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LABOUR PRODUCTIVITY IN ROMANIA'S AGRICULTURE. A REGIONAL ANALYSIS BY FARM TYPES

ABSTRACT

The paper makes an analysis of labour productivity situation on the Romanian farms, across regions. The information sources used in the paper are the *Farm Structure Surveys* (FSS) in the years 2003, 2007, 2010 and 2013 and the *Farm Accountancy Data Network* (FADN) surveys conducted every year to collect data on the economic-financial results from farms, in each European Union member state. The results of the study indicate that in the investigated period, 2007–2012, there were economic growth trends on the Romanian farms, more obvious in certain regions (West region) or less obvious in other regions (North-East). In this context, there are important evolutions in relation to farm incomes, to subsidies and their effects, to farm capital increase and their effects upon the labor productivity. The results are compared to similar indicators at European level.

This analysis regarding the economic results by regions brings new elements and leads to formulating certain conclusions in relation to the effects of the Common Agricultural Policy, as well as to the importance of certain local, socio-economic and structural factors upon labour productivity.

Key words: agricultural production, territorial distribution, structural changes.

JEL Classification: Q12, Q14.

1. INTRODUCTION

Labour productivity in Romania's agriculture is extremely low, as a result of the relatively low level of gross agricultural output in the first place, based on a mix of products with low value added and on the unbalanced structure of the sector, as the share of animal production was down to under 30% of the agricultural production value in the last years. On the other hand, the excessively high number of persons working in agriculture has significantly contributed to this negative situation. Romania is the EU country with the most numerous population working in agriculture, which accounts for 25.5% of total employed population nationwide, as against 4.5% the EU-28 average. At the same time, the importance of the primary sector (agriculture, forestry and fisheries) in labour employment decreased, from 36.4% in total employed population in the year 2002 to 25.5% in 2015, i.e. by 11% in a 13-year period. Expressing the labour force in agriculture in annual work units (AWU), the 2.4 million natural persons working in agriculture in Romania in the

year 2014 represent 1.443 million annual work units. Even so, Romania has one of the lowest agricultural productivities in EU-28, i.e. only 29.1% of the EU average in the year 2014, being on the penultimate place after Latvia.

The analysis of labour productivity evolution in agriculture starts in the first place from the fact that the population employed in Romania's agriculture has already had a decreasing rate and is expected to decrease in the next period. According to certain scenarios, the population employed in agriculture is expected to continue to decrease, from 2.4 million in the year 2014, to 1.4 million by the year 2028 and 1.04 million by the year 2038, under a realistic scenario, and to reach even less than one million (about 800 thousand) in the year 2038, under an optimistic scenario. These scenarios take into consideration the general trend of demographic decline in Romania and the job creation expectations in the secondary and tertiary sectors, under the background of economic growth and integration of markets in the European space. At the same time, the financial allocations for agriculture from the financial exercise 2014–2020 will create premises for a more sustained growth of *Gross Value Added* (GVAa) by the 2020s, both through the increase of physical yields and by promoting products with high value added (fruit, vegetables, animal products).

The very high rate of labour productivity growth in Romania in the period 2009–2014, by 10% annually, is worth mentioning. At the same time, the absolute data regarding the indicator GVAa/AWU in Romania reveals that in the last 10 years (2005–2015), labour productivity in Romania's agriculture practically doubled, while the EU average increased by 43%.

2. MATERIAL AND METHOD

The information sources used in this paper are represented by the farm structure surveys (FSSs) in the years 2003, 2007, 2010 and 2013 as well as the *Farm Accountancy Data Network* (FADN), which annually collects data on the economic and financial results of farms from the EU member states, from Romania inclusively.

In the FSS surveys all the agricultural farms with at least one hectare from the European Union are included. However, the threshold for inclusion in the survey varies from country to country, this survey covering at least 98% of the utilized agricultural area in the European Union and at least 98% of the total number of animals. Instead, the selection of farms in FADN is based on selection plans prepared by each member state.

The FADN surveys refer only to the farms that exceed a certain economic size and thus have the greatest contribution to agricultural production, to the cultivation of agricultural areas and to labour employment.

The FADN database supplies representative data according to three criteria, namely by regions, by economic size and technical-productive orientation. This information network is the only source of micro-data harmonized at EU level that complies with the same principles and methodologies in all the EU-28 member states.

Table 1

Characteristics of the Farm Structure Survey (FSS)
and of the Farm Accountancy Survey (FADN)

	Farm Structure Survey (FSS)	Farm Accountancy Survey (FADN)
Population size	Entire population	Only farms considered commercial farms Extrapolation to basic population is based on weighting coefficients
Threshold	Differs from country to country and provides representativeness at national level. In many countries it has been established at 1 ha; in Romania there is no minimum threshold	It is based on the farm production value (standard output). The thresholds are differentiated by countries. In Romania, the minimum threshold is 2000 euro as farm production value (standard output).
Periodicity	3–4 years	Annually
Time series	2003, 2007, 2010, 2013	2007–2013
Space resolution	Local administrative units	Identification of farms at NUTS 3 level
Type of information	Structural	Financial and structural

Source: EC, DGAGRI, EU Farm Economics Overview FADN 2012, Brussels, 2015

The indicators supplied on the basis of FADN data are mainly indicators used for the evaluation of incomes and financial indicators that provide average values by categories of farms. This paper makes an analysis of problems related to the resources, structure of farms and their economic performance, mainly as reflected by the net value added and productivity by annual work unit. The approach is at regional level, and the indicators corresponding to Romania are compared to the average levels in the European Union, also extracted from the FADN database. The investigated period is 2005–2013.

3. RESULTS AND DISCUSSIONS

3.1. ECONOMIC SITUATION OF FARMS ACROSS REGIONS

In the analysis from this chapter we used the information from the farm accountancy surveys (FADN), which include farms the production of which exceeds 2000 euro per year. There were about 6ooo farms that provided information to this network in the year 2013, which are considered representative for the 1.2 million farms with an economic size higher than 2000 euro from Romania. The distribution by geographic regions of the 1.2 million farms represented in this database is the

following: North-East (22%), South-East (12%), South-Muntenia (17%), South-West Oltenia (15%), West (7%), North-West (15%), Center (10%), Bucharest–Ilfov (2%). The significant indicators for the average farm by development regions are presented in Table 2. The farms in the FADN sample from Romania have a relatively small average area compared to other European countries, the country average being 9.9 hectares.

Table 2

Average indicators of farms from Romania by regions in the year 2013

	Economic size (SO) (thou. euro)	Utilized agricultural area (ha)	Number of animals (LSU)	Total production value (euro)	Gross farm income (euro)	Net value added (euro)
North-East	6.6	7.3	5.7	9273	5539	4484
South-East	10.7	14.5	7.1	16442	11562	10562
South-Muntenia	9.5	11.9	6.7	14920	8398	6319
South-West Oltenia	6.6	6.6	5.0	10400	7266	5992
West	10.9	16.2	7.1	18425	12330	10827
North-West	7.4	8.7	5.9	12168	9434	8535
Center	9.4	10.8	8.1	14413	9497	8449
Bucharest– Ilfov	11.6	5.0	3.7	9538	6889	4920
Romania	8.4	9.9	6.3	12967	8564	7293

Source: FADN database.

In the European Union, the farm size ranges from a few hectares (Malta: 2.57 ha) to several hundred hectares (Slovakia: 595 ha, the Czech Republic: 233 ha). Romania and Bulgaria, as well as Greece and Slovenia are in the category of countries with small-sized farms. Among the countries in which the average farm size in the sample exceeds 100 ha we can also find Estonia and Sweden, besides the already mentioned countries. The EU average farm size is 32.7 ha.

The economic size of farms is represented by the number of standard output (SO) units, a standard output unit being 1000 euro. The EU average is 58 units, Romania having a relatively modest average of 8.4 units per farm in the year 2013. Maximum values in the EU can be found in Slovakia (474 units) and the Netherlands (368 units). At the same time, the average farm size in the FADN sample significantly increased from 2007 to 2013, which signals out that a consolidation process took place at the level of commercial farms and even of semi-subsistence farms, quite significant in certain regions. Thus, the average size of farms from the West region practically doubled, from 7.8 ha to 16.2 ha. At the same time, the farm size in the regions South-East and South-Muntenia increased by over 50%. The farm size in the region Bucharest–Ilfov decreased by 40% in the same period.

There was a relatively modest increase of the average number of animals per farm in the investigated period, only by 15% on the average nationwide, in the year

2013 compared to 2007. The regions where the average number of animals per farm increased the most are West and South-West Oltenia. In the regions Center and North-West, the average number of animals per farm decreased in the period 2007–2013.

The economic indicators of farms in relation to their specialization (Table 3) reveal that the highest incomes are found on the farms specialized in field crops (grains, oil crops, protein crops) and on those specialized in raising granivores (pigs and poultry).

Table 3

Farm income in Romania by production specialization, in the year 2013

	Total production value euro	Intermediary consumptions euro	Total prod./ interm. consumption %	Gross income euro	Net value added euro	Net value added/AWU euro
Field crops	41286	21464	129	28437	24944	16791,7
Horticulture	11568	4876	167	7170	6014	3878,5
Viticulture	18050	6327	98	12593	5666	2545,6
Other permanent crops	16491	5382	180	12016	10201	7039,6
Dairy farms	7813	3521	165	5188	4316	4052,3
Other herbivores	12512	5930	166	8410	7454	5455,6
Granivores	24946	13260	137	13625	11342	7921,5
Mixed farms	7829	3675	161	4919	3996	3501,4
Total	12967	6261	149	8564	7293	5868,9

Source: FADN database.

In terms of net value added per annual work unit, the farms specialized in field crops are also on the first positions, followed by the farms specialized in granivores and those specialized in other permanent crops (mainly orchards). A relatively similar situation can be noticed at the level of the European Union, where the farms specialized in raising granivores, in field crops, wine and horticulture have values above the EU average for the net value added per farm in relation to the number of annual work units, while the farms specialized in raising other herbivorous animals (sheep, goats) and the mixed farms have remained under the EU average. In dynamics, in the European Union, this indicator increased in the year 2013 for the farms specialized in granivores and horticulture, and decreased for the farms specialized in field crops, vine farming and dairy cows, mainly under the effect of production price changes.

A significant difference by comparison with the European levels is represented by the extremely low net value added on the farms specialized in horticulture in our country, compared to the EU average, where this specialization ranks second in terms of economic results. There are significant economic performance gaps between the

Romanian farms and the farms from most EU-15 countries. Table 4 presents the net value added by the main types of farm specializations from Romania and France.

Table 4

Net Value Added of Farms (FNVA) with different specializations in Romania and France, in the year 2013

	Romania (euro)	France (euro)	$FNVA_{FR}/FNVA_{RO}$
Field crops	24944	63660	2.5
Horticulture	6014	96768	16.1
Viticulture	5666	102722	18.1
Other permanent crops	10201	108768	10.7
Dairy farms	4316	51737	11.9
Other herbivores	7454	34607	4.6
Granivores	11342	56540	4.9
Mixed farms	3996	54836	13.7
Total	7293	62665	8.6

Source: FADN database.

3.2. REMUNERATION OF PRODUCTION FACTORS BY FARM SIZE AND REGIONS

Farm net value added is an indicator that measures the remuneration of production factors (labour force, land, capital), regardless of whether these are external to farm or belong to the farm. In absolute value, this indicator widely varies across EU-28 (Fig. 1), with the highest value in Slovakia (176000 euro), followed by Denmark and the Netherlands, and the lowest in Slovenia (5900 euro), Romania coming next.

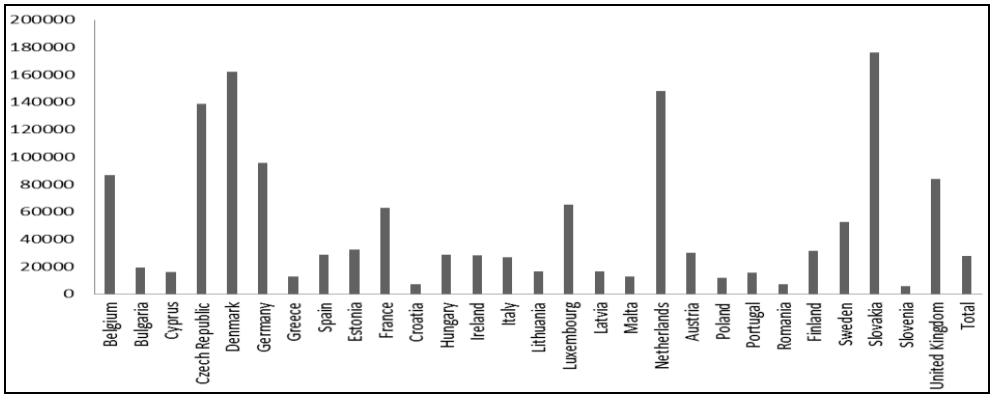

Figure 1. Farm net value added (euro) in EU-28, in the year 2013.

The value of this indicator is mainly correlated with the average farm size and in this context we must have in view that in Slovakia the average farm size is almost 600 ha, while in Romania the average farm size from the FADN sample is 9.9 ha.

The net value added per annual work unit also widely varies, with significant gaps between the EU member states. In the year 2013, Denmark had the highest value (89000 euro/AWU). Croatia is on the last place (3800 euro/AWU), followed by Slovenia (4100 euro/AWU) and Romania (4800 euro/AWU). At the same time, we can notice that among the EU Old Member States, i.e. EU-15, only Greece and Portugal had a gross value added per annual work unit lower than the EU average (18100 euro/AWU, 2013). Among the EU New Member States, only Hungary and Poland have values above the average, while the other states are under the EU average.

The farm net value added has not had very coherent evolutions in any region from Romania (Table 5), being also influenced by the evolution of weather factors. In general, the regions that had values above the national average in the period 2007–2013 are Bucharest–Ilfov, West, South-East, North-West and Center, while the regions under the country's average are North-East, South-Muntenia and South-West Oltenia.

We can also notice the high volatility of farm gross value added in all regions, although this is less strong in Center, North-West and North-East regions, where the share of livestock production is higher.

In dynamics, the net value added per farm increased by 53% nationwide in the year 2013, as compared to 2007, with much higher variations across regions. Thus, it increased in most regions, the highest increase being noticed in the regions South-East (+166%) and West (+137%) and decreased in Bucharest–Ilfov (–70%). These variations are mainly determined by the influence of weather factors upon the mix of crops in the respective region, as well as by prices.

Table 5

Evolution of farm net value added, by development regions, in the period 2007–2013

	2007 (euro)	2008 (euro)	2009 (euro)	2010 (euro)	2011 (euro)	2012 (euro)	2013 (euro)	2007–2013 average	2013/2007 (%)
North-East	2887	3123	3541	4636	4851	4258	4484	3969	155
South-East	3962	6110	5115	8016	9272	10358	10556	7627	266
South-Muntenia	3382	3911	4093	4758	7187	5981	6319	5090	187
South-West Oltenia	4519	4687	3482	4547	6151	6609	5992	5141	133
West	4576	4662	6095	10891	11526	12068	10827	8664	237
North-West	6594	5796	6003	6954	6919	7020	8535	6832	129
Center	8577	6733	5501	6548	7115	7555	8449	7211	99
Bucharest–Ilfov	15711	21996	9352	17966	11116	11896	4920	13280	31
Total	4756	5256	4762	6119	7074	7057	7293	6045	153

Source: FADN database.

The results are also similar for the value added per annual work unit, where the regions Bucharest–Ilfov, West, Center and South-East are also above the country's average, while the regions North-East, South-Muntenia, South-West Oltenia and North-West have values under the national average (Table 6). At the same time, there are noticeable increases of gross value added per annual work unit in all regions, less in the region Bucharest–Ilfov. The highest increases were noticed in the regions South-East (309%) and West (296%).

Table 6

Evolution of agricultural net value added per annual work unit, in the period 2007–2013

	2007 (euro)	2008 (euro)	2009 (euro)	2010 (euro)	2011 (euro)	2012 (euro)	2013 (euro)	2007–2013 average	2013/2007 (%)
North-East	1218	1850	2401	3614	4279	4166	4642	3167	381
South-East	1967	3840	3201	5854	6143	6937	8046	5141	409
South-Muntenia	1654	2482	2981	3706	5253	4222	4469	3538	270
South-West Oltenia	2124	2448	2190	3533	4298	4603	4557	3393	215
West	2462	2562	3667	8861	10154	11490	9746	6992	396
North-West	3054	3081	3401	4031	4144	4763	6017	4070	197
Center	3822	4092	3734	4947	5611	6650	7217	5153	189
Bucharest–Ilfov	12923	10267	3935	7896	7469	8897	4382	7967	34
Total	2224	3051	3051	4485	5184	5436	5869	4186	264

Source: FADN database.

As regards the net value added per annual work unit calculated in relation to the economic size of farms, we can notice that the value of this indicator is comparable with the European average of 18100 euro/AWU only starting with the farms whose standard output is 50000–100000 euro (Table 7).

Table 7

Value added per annual work unit, by farm size groups and regions, 2007–2013 average values (euro/AWU)

	2000–8000 euro	8000–25000 euro	25000–50000 euro	50000–100000 euro	100000–500000 euro	over 500000 euro
North-East	2133	5507	11602	17611	16639	26577
South-East	2085	6298	14836	21630	28171	28321
South-Muntenia	1668	4610	11070	18947	18533	25656
South-West Oltenia	2421	5458	11855	14083	28942	–
West	2844	7861	16731	22766	37318	70637
North-West	2760	5828	12976	20868	30816	18925
Center	2799	5695	13730	19163	16535	18221
Bucharest–Ilfov	3265	6235	–	–	8544	–
Total country	2307	5776	13041	18516	23469	25655

Source: FADN database.

In other words, in Romania, only the farms with a standard output higher than 50000 euro are closer to the average productivity performance of the European Union.

At the same time, the highest net value added per annual work unit was found in the region West, in almost all the categories of farms from this region, which shows that West region is the region with the highest labour productivity in agriculture in Romania.

Subsidies have a direct impact upon farm incomes. At the same time, farmers receive several types of subsidies targeting certain activities, from EU and national sources. Table 8 presents the share of subsidies in total farm income and in the net value added. The total farm income is calculated by subtracting the intermediary consumption from the total value of production plus the balance of subsidies and taxes. We can notice how important subsidies are, as on the average subsidies account for about one quarter of total farm incomes. The total subsidies include subsidies for crop production, including direct payments, subsidies for animal herds and animal products, rural development subsidies, subsidies for inputs and other subsidies.

Table 8

Total amount of subsidies received by farms and their share

	2007	2008	2009	2010	2011	2012	2013
Total subsidies/farm, except for investment subsidies – euro	2119	1492	1725	1538	1693	1944	2033
% in total farm incomes	36.1	23.7	28.7	21.1	20.5	23.4	23.7
% in farm net value added	44.5	28.4	36.2	25.1	23.9	27.5	27.8

Source: own processing based on FADN data.

The direct payments per hectare have had an increasingly important place in the production subsidies. We can notice from Fig. 2 that the share of direct payments in total subsidies received by farms decreased from about 67% in the year 2007 to 19% in 2013.

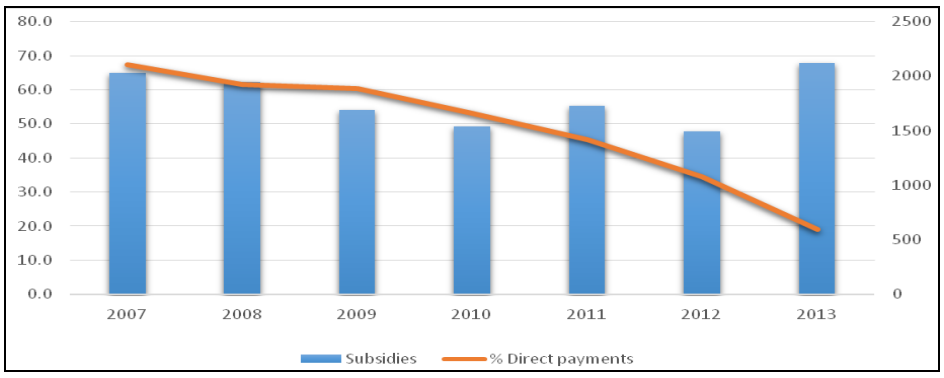

Figure 2. Direct payments received by farms and their share in total subsidies at medium-sized farm level

4. CONCLUSIONS

From this analysis we can draw several conclusions to capture the significant evolutions of the Romanian farms in the period 2005–2007–2013, namely:

1) The distribution of farms by development regions remained unchanged in the period 2005–2013, with the highest number of farms in the regions North-East and South Muntenia (each with 21% of total), followed by the region South-West Oltenia (with 15%). The lowest number of farms is found in the region West (only 7% of total).

2) As regards the value of agricultural production, the most important region is South-Muntenia, followed by the regions South-East and North-East. In terms of agricultural production structure, the region Center has the most balanced structure, where the share of livestock production has reached 40%, and the region North-West, where the share of livestock production is 36%.

4) The economic indicators of farms in relation to their specialization reveal that the highest incomes are found on the farms specialized in field crops (grains, oil crops, protein crops) and the farms specialized in raising granivores (pigs and poultry).

5) The farm net value added (FNVA) has not had very coherent evolutions in any region, being influenced by the evolution of weather factors; in the period 2007–2013, the regions that had values above the national average are Bucharest–Ilfov, West, South-East, North-West and Center, while those under the country's average are North-East, South-Muntenia and South-West Oltenia.

6) The net value added per annual work unit is comparable with the EU average only on the Romanian farms with a standard output ranging from 50000 to 100000 euro. The region with the highest labour productivity value in agriculture in Romania is the region West.

7) Subsidies have a direct impact upon farm incomes, on the average representing about one quarter of total incomes of farms.

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