

Gavrilă, Viorica

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INCREASING THE COMPETITIVENESS OF ROMANIAN FARMS IN THE POST-ACCESSION PERIOD

GAVRILĂ VIORICA¹

Abstract: *The present study investigates various issues related to farm competitiveness, using viability indicators, such as Net Value Added and Net Income of farms, as well as indicators regarding factor productivity, highlighting the relationship between productivity, farm typology and farm size. EUROSTAT and European Commission statistics based on FADN survey from the period 2007-2018 were used. The results reveal that the evolution of income indicators mainly depended on the increase of the physical farm size and on labour force diminution. Both farm specialization and the physical and economic farm size are correlated with labour productivity. Improving the efficiency of production factors should contribute to reducing the disparities in the development level of the agricultural sector.*

Keywords: *farms, productivity, competitiveness*

JEL Classification: *Q12, J24*

INTRODUCTION

The literature emphasizes that there is no single general theory of competitiveness. However, most theories consider that technology and productivity are the main determinants of competitiveness on the long term (Zawalińska 2004). In the studies, there is a tendency to move from isolated indicators, which often weakly capture the spectrum of competitiveness determinants, to more complex approaches (Nowak; Kaminska, 2016).

The selection of data may depend on the competitiveness measures used. Some measures, such as those based on trade, can be calculated only with aggregated data (meso- or macroeconomic level). For other measures, each type of data can be used depending on the purpose of the analysis. Productivity, for instance, can be measured at farm level, at commodity level, at sectoral or national level. Generally, the use of micro-economic data makes it possible to account for variations between firms that would not be captured by using aggregate data (Latruffe, 2010).

One of the important CAP objectives is to support farmers to improve their farm productivity. By countries, there are significant differences, the incomes from Old Member States being generally higher than those from the countries that joined the EU in 2004 or later. The lowest incomes by full-time worker can be found in Romania, Slovenia and Croatia. At the other end of the scale, the factor income by full-time worker in the Netherlands is 3 times the EU average (DG AGRI, 2018). In a report on cereal farms it is shown that, if we consider the farm net value added by annual work unit as the main income indicator, the impact of the crisis from 2009 is very clear. This decreased from 20,221 EUR to 12,873 EUR / AWU (EC, DG AGRI, 2017).

¹ Dr. CSIII VIORICA GAVRILA, Institute of Agricultural Economics, INCE, the Romanian Academy, Calea 13 Septembrie no. 13, sector 5, Bucharest, phone/fax:021/3182411; e-mail: vio.gavrila@yahoo.com

MATERIAL AND METHOD

In the EU, a detailed typology of agricultural holdings was established by economic size classes and type of farming. This is described in (EC) Regulation no. 1242/2008. The standard results describe in detail the economic situation of farms.

The FADN database and Eurostat were used as data sources. The following indicators were used in the analysis: Physical and economic farm size, Labour force, Utilised Agricultural Area. Several income indicators were used, which allow for different comparisons, such as Net Farm Income, Farm Net Value Added, partial labour productivity expressed as NVA/AWU, total factor productivity as total output to total input ratio; the total inputs sum up specific costs, overheads for agriculture, depreciation and external factors, while total outputs represent the agricultural output value. The period under investigation is 2007-2018.

The Net Farm Income (FI) is equal to the Net Value Added (NVA) minus the external factors (hired labour costs, rented land, loan capital), plus the balance of subsidies and investment taxes. Farm NVA is equal to total output value, plus the balance of current subsidies and taxes, direct payments included, minus intermediary consumption (specific costs and overheads for the farm) and depreciation. In order to highlight the differences in size or the structural decreases of labour force used in agriculture, NVA is expressed per annual work unit (AWU), which can be considered as a measure of partial labour productivity.

Total factor productivity is the main indicator for measuring changes in productivity, as it is considered more comprehensive than the partial productivity indicators, such as labour or land productivity. Total productivity increase can be defined as the ratio of changes in the production volume in a given period to the corresponding change in inputs (or factors) used for their production.

The data presented in the table are a subset of Standard Results (SE variables) available in the FADN public database. The variables represent average values per farm.

RESULTS AND DISCUSSIONS

The share of agriculture in total economic activity in the European Union amounted to 1.59% in 2007, and to 1.42% in 2018. In Romania, the share of Gross Value Added (GVA) in agriculture in Gross Value Added of the entire economy is higher, yet on a downward trend, from 5.49% in 2007 to 4.5% in 2018.

The value of crop output increased by 15% in the EU in the period 2007-2018, mainly based on growth in wine, fruit and vegetables, while livestock output increased by 22%. In the same period, crop production in Romania increased by 53%, mainly based on cereals and to a lesser extent on industrial crops, while livestock production decreased by 17%.

In 2013, out of the 10.8 million farms in the EU, 6.5 million (i.e. 59.8%) had a standard output of over 2 000 EUR. The utilised agricultural area (UAA) in EU-28 amounted to almost 175 million hectares. There was a growing trend in the average farm size in most member states. In 2013, the average farm size in EU-28 was 16.1 ha. In 2016, the number of farms decreased to 10.46 million and UAA to 173.3 million hectares. 61.5% of farms had an economic size larger than 2000 EUR and obtained almost 99% of the standard output value. The average UAA per farm was 16.56 hectares.

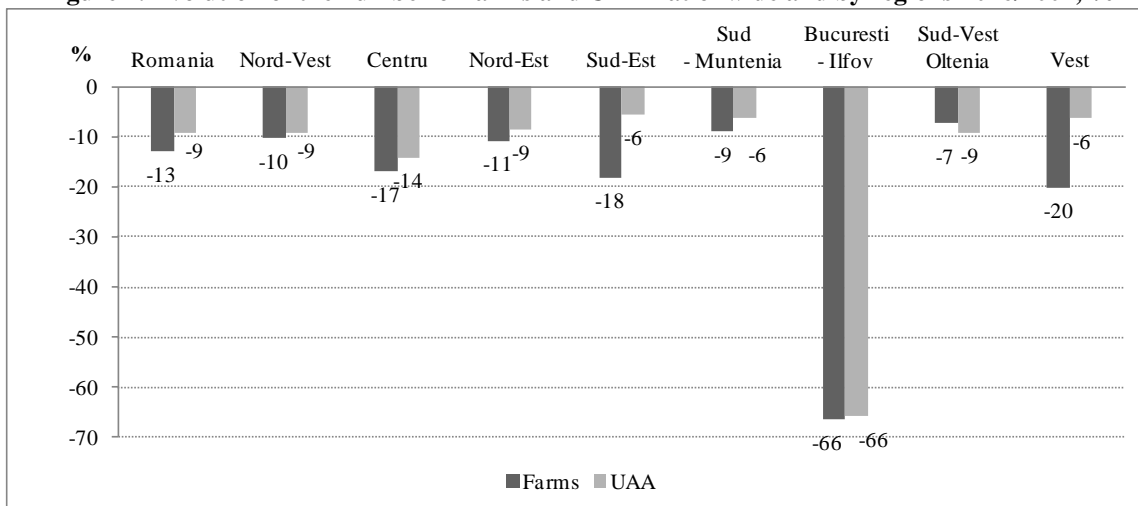
In the EU agriculture, the workforce amounted to 20.5 million persons in 2016. For many people, work on the farm was only a minor activity. When converted into annual work units

(AWU), the agricultural workforce is equivalent to 9.5 million full-time workers. This measure of labour input is used as a labour factor in measuring partial labour productivity.

In the year 2016, about 3.42 million farms with 12.5 million hectares UAA were active in Romania. This means an average farm size of 3.65 hectares. The farms with an economic farm size over 2000 EUR represent almost 32% of total farms and obtain 85% of the standard output value.

In Romania, the full-time or part-time agricultural labour force amounted to 6.1 million persons in 2016, equivalent to 1.64 million full-time workers in annual work units (AWU).

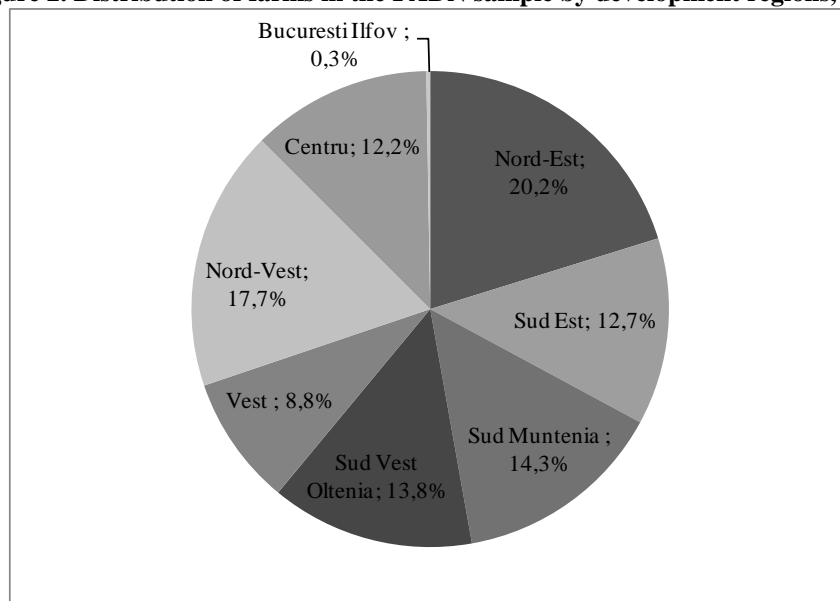
Figure 1. Evolution of the number of farms and UAA nationwide and by regions 2016/2007, %



Source: Eurostat [ef_m_farmleg]

In the period 2007-2016, more than 509 thousand farms ceased their operations, and UAA decreased by 1.25 million hectares. In real terms, the greatest decline was noticed in the Region Centru, by more than 250 thousand hectares. By regions, the largest percentage diminution was reported in the Region Bucureşti-Ilfov (Figure 1).

Figure 2. Distribution of farms in the FADN sample by development regions, 2018



Source: FADN

The FADN farm sample in Romania consists of more than 525 thousand units. Their distribution by regions shows that the greatest number of farms in the sample are found in Region

Nord-Est, i.e. the fifth part, while the farms in București-Ilfov Region account for only 0.3% in total farms in the sample.

The most numerous farms in the sample are mixed farms specialized in crops and livestock, sheep and goat farms, next followed by dairy farms and farms specialized in cereals, oilseeds and protein crops (COP).

According to the FADN farm sample, the average farm size in the European Union was 39.68 hectares in 2018, up by 35% compared to 2007; the economic farm size increased from 49.2 thousand euro to 86.8 thousand euro (76%).

In the FADN sample, one farm averagely used 1.59 AWU in the European Union, with a diminution of labour input by 11% compared to 2007.

On the average, one farm from the EU produced a Net Value Added of 36,953 euro.

The net farm income in the EU was 23,343 euro in 2018, up by 27% from 2007, mainly based on the increase of crop and livestock production and of prices.

The average net value added in the EU was 23295.15 euro/AWU.

In Romania, the *average farm size* from the FADN sample was 17.71 ha, up by 116% from the accession year. The *economic farm size* in 2007 was 7.1 thousand euro and increased by 142%, to reach 17.2 thousand euro in 2018, which represented only 20% of the EU average. This increase in size has hidden significant differences across development regions. Thus, by regions, the largest economic farm size can be noticed in the region București-Ilfov (26.2 thousand euro), followed by the regions Sud-Est (24.6 thousand euro), Vest (21.8 thousand euro) and Sud-Muntenia (20.5 thousand euro); it is in these regions that the greatest increase of the economic farm size was also noticed in the period 2007-2018. The increase of the economic farm size also correlates with the increase of physical size of farms, which can be confirmed if we analyse the farms in terms of their typology.

Table 1. Main indicators of Romanian farms, in the year 2018

	Economic size (SE005) Thou. euro	Total labour input (SE010) AWU	Total Utilised Agricultural Area (SE025) ha	Total livestock units (SE080)	Total output / Total input (SE132)	Farm Net Value Added (SE415) Euro/farm	Farm Net Income (SE420) Euro/farm	Farm Net Value Added /AWU (SE425) Euro/farm
EU	86.8	1.59	39.68	31.56	1.13	36953	23343	23295.15
Romania	17.2	1.24	17.71	7.63	1.33	11474	9051	9248.08
Nord - Est	13.5	1.12	13.2	6.78	1.35	9212	7194	8260.17
Sud-Est	24.6	1.29	27.54	7.92	1.32	17302	13004	13398.53
Sud-Muntenia	20.5	1.1	21.64	6.35	1.38	13343	10109	12171.16
Sud-Vest Oltenia	12.9	1.37	12.75	4.23	1.26	6819	5485	4963.36
Vest	21.8	1.34	25.7	10.5	1.33	16870	13249	12576.88
Nord - Vest	13.8	1.1	12.53	7.54	1.42	9215	7878	7063.37
Centru	18.3	1.26	17.38	12.57	1.28	11111	9016	8810.51
Bucuresti-Ilfov	26.2	0.67	33.31	2.21	2.24	34647	30554	51989.77

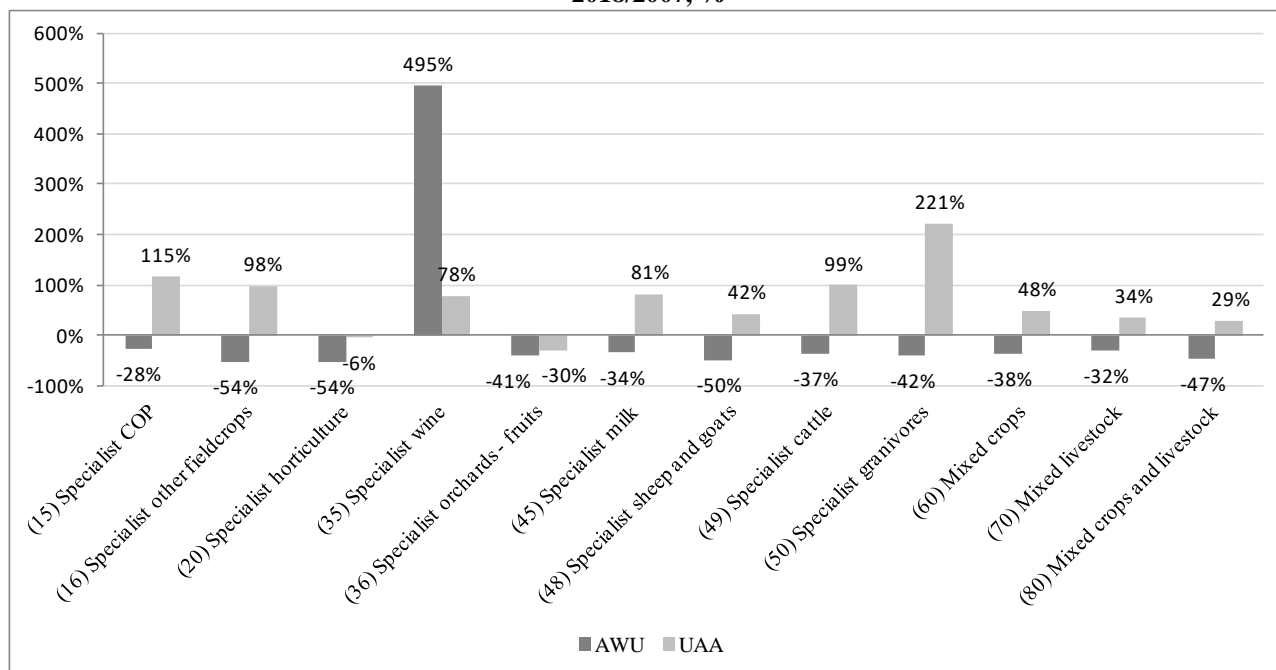
Source: FADN

In the year 2018, the farms from Romania used 1.24 AWU/farm. As compared to the beginning of the investigated period, this indicator reveals a significant diminution of labour on the

farms from the sample (-42%). In percentage terms, the largest labour decline was found on the farms from the regions Sud-Muntenia (-56%), Nord-Est (-53%) and Nord-Vest (-49%).

By farm socialization, the greatest labour diminution in percentage was noticed on the farms specialised in field crops, horticulture and on the sheep and goat farms. Only on the wine farms the labour force significantly increased (Figure 3).

Figure 3. Evolution of labour force and Utilised Agricultural Area by farm specialization, 2018/2007, %



Source: FADN

The gross farm income has high variations for all types of farms, and subsidies (excluding investment) support the farm income to a lesser or greater extent, namely: on the average, in the investigated period, subsidies had an important share in gross farm income, i.e. 37% on the COP farms and 31% on the cattle farms. The most disadvantaged from this point of view are the farms specialised in fruit, wine and horticulture, where subsidies supported farm incomes by 7%, 9% and 12%. On the horticultural farms, the only years when subsidies had an important share were 2008 and 2009, when quite consistent amounts were allocated from the national budget.

The Farm Net Value Added (FNVA) represents the remuneration for the fixed production factors (labour, land and capital), regardless of whether they are external or family factors. As a result, farms can be compared regardless of the family/non-family nature of their production factors. On the average, a farm from Romania produced a FNVA of 11474 euro in the year 2018, which represented 31% of the EU average. The best remuneration of fixed factors was noticed in the region București-Ilfov, with a FNVA of 36647 euro/farm and in the region Sud-Est, with 17302 euro/farm; the latter increased by 337% compared to 2007. The lowest FNVA values were in the region Sud-Vest Oltenia: 6819 euro/farm.

By typology, the farms specialised in granivores and those specialised in cereals, oilseeds and protein crops, had a FNVA 3.3 and 3.2 times as high than the average of all farms. At the same time, on the wine farms FNVA/farm was 2.1 times higher than the sample average.

The net farm income (NFI) represents the amount available for the payment of own production factors (labour, land and capital). In Romania, the net farm income was 9051 euro, by

199% higher than in 2007, due to the increase of crop production. As compared to the EU average, this represented 39%.

By development regions, the net farm income had significant variations, from 30554 euro in the region București-Ilfov, 13249 euro in Vest Region and 13004 euro in Sud-Est to 5485 euro in Sud-Vest Oltenia, which is the region with the lowest farm income.

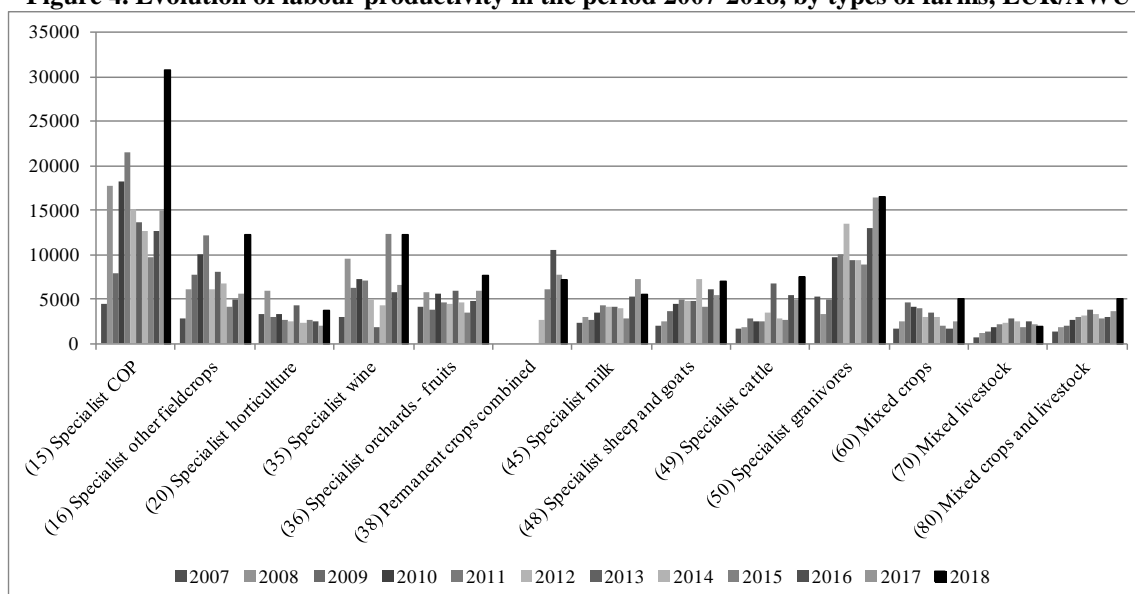
If we refer to the type of specialization, the three types of specialist farms (granivores, COP and wine) also stand out for this indicator. For instance, in the year 2018, the net farm income of farms specialised in cereals, oilseeds and protein crops was twice as high than the 2007-2018 average, and 3.5 times as high than in 2007.

The net farm income did not have a steady increase, depending on external factors, for instance the selling price and weather. For instance, under the background of the decrease of selling prices in 2009 as compared to 2008 (in common wheat from 179.5 EUR/ton to 158 EUR/ton, in maize from 263.8 EUR/ton to 158.0 EUR/ton, and in sunflower from 304.5 EUR/ton to 202.8 EUR/ton), net income decreased more than three times. In the years with higher yields, on the COP farms, even though prices were slightly lower, incomes were up. This was the case in 2018, when the yield in cereal grains was 5999 kg/ha, higher by 64% than the 2007-2018 average, and prices lower by 12% in common wheat, by 21% in maize and by 9% in sunflower.

On the Romanian farms, *labour productivity* represents almost 40% of the EU average. One annual work unit averagely produced 9248.08 euro NVA. In terms of the investigated indicator, the ranking of regions does not change. The highest labour productivity is found on the farms from the region București-Ilfov, i.e. 51989.77 euro/AWU, followed at great distance by the regions Sud-Est (13398.53 euro/AWU), Vest (12576.88 euro/AWU) and Sud-Muntenia (12171.16 euro/AWU). The region Sud-Vest Oltenia has the lowest labour productivity, more than ten times lower than in București-Ilfov. In dynamics, labour productivity increased by 56% compared to the base year. The most spectacular increase was in the region Sud-Muntenia, more than 6 times and in the regions Sud-Est and Nord-Est, more than 5 times, mainly due to the decline of labour force and UAA increase on the farms from sample.

By farm specialization, the highest labour productivity was noticed on the COP farms, with 30793.66 euro/AWU, 2.3 times higher than the average of all farms, in the year 2018.

Figure 4. Evolution of labour productivity in the period 2007-2018, by types of farms, EUR/AWU



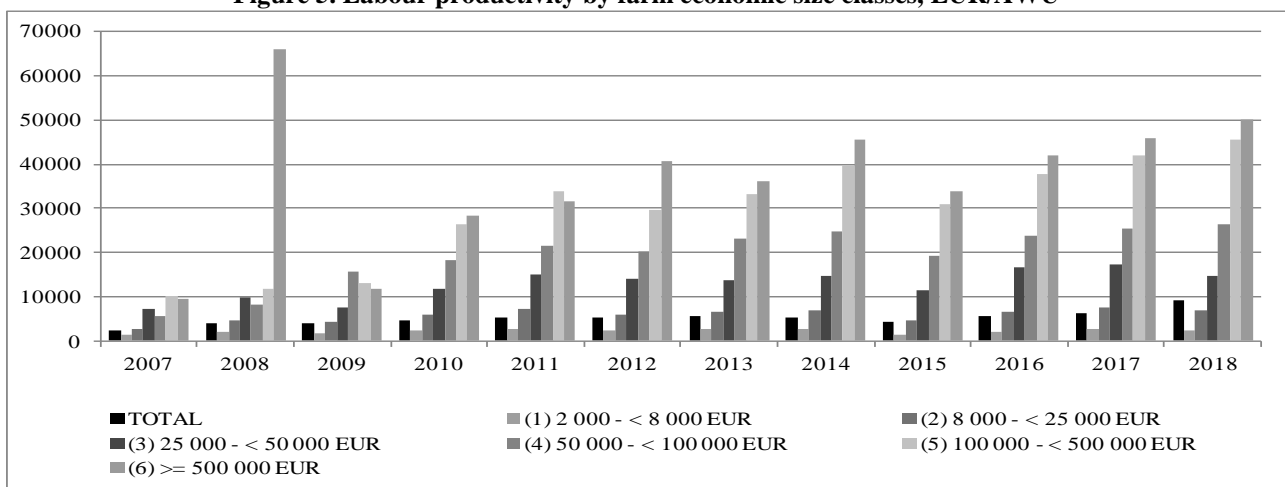
Source: FADN

However, in the investigated period, labour productivity did not increase constantly, depending on external factors, such as selling prices and weather conditions. In the years with good yields, labour productivity increased, even though prices slightly decreased. The farms specialised in granivores rank second in terms of this indicator, with NVA/AWU of 16506.5 euro in 2018, while the wine farms (12301.15 EUR/AWU) and those specialised in other field crops (12202.37 EUR/AWU) rank third and fourth.

The mixed livestock farms and the horticultural farms had the lowest productivity throughout the investigated period.

Starting with the year 2012, labour productivity was directly correlated with the economic farm size (Figure 5).

Figure 5. Labour productivity by farm economic size classes, EUR/AWU



Source: FADN

Total factor productivity means economic output per unit of input. The unit of input represents all production factors, including labour force, machinery and energy (total factor of productivity). Total factor productivity in 2018 was higher by 19% than the EU average on the Romanian farms, which can be explained by the total intermediary consumption per 1 ha UAA lower by 51% than the EU average and favourable pedological conditions; however, the yearly variations show that the external factors, such as prices and weather, had a significant influence. Depending on the specialization of farms, total factor productivity ranged from 1.12 on the granivore farms to 1.95 on the fruit farms in the year 2018.

CONCLUSIONS

In Romania, the value of agricultural output increased in the analysed period, mainly based on cereal crops and to a lesser extent on industrial crops, while livestock output decreased, indicating a non-sustainable development on the long run. In the EU, the percentage increase was lower and was based on the increases in wine, fruit and vegetables, products with high value added, while livestock output also increased.

The indicators in the FADN sample reveal a significant gap compared to the EU average: the economic farm size is five times lower, the net value added is less than one-third of the EU average, the net farm income represents 40% of the European average, and labour productivity is 2.5 times lower.

In dynamics, the increase of the economic farm size correlates with the increase in the physical farm size. This increase in size hid the significant differences between development regions and between farm types.

Labour force on the Romanian farms declined by more than 40% in the investigated period, with the greatest percentage diminution on the farms from the regions Sud-Muntenia, Nord-Est and Nord-Vest, and by farm types on the farms specialised in other field crops, horticulture and on the sheep and goat farms.

In the analysed period, the income indicators largely depended on external factors, such as the selling price of agricultural products and the weather conditions.

The best remuneration of fixed production factors was obtained on the granivore farms and on the farms specialised in cereals, oilseeds and protein crops (COP), with NVA/farm 3.3 and 3.2 times as high than the average of all farms, due to the increase in size and yields.

At the same time, NVA/farm on the wine farms was 2.1 times as high than the sample average, which can be associated with the effects of restructuring under the national support programme.

On the farms specialised in horticulture, the effects of organization into producer groups and organizations have not been noticeable yet.

In Romania, the net farm income increased mainly as a result of crop production growth. In the ranking of regions, the region București-Ilfov ranks first, while Sud-Vest Oltenia is on the last position. If we refer to the specialization type, the three types of farms (granivores, COP, wine) also stand out in the case of this indicator, too.

In dynamics, labour productivity increased by 56% compared to the base year. The most spectacular increase was in the region Sud-Muntenia, by more than 6 times and in the regions Sud-Est and Nord-Est, by more than 5 times, due to the decline in the labour force and to the increase of UAA on the farms in the sample and to farm specialization type. By farm specialization, the highest labour productivity was noticed on the farms specialised in COP. Over time, labour productivity increased in only four farm specializations: on COP farms, on those specialised in granivores, in other field crops and on the wine farms.

Based on lower intermediary consumptions compared to the EU average, total factor productivity was slightly higher on the Romanian farms, which can be also explained by the favourable pedological conditions.

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