	(0790) Greater Poland and Silesia	
	(0540) Balearic Islands	(0795) Masovia and Podlachia	
	(0555) Castilla-La Mancha	(0800) Lesser Poland and the Foothills	

|	(0560) Valencian Community	(0831) Severozapaden	
	(0575) Andalusia	(0832) Severen Tsentralen	
	(0690) Pohjanmaa	(0836) Yugoiztochen	
	(0767) Alfold	(0845) Nord-Vest	
		(0846) Centru	

Source: *Own study based on Farm Accountancy.*

3. Results

In the years studied, the FADN system functioned in 28 Member States of the European Union. In 2017, the system covered nearly 4.6 million farms in 28 countries, including more than 150,000 horticultural farms, which accounted for about 3.3%. In Poland, horticultural farms also accounted for about 3.4% of all farms participating in the FADN system. Malta had the largest share of horticultural farms, about 45%. The Netherlands also had a share of horticultural farms well above the EU average, at around 17%. In 2017, the average horticultural farm had an area of 6.38 ha. In the same year, the average agricultural land of Polish horticultural farms was 5.68 ha, which was less than the average area in the EU. Meanwhile, the horticultural farms in Denmark had the largest average area in the EU. In this country, the area of horticultural farms was 24.68 ha (Farm Accountancy..., accessed on 18.04.2020).

In 2017, horticultural farms participating in FADN occupied nearly 970,000 ha. The structure of the land resources and the number of represented horticultural farms in the EU are shown in Figures 1 and 2.
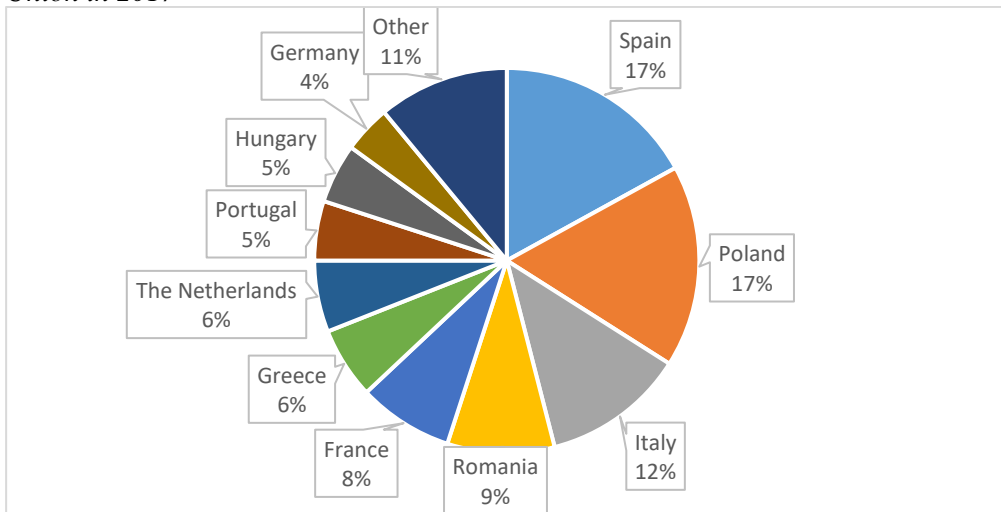
Figure 1. *Structure of land resources of represented horticultural farms in the European Union in 2017*
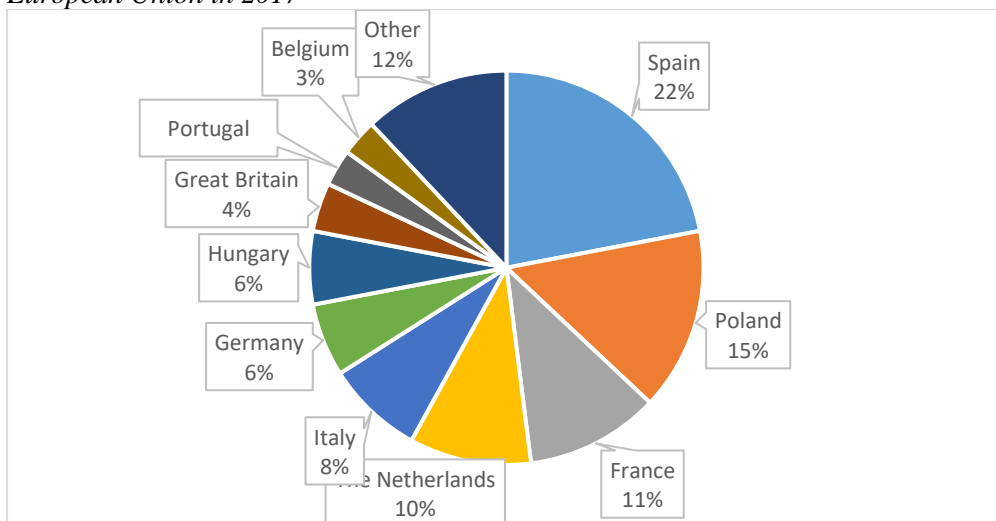
Source: *Own study based on Farm Accountancy.*

Of all horticultural farms in the EU, 22% were agricultural land of horticultural farms from Spain. Poland ranked second in terms of land resources of those farms. In 2017, the total area of Polish horticultural farms accounted for 15% of the area of horticultural farms in the EU. France came in third place with a share of 11%. The horticultural farm area of these three countries accounted for 48% of the total horticultural farm area in the EU. Furthermore, almost 90% of the EU's horticultural farm area was located in just 10 countries.

Figure 2. *Structure of the number of represented horticultural farms in the European Union in 2017*

Source: *Own study based on Farm Accountancy.*

The structure of the number of represented farms differed from the structure of land resources. Also in this case, Spanish horticultural farms had the largest share of the number of represented horticultural farms, but it was lower and stood at 17%. At the same time, the share of Polish horticultural farms was equal to the share of horticultural farms from Spain. This means that the average size of horticultural farms in Spain was larger than the average area of horticultural farms in Poland. Italian farms constituted 12%.

Although the share of land resources of horticultural farms from Romania was low (about 2%), the share of the number of represented horticultural farms reached 9%. This was due to the very small size of the horticultural farms, which averaged only 1.36 ha. The farms of these four countries accounted for 55% of the total number of represented horticultural farms in the European Union.

Horticultural farm production played a significant role in some EU countries (Table 2). This was the case, for example, in the Netherlands, where the share of horticultural farm production in plants production was 81%, and in total agricultural production – 37%. There was also a large share of horticultural farm production in Malta, it stood

at 69% and 31% respectively. In Poland, the share of horticultural farm production was not so significant – it was 14% in plants production and 7% in agricultural production. The average share of horticultural farm production in plants production in the EU as a whole was 17%, while in total production it was 9%.

Table 2. *Share of horticultural farm production in plants production and total production for EU countries[3] in 2017*

Countries																						
The Netherlands	Malta	Finland	Belgium	Cyprus	Spain	Portugal	Denmark	Great Britain	Hungary	Poland	Germany	France	Italy	Greece	Sweden	Croatia	Bulgaria	Estonia	Romania	Lithuania	Czechia	EU-28
Share of horticultural farm production in plants production (%)																						
81	69	40	40	21	20	16	15	14	14	14	13	10	10	9	7	5	4	3	1	1	1	17
Share of horticultural farm production in total production (%)																						
37	31	18	14	8	13	10	5	6	8	7	5	6	7	6	3	3	3	1	1	1	1	9

Source: *Own study based on Farm Accountancy.*

Figure 3 shows the net value added per full-time employee on horticultural farms compared to all farms, both in Poland and in the EU as a whole. The average net value added per full-time employee on horticultural farms in Poland, as well as in the EU as a whole, was higher than the corresponding value on all farms. It can be noted that in the studied period, labour productivity achieved in Polish horticultural farms was significantly below the European average. The same applies to the average net value added per full-time employee in all Polish agricultural farms – it was also lower than the average value achieved in all European Union countries. Polish horticultural farms achieved the highest average labour productivity in 2015 when it reached over €10,000 per full-time employee. After that year, there was a decline in the net value added per full-time employee on Polish horticultural farms.

Figure 3. *Net value added per full-time employee (in EUR thousand) on horticultural farms and all farms in Poland and in the European Union in 2012-2017*
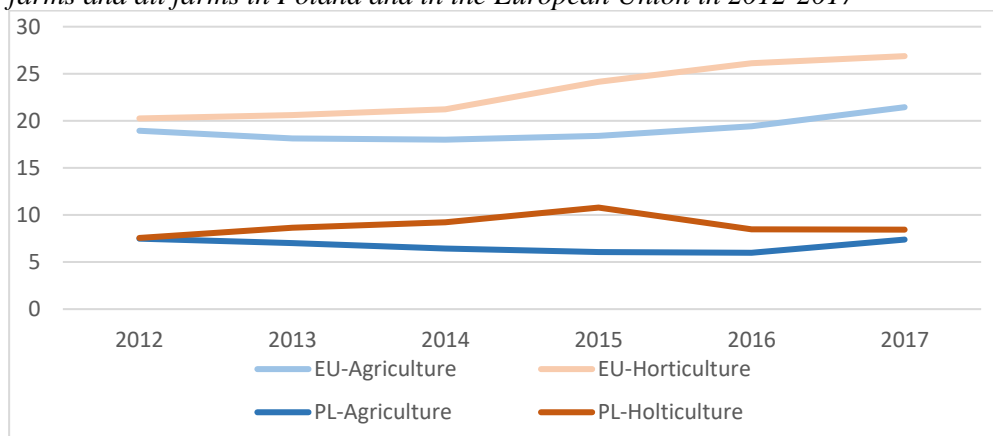
Source: *Own study based on Farm Accountancy.*

Table 3 shows the average values of financial ratios by typological groups determined on the basis of the financial situation of horticultural farms in the EU. There were 13 regions in group I, specified in Table 1. These were mainly regions from Germany, France, Spain, Sweden, Denmark, and the Netherlands. They were characterised by a good financial situation. This class is distinguished from other classes by a higher level of the return on equity ratio, which was 16% on average. The farms in this group also achieved the highest return on total assets ratio (9%) and return on sales ratio (also 9%) compared to other groups.

This is evidence of the effective use of opportunities to finance the activity. This class also had the highest level of total assets debt (46%) compared to the other classes. This may indicate that these farms have the highest propensity to incur debt, or they have better access to borrowed capital. This is a safe level of debt. This class also has the highest assets productivity ratio compared to the other groups, which indicates the efficient use of these assets.

Although the production efficiency ratio for class I was the lowest among all classes (19%), the labour efficiency ratio (over €36,000), own labour efficiency ratio (almost €50,000), and income per farm (almost €76,000) were the highest compared to the other classes. The liquidity of class I farms was also at a good level. Based on this information, it can be concluded that farms from class I regions are characterised by high financial effectiveness (profitability). They maintained adequate levels of liabilities and were distinguished by high labour efficiency and own labour efficiency and the highest income per farm. This proves efficient management in these regions.

The second class included the 25 regions listed in Table 1. These regions were mainly in Germany, France, Italy, Spain, Great Britain, Belgium, and Hungary. They were characterised by a medium-good financial situation. Class II farms had positive and adequate returns on total assets (4%), equity (6%) and sales (8%). This also demonstrates the effective use of opportunities to finance the activity.

Compared to class I, farms in this group had a lower assets debt ratio (28%) and lower equity debt ratio (61%). Class II units were characterised by lower assets productivity, which indicates good farm management, but poorer than in group I units. Although the production profitability (24%) in class II units was higher compared to class I units, these farms had a lower income per full-time employee (just over €27,000) than units in class I, lower own labour remuneration (less than €35,000) and a lower income per farm (about €52,500).

Group II units achieved the highest current and quick liquidity ratios of all groups. Such a high value was influenced by the values of this ratio in Italian regions. If they were not considered, the ratio values would be similar to those of group IV. In conclusion, the regions constituting class II were managed less efficiently. Despite higher production profitability in these units, this class had lower income than class I, but much higher than the other groups.

Table 3. *The financial situation of horticultural farms of FADN macro-regions in EU countries in 2012-2017 by typological groups*

Specification	Financial situation			
	I	II	III	IV
	Good	Medium-good	Medium-weak	Weak
Liquidity ratios				
Current ratio (multiplicity)	15.11	549.89	71.73	31.61
Quick ratio (multiplicity)	14.88	495.10	69.41	27.80
Debt ratios				
Total assets debt ratio (%)	46	28	17	9
Equity debt ratio (%)	100	61	29	13
Profitability ratios				
Return on total assets ratio (%)	9	4	3	-4
Return on equity ratio (%)	16	6	4	-5
Return on sales ratio (%)	9	8	7	-21
Financial productivity and efficiency ratios				
Assets productivity ratio (%)	102	70	47	32
Family farm income to farm production value ratio (%)	19	24	27	23
Efficiency ratios				
Labour efficiency ratio (EUR/AWU[4])	36249	27387	12570	5886
Own labour efficiency ratio (EUR/FWU[5])	49907	34688	15218	4954
Other features				
Income per farm (EUR)	75983	52533	20023	6263

Note: *Features that were the basis for grouping are highlighted in grey.*
Source: *Own study based on Farm Accountancy.*

The third group consisted of farms from 26 regions. They were mainly regions in Spain, Portugal, Italy, Poland, Bulgaria, Romania and single units from France, Great Britain, Greece, Finland, Hungary and Czech Republic, Latvia, Lithuania and Malta. These regions were characterised by a medium-weak financial situation. Group III units had a lower return on total assets (3%), return on equity (4%) and return on sales (7%) than class I and class II units, yet the ratios were still positive.

Compared to group I and group II units, these units achieved a lower total assets debt ratio (17%) and a lower equity debt ratio (29%). This indicates a lower propensity of these units to incur debt or worse access to loans and other sources of borrowed capital. Group III farms had lower assets productivity (47%) compared to class I and II units. On the other hand, these units were characterised by the highest production profitability compared to the other classes (27%). Class III farms, despite having the largest ratio of family farm income to farm production value, did not achieve income as high as units in groups I and II.

The labour efficiency ratio (approx. €12,500) was less than half of the same ratio in Class II units, as was the own labour efficiency ratio (just over €15,000). The income

per farm (just over €20,000) was also over twice as low. Liquidity ratios indicate the solvency of the units. Based on this, it can be concluded that class III units were not as willing to incur debt as class I and class II units, which might have co-determined such low income in these units.

The final group was formed by the 13 regions specified in Table 1. These were mainly regions from Spain, Bulgaria, Romania, Croatia and one region from Portugal and Estonia. These units were characterised by a weak financial situation. On farms in the regions constituting class IV, profitability indicators such as return on total assets (-4%), return on equity (-5%) and return on sales (-21%) reached negative values. Farms in class IV regions had the lowest total assets debt (9%) and equity debt (13%) among all classes, as well as the lowest assets productivity ratio (32%).

The ratio of family farm income to farm production value was 23% in these units. Only units from class I achieved a lower value of this ratio. Class IV farms had the lowest income per full-time employee (less than €6,000), the lowest own labour remuneration (less than €5,000) and the lowest income per farm (just over €6,000) compared to the other classes. To summarise, group IV farms are characterised by the worst financial situation. They had the lowest income and were the least willing to incur debt, which co-influenced the least effective farm management.

4. Discussion and Conclusions

The main objective of business entities, including farms, should be and usually is to achieve economic effects that allow the continuation and development of business in the next years. Not all production units can achieve this objective with satisfactory results. The comparative analysis of the financial situation of horticultural farms in the synthetic approach shows that their performance is diverse between the regions, which indicates that the achieved management results also remain spatially diverse. In addition, it also shows a different market position of horticultural farms in different EU regions, which influences their future development opportunities, market competitiveness and the possibility of further expansion.

Based on the literature data, we can conclude that horticultural farms, compared to all agricultural farms, have better effectiveness in the use of assets involved in production processes (Farm economy..., 2017), which is confirmed mainly by the asset's efficiency ratio and production profitability. According to the research results of Ryś-Jurek and Stefko (2012), the average assets efficiency ratio in 2009 in Poland for agricultural farms in total was 5%, and almost 11% for horticultural farms.

In contrast, in the EU-27 it was 4.6% and 6.3%, respectively. In Poland, the increase in the economic size of the horticultural farm resulted in the increase of assets efficiency (except for very small and very large farms), while in the EU-27 it resulted in its decrease. There were also differences between farms in terms of production profitability (Ryś-Jurek and Stefko, 2012; Brzozowski and Zmarlicki, 2015).

Namely, in 2009 in Poland, higher production profitability was obtained than the average in the EU-27, both in terms of agricultural farms in total and horticultural farms only. The average production profitability of Polish farms in total was 109.4%, and 131.4% in terms of horticultural farms, while an average EU-27 farm reached only 104.6%, and an EU-27 horticultural farm – only 114.5% (Ryś-Jurek and Stefko, 2012).

The analysis of the financial results of farms, including horticultural farms, provides interesting results. Liquidity ratio analysis can be mainly used to assess the relationships between current assets and liabilities of a given unit. Depending on the relationships between these components, their decreased value is a threat to the financial security of the unit and can result in bankruptcy, while their increased value is the result of inefficient management of financial resources (Tatka, 1999; Ryś-Jurek, 2008). Based on the research of Ryś-Jurek and Stefko (2012), it can be indicated that the current liquidity ratio of Polish farms in total was 5.6, and 5.3 in terms of EU farms.

However, horticultural farms had a current liquidity ratio of 2.1 in Poland and 2.8 in the EU-27. These results reflect the management in agriculture, which is based mainly on maintaining high excess liquidity, which results, for example, from a long production cycle and its seasonality, high internal consumption of a part of manufactured agricultural products in the same production unit, but also from significant price fluctuations of both agricultural products sold and agricultural production resources purchased.

Ryś-Jurek and Stefko (2012) indicated that the highest current excess liquidity appears in small horticultural farms. Moreover, the larger the economic size of a horticultural farm, the smaller the inventories it maintains, which is undoubtedly more beneficial for the farms, since maintaining large inventories entails large, fixed costs (Poczta and Średzińska, 2007).

Research conducted by Ryś-Jurek and Stefko (2012) also shows that in general, the larger the economic size of a horticultural farm, the greater the tendency to increase the debt of both own and total assets. At the same time, the indicated debt ratios in horticultural farms compared to agricultural farms in total were several times higher. The debt of total assets was nearly five times higher in the largest horticultural farms compared to the agricultural farms in Poland in total, as it amounted to 29.7% compared to 6.3%, while in the EU-27 it was 49.3% compared to 15.4%, i.e., it was more than three times higher.

In Poland, the debt of equity was almost eight times higher in the largest horticultural farms compared to the farms in total, i.e., 35.3% and 4.7%, respectively. By contrast, in the EU-27 countries, these figures were 75% compared to 14%, respectively, i.e., the debt of own assets was more than five times higher in the largest horticultural farms compared to the farms in total.

A better average financial situation of horticultural farms compared to the financial situation of farms in total is also reflected in the research results of Komorowska (2018), which covered the 2013-2015 period. They show that horticultural farms had higher own labour efficiency ratios per working person[6] compared to agricultural farms in total because own labour efficiency in horticultural farms was significantly higher throughout the studied period compared to agricultural farms in total.

While in 2013 it was about 52% (40,100 PLN per person compared to 26,300 PLN per person), in 2015 the difference increased to 242% (54,500 PLN per person compared to 22,500 PLN per person). Moreover, horticultural farms had a significantly higher economic efficiency compared to agricultural farms in total, which is represented by the asset's efficiency expressed in relative terms. While the profitability of the total assets in agricultural farms in total was around 5%, in horticultural farms it reached almost 15% in the last year of the research. Therefore, in the subsequent 2013-2015 period, the efficiency of the total assets in horticultural farms clearly continued to grow, while in the agricultural farms in total, a gradual fall was recorded.

To sum up, it is possible to claim that horticultural farms, including vegetable farms, have been gaining an economic advantage in the last years, especially in the last two decades, compared to agricultural farms in total.

Horticultural farms use a smaller area of land compared to agricultural farms in total. Due to the labour-intensive production, horticultural farms engage significantly greater labour input, and despite this, their production and economic performance is significantly higher than that of agricultural farms in total.

At the same time, this analysis proved that horticultural farms are also characterised by differences in production potential and the obtained effects, both at the production and economic level. Factors co-determining final production effects are the physical and economic size of farm resources, relationships between them, as well as the intensity of production and efficiency of individual production factors.

Moreover, as presented in the results of the study, horticultural farms remain highly spatially diverse in terms of their production and economic efficiency. Consequently, these results affect their financial situation, which in turn determines their possibility of further market development, that is the economic safety of farm families, as well as the supply safety of food consumers.

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Notes:

1 According to the FADN agricultural typology, fruit production is categorised as a different type of farming, so in the results, data will be analysed including vegetables, strawberries, flowers and ornamental plant farms, as well as those specialising in mushrooms and plants nursery.

2 The optimum of the normative size was determined on the basis of the value of the quick ratio and debt ratio of equity of 25% of the analysed regions of the EU countries, in which the labour efficiency of an average horticultural farm of the FADN sample was the highest (upper quartile). This method has already been used by Średzińska and Poczta (2012).

3 No data is available for Ireland, Luxembourg, Latvia, Austria, Slovakia, and Slovenia due to too few farms in the sample.

4 FWU (Family Work Unit) is equivalent to 2120 hours of family work within a year (Floriańczyk et al., 2017).

5 AWU (Annual Work Unit) is equivalent to 2120 hours of work within a year (Floriańczyk et al., 2017).

6 This situation is notable because agricultural farms in total have significantly higher income subsidies compared to horticultural farms.