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The Economic Disparity in European Agriculture in the Context of the Recent EU Enlargements

Jindrich Spicka*
University of Economics, Prague, Faculty of Business Administration, W. Churchill Sq. 4, Prague 3, Czech Republic
* E-Mail: jindrich.spicka@vse.cz

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Abstract
The paper investigates the differences of the farm income and its determinants between the old- (EU-15) and new EU member states (EU-12) before and after the EU enlargement. The analysis covers the period 2001 – 2011. The Economic Accounts for Agriculture and the Farm Structure Surveys are the main data sources. The comparison and evaluation devote to the key structural indicators, production, cost, subsidies, compensation of employees and income indicators in the Purchasing Power Standard (PPS). The cluster analysis identifies the specific structural and economic features within the EU. The paper also contains the international comparison based on the Factor Income per AWU and Wilcoxon signed-rank test. The results show the sharp drop in livestock production in the EU-12 after the EU accession. This was mainly caused by the reduction of the pig production. The unfavorable input-output value relations and the high number of labor input (AWU) per hectare generate relatively low income per AWU in the EU-12. The lower income level in the EU-12 corresponds to the lower compensations of employees in agriculture. The level of the current subsidies in the EU-27 becomes equal. Overall, there has been still the relatively large income disparity between the old- and the new EU member states. However, the gap slightly diminishes. The structure of agricultural holdings within the EU-27 is highly heterogeneous. This raises questions about the future CAP policy settings.
Keywords: economic indicators, agriculture, EU enlargement, income disparity

1. Introduction

After the EU enlargements in 2004 and 2007, the new member states have had to adapt to the Common Agricultural Policy. The adaptation process entails pros and cons not only for farmers but also for the whole agri-food vertical. The changes of the income determinants in agriculture become more topical because of the ongoing design of the new Common Agricultural Policy (CAP) after 2013. Since 2004, the agricultural income has been highly volatile with the peaks in 2007 and 2011 and the sharp drop in 2009.

The discussion about the farm income disparity has been topical in the new member states since their EU accession. Firstly, literature considers the analysis of the income distribution among farmers (Severini & Tantari 2013), the impact of the CAP on the social sustainability in rural areas (Manos, Bournaris & Chatzinikolaou 2011), specific regional development strategies (Becvarova 2012), and the farmers' risk attitudes in a changing policy environment (Koundouri *et al.* 2009). Secondly, some authors make an outlook of the CAP beyond 2013 (Peeters 2010; Lososova & Svoboda 2013).

Many studies focus on the commodity level assessments. Strnadlova (2009) describes the significant negative structural changes of sugar beet growing and sugar production in the Czech Republic after the EU accession. Konig & Major (2006) consider changes in the Hungarian dairy industry after the EU accession. They point out the rapid increase of the cheap imports, while the purchase and sale of domestic products have been decreasing or stagnating. Basek *et al.* (2010) assess the current state and development tendencies of the Czech agriculture after EU accession. The operational subsidies have decisively contributed to an improvement of the economic situation on farms. Without the subsidies, many farms would not be profitable and viable. The level of the self-sufficiency (Note 1) for most crop commodities has significantly increased. Alternatively, the level of the self-sufficiency for most livestock commodities has decreased. Doucha & Foltyn (2008) evaluate the multifunctionality of Czech agriculture and its individual farm categories before and after the EU accession. The highest level of multifunctionality is in the category of farms of sole holder holdings with 101-300 ha and the lowest level in the category of collective farms - cooperatives and joint stock companies.

Some studies investigate the impacts of the EU accession on more new member states at once. Campos, Jaklic & Juvancic (2010) identify the determinants influencing the farm productivity in the five new EU member states. Results suggest that adjustment patterns are diverging and are region-specific, depending mainly on the initial farm structural conditions, and availability of the non-farm jobs. After the EU accession, the competition of the new markets increased significantly, resulting in massive import penetration. The agricultural employment has

further decreased in the new member states. Nevertheless, the economic situation of the farmers improved due to increasing incomes (Kiss 2011). Sahrbacher (2011) also highlights the increase of the farm income due to the annually increasing direct payments. Nevertheless, not only do farmers benefit from the increasing direct payments but so do landowners.

Torok & Jambor (2013) estimate the effects of the EU accession in the agri-food trade, especially considering the comparative advantages. They conclude that the competitive advantage of the new member states except Latvia and Lithuania decreased after the accession, though it is still acceptable. As Csaki and Jambor (2013) find, the role of agriculture has further decreased in the new member states, productivity lag has decreased, but remains remarkable. The EU accession has strengthened the extensive ways of production. They also find a significant increase of the farm income in the new member states, mainly due to the agricultural subsidies.

Based on the current state of knowledge, the global aim of the paper is to ex-post evaluate the differences of farm income and its determinants between the old- (EU-15) and new EU member states (EU-12). The key analysis focuses on the second enlargement from EU-15 to EU-27 in 2004 and 2007. This enlargement did bring in a large land area and brought in countries which produced products which competed with existing products. The paper targets to obtain answers to the four main questions:

1) What structural and income differences exist among the countries of the EU-27?
2) How the economic level of the agrarian sector in the EU-12 differs compared to the EU-15?
3) How was the development of the production dimension of agriculture in the EU-12 compared to the EU-15?
4) How the dependency of the farm income on the current subsidies changed after the EU enlargement?

The study brings the evidence about the agricultural income disparity between the old- and the new- EU member states with special focus on its determinants. The topic is often discussed by the non-governmental agrarian organizations especially in the new member states in order to enhance the central public administration to improve support strategy and tools. It is important to point out that the analysis is not based on rigorous academic research. However, it gives the important facts about agriculture that plays essential role in the sustainable development of rural areas.

The paper is organized as follows. After the literature overview, the material and methods are described with the emphasis on the definition of the indicators. The results describe the most important findings about the differences of the farm income in the EU-27 before and after the recent EU enlargements. The conclusions indicate the purpose and the main findings.

2. Material and methods

2.1 The geographic scope

As mentioned in the introduction, the paper evaluates the differences of farm income and its determinants between the old- (EU-15) and new EU member states (EU-12). Although the European Union currently comprises 28 sovereign member states, the analysis covers 27 member states because Croatia joined in 2013. So, the effects of the EU accession on Croatian agriculture cannot be evaluated.

- The EU-15 (the "old" member states) area countries are: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden and United Kingdom.
- The EU-12 (the "new" member states) area countries are: Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia and Slovenia.

2.2 The data source and the key indicators

The analysis is based on the Eurostat data. The Economic Accounts for Agriculture (EAA) provide detailed information on income in the agricultural sector. The EAA database contains data on output value, intermediate consumption, subsidies and taxes, consumption of fixed capital, rent and interests, capital formation etc. Agricultural Labour Input is an integrated part of the overall concept of the Economic Accounts for Agriculture. The National Statistical Institutes or Ministries of Agriculture are responsible for data collection and calculation of the national EAAs, in accordance with EC Regulations. Eurostat is responsible for the EU aggregations.

Agricultural labour input is expressed in thousands of annual work units (AWU). One AWU corresponds to the work performed by one person who is occupied on an agricultural holding on a full-time basis, i. e. 1 800 hours per year. The utilized agricultural area (UAA, hectares) comes from the Farm Structure Surveys 2003, 2005, 2007 and 2010. The missing values are approximated.

The evaluation covers the period 2001 – 2011. The 2012 data are estimates only, so they are not included. The period is divided into four intervals – one pre-accession period (2001-03) and three post-accession periods (2004-06, 2007-09, 2010-11). The EAA has specific methodology that is obligatory for all national statistical offices in the EU. The Eurostat defines the main EAA indicators as follows:

- Crop Output + Animal Output + Agricultural Services Output + Non-agricultural Secondary Services

(inseparable) = Output of the Agricultural "Industry"
- Output of the Agricultural "Industry" – Total Intermediate Consumption (Note 2) = Gross Value Added at Basic Prices
- Gross Value Added at Basic Prices – Fixed Capital Consumption (Note 3) = Net Value Added at Basic Prices
- Net Value Added at Basic Prices – Other Taxes on Production + Other Subsidies on Production (Note 4) = Factor Income
- Factor Income – Compensation of Employees – Rents and Other Real Estate Charges To Be Paid – Interest Paid + Interest Received = Entrepreneurial Income

The Factor Income per AWU represents the key income indicator in agriculture. Since it covers costs on external factors (wages, interest paid and land charges), it is convenient for comparison of the different farm structures within the EU-27.

The EAA indicators are expressed in PPS (Purchasing Power Standard). According to the Eurostat glossary, "the PPS is the technical term used by Eurostat for the common currency in which national accounts aggregates are expressed when adjusted for price level differences using PPPs. Thus, PPPs can be interpreted as the exchange rate of the PPS against the euro. PPS are derived by dividing any economic aggregate of a country in national currency by its respective purchasing power parities."

2.3 The quantitative methods

Firstly, the cluster analysis attempts to show the different structures and the income level in agriculture within the EU-27. The medoid partitioning algorithms used here attempt to accomplish this by finding a set of representative objects called medoids. The medoid of a cluster is defined as that object for which the average dissimilarity to all other objects in the cluster is minimal. The medoid algorithm by Kaufman & Rousseeuw (1990) is applied. Two of the most difficult tasks in cluster analysis are deciding on the appropriate number of clusters and deciding how to tell a bad cluster from a good one. Kaufman and Rousseeuw define a set of values called silhouettes (s) that provide the key information about both of these tasks. The silhouette measures how well an object has been classified by comparing its dissimilarity within its cluster to its dissimilarity with its nearest neighbour. When s is close to one, the object is well classified. When s is near zero, the object was just between clusters A and B. When s is close to negative one, the object is poorly classified. Kaufman & Rousseeuw interpret the average silhouette SC. When SC exceeds 0.5, a reasonable structure has been found. Otherwise the structure is weak and could be artificial. The Manhattan distance method for place similar objects in one cluster is applied (Ciaschini, Pretaroli & Socci 2011). The Manhattan distance d_{jk} between rows j and k is computed using:

$$d_{jk} = \frac{\sum_{i=1}^{P} \left| \delta_{ijk} \right|}{P}, \qquad (1)$$

where $\delta_{ijk} = z_{ij} - z_{ik}$ for interval variables.

Let's assume that j and k reference different countries. P denotes a number of variables. In order to remove distortions due to the differences in scales, the data are transformed to a common scales z_{ij} and z_{ik} using standard deviation. The cluster analysis uses three structural variables (UAA per hectare, AWU per 100 hectares and number of livestock units per hectare in 2010) and one key income indicator (average Factor Income per AWU in PPS in 2010-11) to classify the EU countries.

The last part of the analysis considers the international comparison. The EU-27 countries are ranked by the Factor Income per AWU in all time periods. The results of the international comparison are processed through the paired Wilcoxon signed-rank test. This nonparametric test makes use of the sign and the magnitude of the rank of the differences (paired differences minus the hypothesized difference). For the Wilcoxon signed-rank test, the null and alternative hypotheses relate to the median. In the two-tail test for the median difference (assuming a hypothesized value of 0), the null hypothesis would be H_0: median=0 with the alternative being H_A: median≠0. Test is particularly known, so it is not described in detail in the paper (see e. g. Lehman 2006).

3. Results and discussion

3.1 The results of the cluster analysis

The average silhouette value 0.4867 identifies three clusters. However, the average silhouette does not exceed 0.5, so the structure can be considered as rather weak. The table 1 gives the medoid (most centrally located) of each cluster.

The last row of the table 1 shows representative countries of each cluster. The countries in the cluster 1 have the highest Factor Income per AWU and high livestock density. The countries in the cluster 2 have typically larger

utilized agricultural area per holding and relatively low labor input. The countries in the cluster 3 have typically small farms with high labor input and low livestock density. They economic level of agriculture in the cluster 3 is low.

The table 2 presents results of the cluster analysis. Even though the overall average silhouette does not confirm the reasonable structure in the EU-27, some homogeneous sub-clusters can be set.

The cluster 1 in the table 2 represents Belgium and the Netherlands with highly intensive farming. Both countries have relatively high livestock density and high labor input per hectare. They are remarkable for the top level of the Factor Income per AWU.

The cluster 2 in the table 2 is subdivided into three clusters, of which only the first has a homogenous structure. The first sub-cluster consists of Germany, France, Sweden and Estonia. There are larger farms than in Belgium and the Netherlands and relatively high Factor Income per AWU. Nevertheless, the farming intensity is not as high as in the Benelux. In the second sub-cluster, the only extreme is the Czech Republic. It has the largest average UAA per farm. The structure of today's Czech agriculture is rooted in its history. Family farms are not as important as in western states of the European Union. The bigger part of the agricultural area (about 70 percent) is used by large holdings of legal persons. The existence of large agricultural holdings affects the landscape. Often large fields are cultivated in monoculture of either cereals or rapeseed. The third sub-cluster is highly heterogeneous and does not have common features.

Finally, the cluster 3 in the table 2 has the average silhouette 0.57. This cluster can be labeled as "low income" and contains two sub-clusters. The first sub-cluster contains eight countries with relatively small average UAA per holding, high AWU per 100 hectares and relatively low Factor Income per AWU. The second sub-cluster is heterogeneous. It consists of two Baltic States – Latvia and Lithuania – and Cyprus. Latvia and Lithuania have relatively low Factor Income per AWU, low livestock intensity and higher average UAA per holding. On the contrary, Cyprus has small farms, high labor input per 100 hectares and high livestock density on average.

3.2 The development of the key economic indicators

The table 3 describes the main economic indicators of the agricultural income in the old member states (EU-15) and the new member states (EU-12).

Although the crop output per hectare in the EU-12 increases, its year-by-year volatility caused by the various weather conditions is inherent. The crop output in the EU-12 reaches the EU-15 average. The big problem is that the livestock output has been decreasing in absolute and relative terms. The share of the livestock output in the EU-12 compared to the EU-15 dropped from 90.8 % in 2001-03 to 77.8 % in 2010-11. The question is which livestock categories in which countries have been reduced?

The average annual change of the animal output value per hectare between 2001 and 2011 decreased in Bulgaria (by 8.45 %), in the Czech Republic (by 2.24 %), in Latvia (by 0.24 %), in Hungary (by 2.39 %), in Malta (by 2.10 %), in Romania (by 2.53 %), in Slovenia (by 1.03 %) and in Slovakia (by 1.38 %). In the EU-12, Estonia, Lithuania, Poland and Cyprus increased the real value of livestock production. Alternatively, the livestock production in the EU-15 has been either stabilized or increased. The most threatened category of livestock in the EU-12 is pig production. The value of pig production in the EU-12 fell from 13,470 million of PPS in 2001 to 8,592 million of PPS in 2011. On the other side, the pig production in the EU-15 has not significantly changed. More than 30% drop of the pig production (the 2011 level in real values, compared to the base 2005 = 100 %) was in Slovakia (48.8 %), in Romania (49.2 %), in Bulgaria (56.1 %), Slovenia (56.8 %), in Malta (64.4 %), in Lithuania (64.6 %), and in the Czech Republic (67.8 %).

In the EU-15, the highest increase of the real value of pig production (the 2011 level in real values, compared to the base 2005 = 100 %) was in Ireland (143.2 %), in the United Kingdom (136.0 %), in Germany (126.0 %), in Italy (115.9 %) and in the Netherlands (115.6 %). The other livestock production in the EU-12 has not as clear decreasing trend as the pig production.

There are also differences in the livestock density between EU-12 and EU-15. Basek & Kraus (2011) reveal that the livestock density in the new member states, with the exception of Poland, fundamentally differs from the old member states. They conclude that the family form of farming in the old member states is linked to a greater animal density, which plays its role from the standpoint of the efficiency of agricultural business.

The agricultural services output is a marginal part of the total output of the agricultural industry. It has been increasing mainly in the EU-15 from 97.5 PPS per hectare in 2001-03 to 125.2 PPS per hectare in 2010-11. The value of the agricultural services in the EU-12 is at the 44% level of the EU-12 with decreasing trend.

The output of the agricultural industry per hectare in the EU-12 is at the 85 – 95% of the EU-15. As seen in the table 3, the EU-12 faces other more serious problems affecting the agricultural income per AWU.

Firstly, the EU-12 has less favorable input-output conditions. The share of the intermediate consumption to the total output is higher than in the EU-15. It means that one unit of output requires more costs than in the EU-15. Nevertheless, the input-output relations in the EU-12 are getting closer to the EU-15. Moreover, the fixed capital consumption per hectare in the EU-12 is lower than in the EU-15. It reflects a decline in value due to normal

wear and tear, foreseeable ageing (obsolescence) and a normal rate of accidental damage.
Secondly, the agriculture in the EU-12 requires considerably more labor input per 100 ha than in the EU-15. The table 3 shows 10.5 AWU/100 ha in the EU-12, compared to the 4.2 AWU/100 ha in the EU-15. This disproportion in labor input causes the low level of income indicators per AWU. In the EU-12, the relatively high labor input is in Slovenia (16.2 AWU/100 ha in 2011), in Poland (14.5 AWU/100 ha in 2011), in Rumania (11.8 AWU/100 ha), in Hungary (9.2 AWU/100 ha) and in Bulgaria (9.1 AWU/100 ha in 2011). Malta and Cyprus have also high labor input but they are not agriculturally important countries within the EU. These countries use more on-farm manual workers.
The lower total agricultural output, unfavorable input-output relations and higher average labor input per 100 ha give reasons for considerably lower net value added (NVA) per AWU and for other income indicators. The NVA/AWU in the EU-12 does not reach 50 % of the EU-15 level. However, the situation has been improving since it increased from 24.1 % (2001-03) to 41.0 % (2010-11) of the EU-15 level.
The current subsidies are the important part of the farm revenues in the EU. The total current subsidies per hectare in the EU-12 rapidly increased and nearly catch up with the EU-15 (98.6 % of the EU-15 level in 2010-11). The current subsidies affect the Factor Income. In the EU-12, it reaches the 40 % of the EU-15 level. Strelecek, Zdenek & Lososova (2009) conclude that the still existing lower subsidies weaken the competitiveness, mainly due to the slower renewal and modernization of assets in agriculture. Alternatively, Bohackova & Hrabankova (2011) confirm the increasing reliance of the new EU member states on the current subsidies. The share of the current subsidies to the Factor Income increased from 9.8 % in 2001-3 to 40.3 % in 2010-11 in the EU-12. The dependency of the Factor Income on subsidies is now equal to the old member states (EU-15).
The lower labor productivity follows the lower level of staff costs in the new EU member states. The average annual compensations of employees have exceeded 10,000 PPS per AWU salaried since 2005 in the EU-12. Nevertheless, they are still below the EU-15 level. The average staff costs were at 58.5 % of the EU-15 level in 2010-11.

3.3 The international comparison of the farm economic level

Table 4 shows how the ranking of the EU-27 countries changed after the EU enlargement. The counties are ranked by Factor Income per AWU. The Netherlands, Belgium and Denmark take top ranks because of high intensive production. There is a lack of available agricultural land in these relatively small countries. So, each hectare of agricultural land has to be exploited. The United Kingdom takes the first place because of relatively low intermediate consumption per hectare and low labor input per 100 hectares. Nevertheless, there is relatively low livestock and crop output per hectare.
From the progressive point of view, the United Kingdom, Finland and Denmark are the winners among the EU-15 countries. They moved up by 4 ranks between 2001-03 and 2010-2011. Denmark improved mainly livestock output per hectare. In Finland, there are relatively high current subsidies per hectare in PPS. On the other side, Luxembourg, Portugal, Italy and Spain moved down its ranking between 2001-03 and 2010-2011. In Italy, the crop output per hectare, the input-output relations and the current subsidies per hectare in PPS got worse. The input-output price relations are also the serious problem in Spain and Portugal.
In the new member states (EU-12), the most dynamic shift up in ranking experienced Estonia and the Czech Republic mainly due to the higher current subsidies per hectare, reduction of AWU/100 ha and not much worsening of the input-output price relations in PPS among the EU-27 states. Alternatively, ranking of Romania, Slovenia and Cyprus noticeably dropped.
The Wilcoxon signed-rank test (table 5) rejects the null hypothesis about the zero median differences between the Factor Income per AWU in subsequent time periods. So, the median differences of the Factor Income vary in time because the agricultural income level among the EU-27 states develops in different ways. Thus, the CAP should take into consideration the different development of the income level within the EU.

4. Conclusion

The paper aims to ex-post evaluate the differences of farm income and its determinants between the old EU member states (EU-15) and the member states joined in 2004 or 2007 (EU-12). It refers to the important facts about agriculture that plays essential role in the sustainable development of rural areas. The analysis of the economic impacts of the EU enlargement reveals some important findings.
The structural characteristics of the EU member states significantly differ. In the EU-27, there are high income countries with intensive farming (Belgium, the Netherlands). On the other side, there are low income countries with relatively small farms and high labor input on average (Romania, Poland, Portugal, Hungary, Bulgaria, Slovenia, Greece, and Italy).
The agricultural output per hectare in the EU-12 reaches the 90 % of the EU-15 level. However, the livestock production in the new member states sharply dropped after the EU enlargement. The most threatened is the pig

production. Moreover, the unfavorable input-output value ratio in the EU-12 relative to the EU-15 indicates both hidden reserves in technology and different input-output price relations.

The economic level of agriculture in the EU-12, measured through the Factor Income per AWU in PPS, reaches only 40 % of the EU-15 level. Nevertheless, the gap between the EU-12 and the EU-15 slightly diminishes mainly as the dependency of farmers on the current subsidies in the EU-12 has been increasing since their EU accession. The level of the current subsidies in the EU-27 becomes equal with time.

The average labor input per 100 hectares in the EU-12 is substantially higher than in the EU-15. This fact, together with the lower fixed capital consumption per hectare, points to the lower level of the technical equipment and farming technologies in the EU-12. Alternatively, the labor input per hectare has been decreasing for a long period.

The ranking of the EU-27 countries changed after the EU enlargement. However, the European countries with highly intensive agriculture still rank the top positions.

Generally, the considerably different economic position of agriculture in the EU-12, compared to the EU-15, confirms that the design of the future CAP is highly ambitious challenge to meet the requirements of all subjects in the single EU market.

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Notes

Note 1. Commodity self-sufficiency is expressed as the total domestic production of the commodity divided by the domestic consumption of the commodity.

Note 2. Total Intermediate Consumption includes consumption of seeds and planting stock, energy, lubricants, fertilisers, soil improvers, plant protection products and pesticides, veterinary expenses, animal feedstuffs, maintenance of machinery and buildings, agricultural services, financial intermediation services indirectly measured and other goods and services.

Note 3. Fixed Capital Consumption includes depreciation of equipment, buildings, plantations and other capital.

Note 4. The Eurostat distinguishes between subsidies on products and other subsidies on production. The subsidies on products are directly related to the agricultural production and their amount has been decreasing over a long period. The other subsidies on products are independent on the agricultural production and their amount has been increasing.

Jindrich Spicka graduated at the Czech University of Life Sciences Prague (2006, Master's Degree) and gained the PhD at the University of Economics, Prague (2011). In 2008 – 2012 he was a division manager and research team leader at the Institute of Agricultural Economics and Information, Prague. Currently, he is an assistant professor at the Department of Business Economics, Faculty of Business Administration at the University of Economics. He is a member of the Czech Academy of Agricultural Sciences – since 2013 he is a member of the Board of economics, management, sociology and computer science. *Research field*: economics of enterprises in agriculture and food industry, risk analysis and risk management of agricultural enterprises, renewable energy resources in agriculture.

Table 1. Cluster medoids section (representatives)

Variable	**Cluster 1**	**Cluster 2**	**Cluster 3**
UAA per holding	31.69	55.84	12.02
AWU per 100 ha	4.53	3.27	9.91
LSU per ha	2.80	1.07	0.60
Factor Income per AWU (PPS)	31 018.5	23 267.0	7 523.5
Typical country	Belgium	Germany	Portugal

Source: Author

Table 2. Results of the cluster analysis

Cluster	Country	Silhouette value	UAA/hold	AWU/100ha	LSU/ha	Factor Income/AWU (PPS)
Cluster 1	Netherlands	0.6327	31.7	4.5	2.8	31 018.5
	Belgium	0.4985	25.9	8.6	3.6	27 971.7
	Cluster average	0.5656	28.8	6.6	3.2	29 495.1
Cluster 2	Germany	0.5770	55.8	3.3	1.1	23 267.0
	France	0.5507	53.9	2.8	0.8	27 509.2
	Sweden	0.5416	43.1	1.9	0.6	20 950.3
	Estonia	0.5154	48.0	2.7	0.3	19 943.9
	Finland	0.4996	35.9	2.6	0.5	21 389.7
	Luxembourg	0.4877	59.6	2.8	1.3	16 142.1
	United Kingdom	0.4370	84.0	1.7	0.8	35 805.6
	Czech Republic	0.4294	152.4	3.1	0.5	20 941.5
	Spain	0.3795	24.0	3.7	0.6	26 899.3
	Slovakia	0.3481	77.5	3.0	0.4	12 887.4
	Ireland	0.2733	35.7	3.3	1.2	14 113.5
	Austria	0.1180	19.2	4.0	0.9	17 283.4
	Denmark	0.0877	62.9	2.0	1.9	30 389.9
	Cluster average	0.4034	57.8	2.8	0.8	22 117.2
Cluster 3	Romania	0.7005	3.4	12.1	0.4	7 031.2
	Poland	0.6976	9.6	13.1	0.7	7 862.8
	Portugal	0.6814	12.0	9.9	0.6	7 523.5
	Hungary	0.6400	8.1	9.0	0.5	10 889.6
	Bulgaria	0.6355	12.1	9.1	0.3	9 454.6
	Slovenia	0.6189	6.5	15.9	1.1	6 955.3
	Greece	0.5466	4.8	12.3	0.7	16 224.4
	Italy	0.5011	7.9	7.4	0.8	12 728.6
	Cyprus	0.4876	3.0	15.7	1.7	12 687.6
	Lithuania	0.4490	13.7	5.4	0.3	8 288.3
	Latvia	0.3206	21.5	4.7	0.3	7 291.2
	Cluster average	0.5708	9.3	10.4	0.7	9 721.6

Source: Author

Table 3. The key agricultural economic indicators in the EU-15 and the EU-12

Indicator	Unit	2001-03		2004-06		2007-09		2010-11	
		EU-12	% of EU-15	EU-12	% of EU-15	EU-12	% of EU-15	EU-12	% of EU-15
Crop Output	PPS/ha	993.8	83.1	1 105.2	96.2	1 137.1	94.1	1 287.2	103.1
Livestock Output	PPS/ha	818.9	90.8	778.7	88.0	762.1	81.9	761.8	77.8
Output of the Agricultural "Industry" (Total Output)	PPS/ha	1 936.7	86.2	2 028.9	92.5	2 044.6	88.1	2 194.2	90.6
Intermediate Consumption	PPS/ha	1 120.3	101.0	1 165.5	101.3	1 265.0	94.6	1 354.6	94.3
Fixed Capital Consumption	PPS/ha	186.0	59.2	202.7	60.3	207.4	54.5	237.6	60.0
Share of Intermediate Consumption to Total Output	%	57.9	117.2	57.5	109.5	61.9	107.3	61.8	104.2
Agricultural Labour Input	AWU/100 ha	15.8	317.8	14.1	297.6	12.4	279.0	10.5	249.5
Gross Value Added	PPS/AWU	5 153.7	22.6	6 138.2	27.9	6 298.4	28.5	8 003.4	34.2
Net Value Added	PPS/AWU	3 976.4	24.1	4 696.8	31.5	4 621.6	34.1	5 739.8	41.0
Current Subsidies	PPS/ha	63.6	19.6	215.1	63.1	296.5	82.0	353.6	98.6
Share of Current Subsidies to Factor Income	%	9.8	27.4	28.1	72.2	38.6	93.5	40.3	99.5
Factor Income	PPS/AWU	4 107.9	22.6	5 523.2	29.8	6 242.6	31.4	8 409.8	39.9
Staff Cost	PPS/AWU salaried	8 572.0	57.0	9 833.8	59.9	12 956.2	72.7	10 986.0	58.5
Entrepreneurial Income	PPS/AWU	2 835.0	24.4	4 018.4	36.0	4 177.5	36.9	6 340.6	52.3

Source: Author

Table 4. Ranking of the EU-27 countries by the Factor income per AWU (in PPS)

Country	2001 - 03		2004 - 06		2007 - 09		2010 - 11	
	FI/AWU	Rank	FI/AWU	Rank	FI/AWU	Rank	FI/AWU	Rank
Belgium	25 510	**3**	27 965	**1**	29 208	**2**	31 018	**2**
Bulgaria	6 212	**19**	6 402	**21**	8 680	**19**	9 455	**20**
Czech Republic	9 102	**16**	14 503	**13**	16 675	**11**	20 942	**10**
Denmark	21 150	**7**	22 651	**6**	19 151	**9**	30 390	**3**
Germany	15 311	**10**	19 922	**8**	24 512	**5**	23 267	**7**
Estonia	5 251	**20**	10 130	**17**	12 773	**17**	19 944	**11**
Ireland	13 242	**14**	14 780	**11**	13 742	**14**	14 113	**15**
Greece	15 505	**9**	13 883	**14**	15 866	**13**	16 224	**13**
Spain	26 485	**1**	25 708	**3**	26 068	**4**	26 899	**6**
France	21 236	**6**	21 533	**7**	22 627	**6**	27 509	**5**
Italy	15 087	**11**	13 714	**15**	13 636	**15**	12 729	**17**
Cyprus	13 437	**13**	13 356	**16**	13 564	**16**	12 688	**18**
Latvia	2 497	**26**	5 002	**25**	5 787	**25**	7 291	**24**
Lithuania	3 021	**24**	5 193	**23**	6 865	**22**	8 288	**21**
Luxembourg	23 983	**4**	23 638	**5**	21 786	**7**	16 142	**14**
Hungary	4 422	**21**	6 552	**20**	8 424	**20**	10 890	**19**
Netherlands	26 083	**2**	27 400	**2**	27 415	**3**	27 972	**4**
Austria	12 784	**15**	14 547	**12**	16 314	**12**	17 283	**12**
Poland	2 677	**25**	4 674	**26**	5 867	**24**	7 863	**22**
Portugal	6 589	**17**	7 112	**19**	7 141	**21**	7 523	**23**
Romania	4 281	**22**	5 137	**24**	4 671	**26**	7 031	**25**
Slovenia	4 210	**23**	6 304	**22**	6 350	**23**	6 955	**26**
Slovakia	6 476	**18**	8 465	**18**	10 383	**18**	12 887	**16**
Finland	14 973	**12**	15 692	**10**	18 326	**10**	21 390	**8**
Sweden	15 522	**8**	16 188	**9**	19 450	**8**	20 950	**9**
United Kingdom	22 422	**5**	25 539	**4**	32 301	**1**	35 806	**1**

Note: Malta is not included.
Source: Author

Table 5. Results of the Wilcoxon signed-rank test (Factor Income per AWU in PPS)

Periods	W Sum Ranks	Mean of W	Std Dev of W	Z-Value	p-value	Reject H_0 at 0.05
2004-06 / 2001-03	38	175.5	39.37321	3.4795	0.000502	Yes
2007-09 / 2004-06	59	175.5	39.37321	2.9462	0.003217	Yes
2010-11 / 2007-09	52	175.5	39.37321	3.1240	0.001784	Yes

Source: Author