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INCOME FROM VINEYARD FARMS ACCORDING TO ECONOMIC SIZE IN SELECTED EUROPEAN UNION COUNTRIES[1]

Key words: economic size, income, vineyards, European Union

ABSTRACT. The wine sector is of great importance for many national economies of EU countries. The European Union is a world leader in area under grape cultivation and wine production. The goal of the paper was to determine the profitability of farms specializing in winegrape production depending on economic size in selected EU countries in the years 2004-2016. In addition, the level of farm income per 1 ha of viticulture was determined, as well as the level of family income and the share of total subsidies in total income. Overall, it was found that there was an increase in income, however income increased along with economic size. In the examined period, growth was only observed from the fourth economic class (EUR 50-100 thousand). Additionally, the share of income subsidies under CAP decreased along with economic size. The conducted research gave light to information that could prove vital to adapt the European vineyard and wine sector to the opportunities and needs of the market, namely by taking into account the links between economies of scale and economies of scope.

INTRODUCTION

According to the theory of Industrial Economy, structural characteristics of the industry significantly impact the operations of firms within the market. According to Frederic Scherer and David Ross [1990], the size of the market and the degree of competition or concentration as well as entry barriers, all examples of characteristics of a particular sector, are variables that could explain disparities in the results of firms. As proven by research [Tipurić 2002, Doğan 2013, Jónsson 2007], there occurs a negative relationship between size and profitability in more capital-intensive sectors. This might result i.a. from lower interest rates. Another important reason for this phenomenon is the separation of owner-

[1] This paper is based on the results of the project VITISMART (Toward a sustainable viticulture: Improved grapevine productivity and tolerance to abiotic and biotic stresses by combining resistant cultivars and beneficial microorganisms). The financing of this project by the ERA-NET CO-FUND FACCE SURPLUS programme through the Polish National Centre for Research and Development (NCBiR) is acknowledged.

ship and control. The different points of views for a firm's operation between managers and shareholders creates conflict. As a result of such conflict, a shift from the objective of maximising benefits for shareholders towards benefits of management is observed. Such a situation ends up in the company implementing different strategies, such as survival or growth [i.e. Corsi et al. 2004]. Is the situation different in agriculture?

A literature review has shown the evidence for yield differences across farm size. As shown by Adamopoulos [2011], in agriculture, there is also an inverse relationship between farm size and productivity. With regard to small farms, very high outputs from the used area are obtained, thus they are very productive. Nonetheless, it is worth questioning whether such an inverse relationship is not caused by measurement errors in case of land as a production factor, which might result from land quality [Adamopoulos, Restuccia 2014]. It is argued that the productivity of small farms remains low, in the case of labour, and that results in low farm income, often run by a family [Delord et al. 2015]. Having that in mind, it is worth noting that the inverse relationship between farm size and profitability is not a simple mechanism that can potentially lift the income of a small farm. If small farms would like to increase income through the use of market mechanisms, i.e. offering value-added quality products, they should, as indicated i.a. by Mesut Dogan [2013] either expand on area or focus on non-agricultural off-farm activities. The importance of rural non-farm activities has been raised by Steven Helfand and Matthew Taylor [2017] with regard to low labour productivity of small farms. When it comes to a return on a vineyard's scale, Townsend et al. [1998] inform that, in Western Cape (South Africa), for over 50% of wine grape producers, return on scale does not change and only 10% can reach an increase.

As argued by Arturo Urso et al. [2018] the grape production stage significantly impacts the competitiveness of the wine production chain. This was recognised by the European Union in the 1999 Common Agricultural Policy reform which introduced a special finacial incentive for primary producers in the wine sector. The policy aimed at changing the composition of grape varieties in the production structure and also encouraging farmers to change agronomic practices. All was supported from structural funds. The reforms resulted in a higher quality of production and a higher lever of mechanization, thus showing that the policy measures were effective. In turn, viticulture in Europe increased its profitability. Also, other researchers i.e. Gioacchino Pappalardo et al. [2013] and Alessandro Corsi et al. [2004] claim that the wine sector in Europe, using path dependence conditions, is developing competitive positions, including the financial situation of farms. However, Ricardo Sellers-Rubio [2010] warns that the average situation should not blur the picture of the wide variety of both the competitive position and financial situation in individual countries and wine regions of Europe. The investigation conducted by R. Sellers-Rubio and Veronica Alampi-Sottini [2016], in Italian farms, has shown that there is a positive relation between farm size and profitability. The financial economies of scale obtained by big farms resulted from the possession and usage of technical equipment of farms as well as their better commercial opportunities. These opportunities mostly come from bargaining power with different market stakeholders (i.e. consumers, suppliers, financial institutions), as well as easier access to international markets. The evidence from France

has shown that farm size has little impact on performance. The most significant differences come from the ability to achieve competitive prices of wine [Delord et al. 2015].

Therefore, considering that the European Union is a world leader in area under grape cultivation and wine production, it must be noted that the level of agricultural income in this sector is a very important issue for the functioning of economic entities in agriculture. On the one hand, this is a result of undertaken production activity in the agricultural sector, on the other, it is the remuneration for own labour outlays incurred and the resources of land and capital involved. Thus, it is important to empirically investigate if the income of vineyards are dependent on a farm's economic size.

RESEARCH MATERIALS AND METHODS

The aim of the research was to determine the profitability of wine farms depending on economic size in selected EU countries in the years 2004-2016. The study determines the income level of wine farms depending on economic size, level of income per 1 ha of UAA and level of total subsidies in the total income of wine farms. The data from wine farms participating in the European agricultural accounting system FADN[2] were used for the research. Under this system, data were available for 14 countries: Austria, Bulgaria, Croatia, Cyprus, Greece, Spain, France, Germany, Portugal, Romania, Slovenia, Hungary and Italy. As part of the FADN, the year * Country * SIZ6 * TF8 (type 3 Wine and 6 economy class[3]) have been distinguished according to typology. The time range included available data from the system for the years 2004-2016. The study uses simple methods of descriptive statistics, including the dynamics of changes using linear and exponential regression analysis. The material was presented in descriptive, tabular and graphical forms.

RESEARCH RESULTS

The development of farms, including those growing wine, is possible when positive effects of generated production activity are obtained. The basic objective of the functioning of farms is to obtain a positive income, which is an economic surplus taking the involvement of basic production factors (land, labor and capital) into account. Table 1 presents the net income of wine farms, in classes differentiated in terms of economic size, in 2004-2016, in EU countries. In the analyzed period, net income per farm increased, on average, from EUR 23.5 thousand to EUR 34.6 thousand, i.e. by 47.2%. In the analyzed years, an average annual increase in income by 3.5% was observed. In absolute terms, the income of wine farms increased annually by approx. EUR 940. However, if we include inflation, farm income only increased by 1.5%.

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[2] The Farm Accountancy Data Network (FADN) is an instrument for evaluating the income of agricultural holdings and the impacts of the Common Agricultural Policy.

[3] As part of the FADN system, 6 classes of economic size were identified: Class (1) 2,000 – < 8,000 EUR, (2) 8,000 – < 25,000 EUR, (3) 25,000 – < 50,000 EUR, (4) 50,000 – < 100,000 EUR, (5) 100,000 – < 500,000 EUR, (6) ≥ 500,000 EUR.

Table 1. Farm Net Income of specialist vineyards depending on economic size in 2004-2016

Years	Economic size class [EUR]						Total average
	(1) 2,000 – < 8,000	(2) 8,000 – < 25,000	(3) 25,000 – < 50,000	(4) 50,000 – < 100,000	(5) 100,000 – < 500,000	(6) ≥ 500,000	
	Farm Net Income [EUR]						
2004	6,183	11,337	20,607	29,116	62,329	154,240	23,459
2005	3,341	9,923	18,815	25,519	59,150	177,987	20,804
2006	3,675	11,600	22,581	29,321	57,764	155,974	21,647
2007	4,403	11,926	23,635	35,241	78,063	175,936	26,019
2008	4,438	12,232	23,073	30,376	66,729	152,006	24,099
2009	1,760	5,858	9,173	16,490	50,748	147,850	17,432
2010	5,624	6,579	11,251	22,507	56,882	256,414	22,064
2011	5,953	7,594	13,259	27,478	68,955	254,469	25,591
2012	4,400	11,084	13,647	27,235	70,969	189,457	28,075
2013	2,986	10,176	13,648	27,245	63,413	204,218	25,865
2014	2,101	9,715	14,357	29,946	73,883	231,521	29,086
2015	4,272	9,658	16,059	30,602	78,252	258,357	32,594
2016	4,225	10,342	17,747	38,941	80,061	250,498	34,605
Absolute change [EUR]	-1,958	-995	-2,860	9,825	17,732	96,258	11,146
Average annual change [%]	-1.8	-1.0	-3.2	1.2	2.0	4.3	3.5
Regression coefficient [EUR]	-74.3	-113.4	-596.5	371.3	1,368.8	8,505.2	940.8
Coefficient of variation [%]	31.6	19.7	27.0	18.5	13.4	21.1	18.0

Source: own calculations based on FADN data

The data presented in Table 1 shows that income of selected European wine farms increased along with the economic size of a farm. At the same time, fluctuations in net income were recorded in the researched period. The coefficient of variation in net income, in wine farms, in 2004-2016, in selected EU countries, was 18%. However, the increase in income was only observed starting from the fourth economic size group. On wine farms of economic size classes 1 to 3, there was a decrease in net income per farm. Income of winemaking class 4 increased from EUR 29.1 thousand to EUR 38.9 thousand, i.e. by 33.7%. In the analyzed period, net agricultural income in class 4 increased, on average by EUR 371.3, ie. by 1.2%. The largest increase in net income was observed in the largest

farms, group 6. In this economic class, income increased from ca. EUR 154.2 thous. to about EUR 250.5 thousand, i.e. by 62.5%. The average annual increase in net income was approximately 4.3%. On the other hand, the largest decrease in net income was observed in class 3 of wine farms. The average annual decline was -3.2%. In this group, the drop in income amounted to approx. EUR 585.5 per year. Another group with a fairly large drop in income was wine-producing holdings of class 1. In this group, income decreased from approx. EUR 6.2 thousand in 2004 to approx. EUR 4.3 thousand in 2016, i.e. by 31.7%.

The highest coefficient of variation in net income, in European wine farms, was observed in the smallest economic class (class 1) (31.6%), then in class 3 (27%) and class 6 (21.1%). The smallest coefficient of variation was determined in class 5 (13.4%), followed by class 4 (18.5%) and class 2 (19.7%). In the examined period, the most stable net income was noted in groups 4 and 5 (Figure 1). It means that farms with greater economic strength are less sensitive to market fluctuations. The largest declines in income in all classes counted year-on-year were recorded in 2009, ie. just after the financial crisis. In 2009, the decrease in net income, in European wine farms, was the highest in class 1 and class 3 (around 60% each). Only in 2009, in the largest wine farms, class 6, was a 3% decrease recorded. In turn, the largest increase in income was noted in class 1 in 2010 (3.2-fold). In the analysed period, net income increased the most in group 3 (nine times) and four classes (eight times). Most falls were recorded in class 1 and class 6 farms (6 times each).

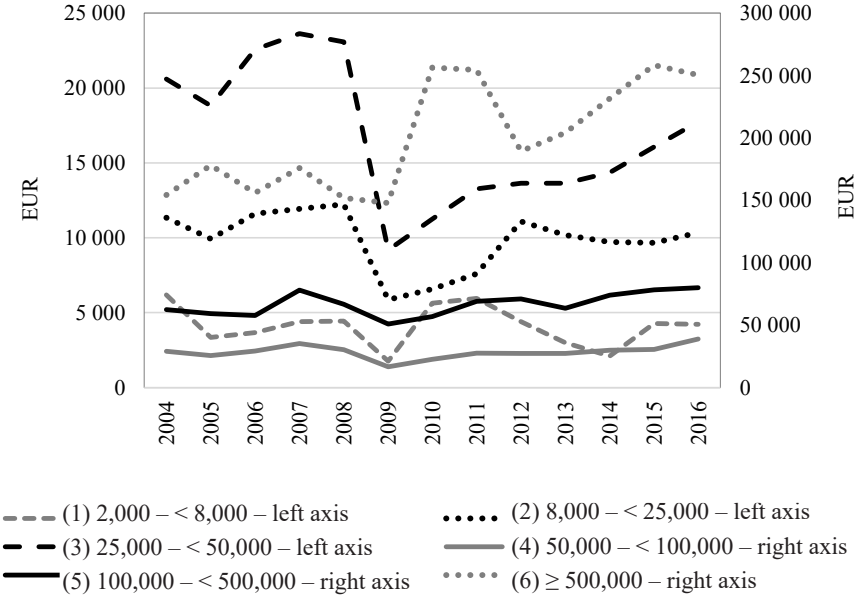

Figure 1. Farm Net Income of specialist vineyards depending on economic size in the EU (average of years in EUR)

Source: own calculations based on FADN data

Table 2. Farm Net Income per 1 ha of specialist vineyards depending on economic size in 2004-2016

Country	Year	Economic size class [EUR]					
		(1) 2,000 – < 8,000	(2) 8,000 – < 25,000	(3) 25,000 – < 50,000	(4) 50,000 – < 100,000	(5) 100,000 – < 500,000	(6) ≥ 500,000
		Farm Net Income [EUR]					
(DEU) Germany	2004-2006	-	-	3,824.9	4,455.1	3,998.8	2,353.2
	2014-2016	-	-	7,717.7	5,115.1	3,925.2	-
	Change	-	-	3,892.8	660.0	-73.6	-
(ELL) Greece	2004-2006	3,545.3	3,127.2	3,813.7	-	-	-
	2014-2016	-	1,370.0	2,203.4	2,267.4	-	-
	Change	-	-1,757.3	-1,610.3	-	-	-
(ESP) Spain	2004-2006	605.8	672.0	908.4	944.8	2,244.3	-
	2014-2016	687.9	992.5	832.5	1,101.3	892.1	-
	Change	82.1	320.5	-75.9	156.5	-1,352.2	-
(FRA) France	2004-2006	-	-	902.2	1,151.5	1,844.9	3,368.5
	2014-2016	-	-	1,472.1	2,271.0	2,615.0	3,625.7
	Change	-	-	569.9	1119.5	770.1	257.1
(ITA) Italy	2004-2006	1,199.9	2,163.2	2,728.6	3,002.5	2,668.9	3,100.5
	2014-2016	-	2,029.8	2,467.6	3,095.6	3,667.1	3,155.4
	Change	-	-133.5	-261.0	93.1	998.3	54.9
(OST) Austria	2004-2006	-	-	392.1	1,097.2	1,158.7	-
	2014-2016	-	-406.6	2,755.9	1,662.0	1,498.6	-
	Change	-	-	2363.8	564.7	339.9	-
(POR) Portugal	2004-2006	585.5	1,185.6	496.8	-	-	-
	2014-2016	1,567.5	1,483.1	936.5	-	-	-
	Change	982.0	297.5	439.7	-	-	-

Source: own calculations based on FADN data

In most years of the analyzed period, an increase in the income of wine farms from selected EU countries was observed with an increase in economic size, but also a decrease in income per 1 ha along with economic size (Table 2). This is due to the fact that along with the scale of production, the level of income per farm increased by increasing the area of farms, with a simultaneous decrease in productivity (profitability) from a unit of area. The production scale effect was achieved mainly by increasing resources, mainly land.

In the case of the French wine farms, not only an increase in income per 1 ha was observed, comparing the years 2004-2006 and 2014-2016, but also an increase in income

from 1 ha along with an increase in economic size. In the 3rd economy class, income from 1 ha in France in 2004-2006 and 2016 amounted to EUR 902.2 and EUR 1,472.1 from 1 ha respectively, and in the 4th economy class, respectively: EUR 1,151.5 and EUR 2,271.0 from 1 ha, while in economy class 5, respectively EUR 1,844.9 and EUR 2,615 from 1 ha, however for economy class 6, respectively 3,368.5 and 3,625.7 ha. Due to limitations related to the FADN accounting methodology, it can nevertheless be stated that, in French farms, the concentration of production is likely to occur by increasing unit productivity and profitability of resources rather than by concentrating resources [see Filipiak, Maciejczak 2018].

A similar situation was observed in Italian farms, with an income per 1 ha in class 2 and 3 lower in 2014-2016 than in 2004-2006. It was higher only in the case of classes 4. On the other hand, income per 1 ha in 2014-2016 increased from the 2nd class to the 5th economic size class and in class 6 it decreased slightly. In the period 2014-2016, in Italian vineyards, income per 1 ha in classes 2-6 amounted, respectively, to EUR 2,029.8, EUR 2,467.6, EUR 3,095.5, EUR 3,667.1 and EUR 3,155.4.

In the other researched countries, a decline in profitability per unit area was observed, although, in some cases, it depended on the size class. For example, in Spanish farms, in 2014-2016, the income per 1 ha increased from EUR 687.9 in the 1st class, to EUR 992.5 class 2, then it decreased to EUR 832.5 in the 3rd class and again increased to EUR 1,101.3 in the 4th class, and in the 5th class amounted to EUR 892.1. In German farms, in the years 2014-2016, income per 1 ha decreased along with the size, in class 3 it amounted to EUR 7,717.7 per 1 ha, in class 4 – EUR 5,115.1 per 1 ha, and in class 4 – EUR 3,925.2 per 1 ha.

In the investigated period, a large diversity in income support under the EU CAP was noted in selected EU countries. In general, the share of support in income decreased along with the economic size of wine farms, although not in all countries. The smallest share of subsidies in the income of wine farms was definitely in French farms. In France, the share of subsidies in total income decreased both in the examined years and in economic size. In the third class of economic size, the share of subsidies in the years 2004-2006 and 2014-2016 was 31.7% and 10.8% respectively, in the fourth class 14.8% and 6.0% respectively, in the fifth class 11.2% and 5.5% respectively, while in the sixth class, 4.0% and 4.7% respectively. Another country with the lowest share of subsidies in total income was Germany, while the share of subsidies with an increase in economic size was smaller in 2004-2006 and decreased with an increase in economic size, while in 2014-2016 it was larger and increased with an increase in economic size. The share of subsidies in income in Germany, in the years 2004-2006 and 2014-2016, in the third class, was 8.1% and 8.0%, respectively, in the fourth class 6.7% and 10.7% respectively, and in the fifth class 6.3% and 11.2% respectively. In Italy, in turn, the share of subsidies in total income in the years 2014-2016 was higher than in the years 2004-2006 in each economic size, while in both periods it decreased along with an increase in economic size. In 2004-2006 and 2014-2016, in Italy, the share for the first class of economic size was 6.6% and 12.5% respectively, for the second class 6.3% and 10.3% respectively, for the fourth class 7.5% and 10.4% respectively, for the fifth 5.8% and 9.8% respectively and for the sixth class 3.6% and 9.2% respectively.

The largest share of subsidies in income was definitely the lowest in the economically smallest farms, in countries such as Greece, Cyprus, Hungary, Portugal, and Austria. Similarly to the countries and farms with the largest economic size (France, Italy, Spain, Germany), together with an increase in economic size, the share of subsidies to income of these farms decreased. In Bulgarian farms, payments in some years did not cover the losses on wine-making activities. A similar situation was noted, for example in Austria, where, in the second class of economic size, wine farms achieved a loss on wine-making activities.

CONCLUSIONS

Based on the obtained results, it can be stated that in wine farms in selected EU countries researched in 2004-2016, an increase in income was noted, while their wide variation was observed both in countries and under economic size. The income of wine farms increased along with economic size, however, in the examined period, growth was observed only from the fourth economic class (class 4 from EUR 50-100 thousand). In the smallest classes (from class 1 to class 3), a decrease in wine farm income was recorded; the largest being in the third class. In turn, the largest increase in income was noted in the fourth grade. Moreover, in wine farms, a decrease in productivity from a unit of area was observed with increasing area. The production scale effect was achieved by increasing resources, mainly land. The exceptions were French and Italian farms, where the increase in physical hectars increased along with an increase in economic size. In the analyzed period, income support under CAP was diversified. In general, the share of income subsidies decreased along with economic size. The smallest share of subsidies in income was noted in France, Germany and Italy, while the largest in Greece, Cyprus, Hungary, Portugal and Austria.

The conducted research gave light to information that could prove vital to the adaptation of the European vineyard and wine sector to the opportunities and needs of the market while exploiting all existing components. It can be agreed with Urso et al. [2018] that, considering the EU's new rural development regulation, there should be more emphasis placed on specific measures for small and medium farms that need a restructured production environment, including vineyards. Finally, re-establishing a link between economies of scale and economies of scope is a challenge for the agricultural sector nowadays, in particular for specialist vineyard farms. This issue will require further investigation when it comes to the vineyards and wine sector in Europe.

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DOCHODY Z GOSPODARSTW WINIARSKICH WEDŁUG ICH WIELKOŚCI EKONOMICZNEJ W WYBRANYCH KRAJACH UNII EUROPEJSKIEJ

Słowa kluczowe: wielkość ekonomiczna, dochody, gospodarstwa winiarskie, Unia Europejska

ABSTRAKT

Sektor winiarski odgrywa znaczącą rolę w wielu gospodarkach Unii Europejskiej. Unia Europejska jest światowym liderem w zakresie wielkości powierzchni upraw, różnorodności odmian winogron, a także produkcji wina. Celem badań było określenie rentowności gospodarstw specjalizujących się w uprawie winogron z przeznaczeniem na wino w zależności od wielkości ekonomicznej w wybranych krajach UE w latach 2004-2016. Ponadto określono poziom dochodów z tych gospodarstw na 1 ha uprawy winorośli, a także poziom dochodów rodziny i udział dopłat w całkowitych dochodach. W badanym okresie stwierdzono ogólny wzrost dochodów, które zwiększały się wraz z wielkością ekonomiczną. Wzrost ten obserwowano jednak dopiero od czwartej klasy ekonomicznej (50-100 tys. EUR). Jednocześnie wraz z wielkością ekonomiczną malał udział dopłat uzyskiwanych w ramach Wspólnej Polityki Rolnej. Przeprowadzone badania pozwoliły na uzyskanie informacji, które mogą być przydatne w procesie dostosowywania europejskiego sektora winiarskiego do możliwości i potrzeb rynku, w szczególności poprzez ustanowienie powiązań pomiędzy korzyściami skali a korzyściami wynikającymi z dywersyfikacji.

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