Cecilia ALEXANDRI, Lucian LUCA

Institute of Agricultural Economics, Romanian Academy, Bucharest
cecilia@eadr.ro
luca@eadr.ro

COMMON AGRICULTURAL POLICY EFFECTS ON FARMS

ABSTRACT

The paper analyses the impact of the Common Agricultural Policy on the agrarian structure and farm incomes. The analysis used information provided by the Farm Structure Surveys from 2006 to 2016, information from the Agency for Payments in Agriculture (APIA) and by the Eurostat databases. The obtained results reveal the farmland consolidation in the period 2005–2016, together with the decrease of the number and areas of small farms. At the same time, changes were produced in farm production, in the sense of livestock sector diminution, decrease of crop production diversity and increased importance of the grain and oilseed sector. The farm incomes significantly increased in the post-accession period, mainly due to subsidies in the form of payments per hectare.

Key words: CAP, farms, direct payments, Romania.

JEL Classification: Q18, Q15, Q14.

1. INTRODUCTION

The assessments made in recent years on the effects of CAP implementation in the EU New Member States, in Romania inclusively, revealed as main positive effects the improvement of the agricultural trade balance and the increase of farm incomes in particular, while as negative effects the strong concentration trend of agricultural land and the orientation towards extensive farming (C. Csaki, A. Jambor, 2013).

Under the influence of CAP adoption, the performance of agriculture in Romania as well as in the other Central and Eastern European countries has improved. The share of agriculture in GDP decreased, the value of agricultural output per hectare increased, grain yields also increased, while labour productivity significantly improved. At the same time, farm production evolved in an extensive direction, under the background of the livestock sector decline, both in Romania and in the other countries in the region.

In this paper, we intend to identify the main domains in which changes were produced due to CAP funding.

2. MATERIAL AND METHOD

The paper contains socio-economic analyses performed on the basis of indicators concerning agriculture funding in the pre- and post-accession periods, as well as information on farm and agricultural production structure, evolution of farm incomes and subsidies, labour productivity and other. This information comes from the Farm Structure Surveys, the Farm Accountancy Data Network (FADN), as well as from Eurostat. A set of information concerning agriculture funding in the period 2003–2015 was provided by the Agency of Payments in Agriculture (APIA).

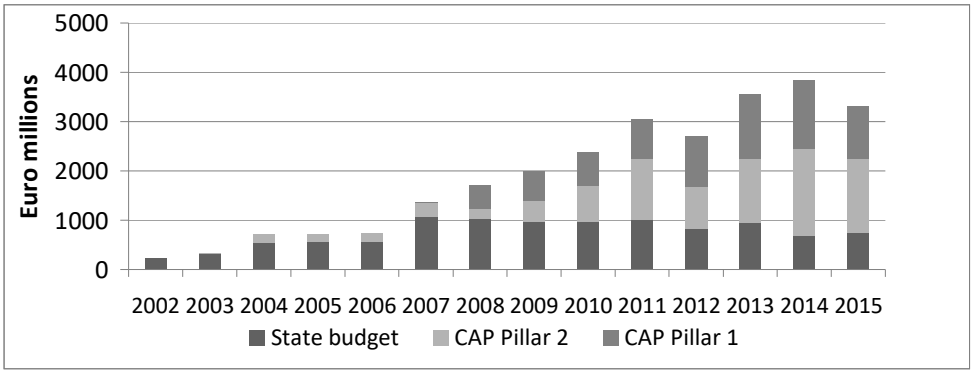
For the evaluation of farm production diversity in 2015, compared to 2007, the Berry index was calculated for farms of different sizes. Comparisons were also made between the key indicators of agriculture in Romania as against the European average, in order to identify the direction in which Romanian farms have evolved.

3. RESULTS AND DISCUSSIONS

3.1. AGRICULTURE FUNDING IN THE POST-ACCESSION PERIOD

Romania's accession to the European Union brought about the *predictability of the value of financial support to agriculture, due to the multi-annual financial programming of European funds,* with a positive impact on the increase of farm production and farmer incomes. To complement the EU funds, the state budget contribution to support agriculture significantly increased, being around one billion euros annually in the first years after the accession, to follow a downward trend after 2012. Total public funding to support agriculture has continuously increased, exceeding 3 billion euros in each of the last four years (Fig. 1), cumulating the support in the form of state aid (from national funds, of the state budget), through the measures of CAP Pillar 1 (from the European Agricultural Guarantee Fund) and through the measures of CAP Pillar 2 (from the European Agricultural Fund for Rural Development, to which the national contribution is added).

The European funds for agriculture will continue to increase by the year 2020, which will result in total allocations – from EU and national funds – of about 4 billion euros annually. The increase of support to agriculture is due to the increase of direct payments (provided under CAP Pillar 1), which in 2016 were estimated at 1.77 billion euros, while in 2019 at 1.90 billion euros. These allocations are the result of negotiations from the CAP 2013 reform, and the cumulated financial support for Romania for the period 2015–2020 includes 10.85 billion euros for direct payments and 8.12 billion euros for the NRDP 2014–2020 payments.



Source: Authors' processing of MARD data.

Figure 1. Evolution of support to agriculture and rural development from national and EU funds in the period 2003–2015 (actual payments per calendar years).

The implementation of the Common Agricultural Policy and of the measures from Pillar 1 in particular, had as first effect the increase of farm incomes, but at the same time it brought about changes in the farm structure and productive orientation. Under CAP Pillar 1, farms received consistent support, in the form of direct payments, of coupled payments inclusively and of market measures.

3.2. FARM DYNAMICS

Following the application of successive legislative regulations for the agricultural land restitution to former owners and their heirs, Romania became the European Union country with the largest number of farms. In the year 2016 there were about 3.4 million farms in Romania that owned agricultural land, accounting for 33% of the total number of farms in the EU. Most of these are subsistence and semi-subsistence farms, having an important role in the food security of peasant households, but a minor role in the formation of food supply crossing the chains to processors and final consumers. At the same time, in the last 10 years, the number of farms followed a downward path and land was concentrated on medium and large-sized farms, in various ways, mainly by land lease but also by land sale/purchase. Land consolidation led to the increase of the number of large and very large-sized farms and partially of the number of medium-sized farms (Table 1).

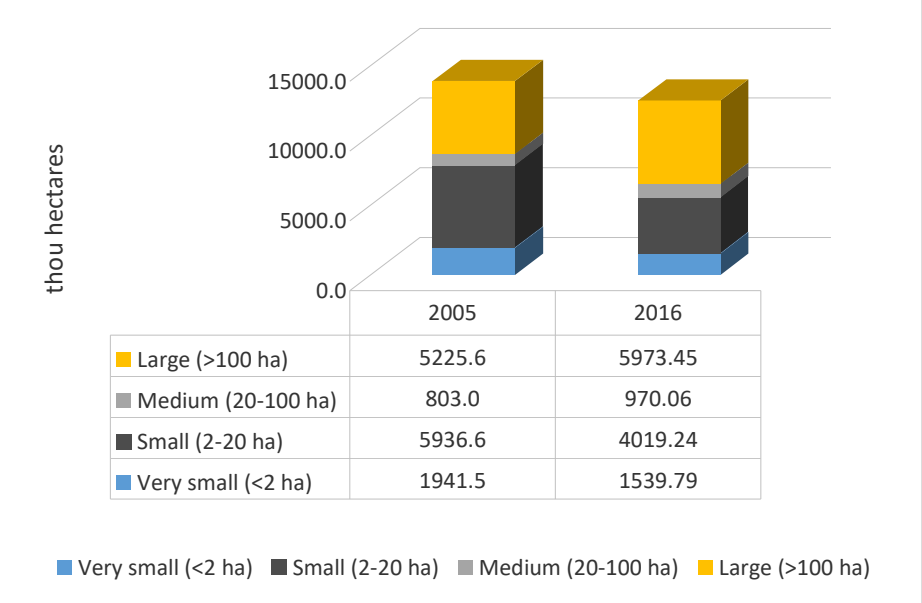
At the same time, the areas utilized by the large and medium-sized farms increased, while the land areas utilized by small farms decreased (Fig. 2). In the period 2005–2016, the total number of farms was down by 20%, while the average farm size increased from 3.3 ha in the year 2005 to 3.6 ha in 2016; very great differences continued to exist between the size of farms without legal status (2 ha/farm on the average) and those with legal status with an average size of 175 ha/farm.

Table 1

Number of farms and utilized agricultural area

	Number of farms (thousand)			Utilized agricultural area (thou. hectares)		
	2005	**2016**	**(2016)–(2005)**	**2005**	**2016**	**(2016)–(2005)**
Total	4256.2	3422.0	–834.1	13906.7	12502.5	–1404.2
Zero ha	134.9	79.8	–55.1	0.0	0.0	0.0
Under 2 ha	2721.7	2400.9	–320.8	1941.5	1539.8	–401.7
2.0–4.9 ha	1014.1	660.0	–354.1	3160.6	2048.6	–1112.0
5.0–9.9 ha	289.6	194.2	–95.4	1926.4	1304.4	–622.0
10.0–19.9 ha	65.9	50.2	–15.7	849.6	666.3	–183.4
20.0–29.9 ha	10.1	11.0	+0.9	243.2	263.0	+19.7
30.0–49.9 ha	6.0	7.5	+1.5	227.1	288.6	+61.5
50.0–99.9 ha	4.9	6.0	+1.1	332.7	418.5	+85.8
Over 100 ha	8.9	12.3	+3.4	5225.6	5973.5	+747.9

Source: Author's processing based on Eurostat data.



Source: Eurostat.

Figure 2. Utilized agricultural area by very small, small, medium and large-sized farms.

At the same time, the subsistence economy continued to be very present on the Romanian farms. Although the subsistence phenomenon has decreased in recent years, it has remained a significant phenomenon, as the number of farms that utilize more than 50% of their final output for their own needs stood at quite a constant level in the mentioned period, i.e. at 80–87%.

3.3. LIVESTOCK HERDS

The number of animals, expressed in livestock standard units (LSU), decreased by 27% in the investigated period, 2005–2016 (Table 2). The evolution of livestock herds by species indicate that the number of animals decreased in the year 2016 as against 2005, by 33% in cattle, by 16% in pigs and 11% in poultry. At the same time, the number of sheep herds increased by 20% and the number of goats by 76%. The animals are mainly raised on small farms, without legal status, the average number of animals per farm being under 2 LSU, and the consolidation of livestock herds has been a slow process in all the regions of the country. However, in the investigated period, the livestock herds on the farms with legal status increased by 41% in 2016 compared to 2005.

Table 2

Evolution of livestock herds (LSU) in Romania in the year 2016

	MU	**2005**	**2007**	**2010**	**2013**	**2016**	**%**
Total LSU	LSU	6602750	6041720	5444180	4975310	4828780	–26.9
Equidae	heads	947200	905170	592520	476200	363311	–61.6
Cattle	heads	2766100	2733560	1989790	1936460	1849279	–33.1
Sheep	heads	7604430	8531850	8412170	8944500	9106536	19.8
Goats	heads	780980	874030	1240860	1325530	1372792	75.8
Pigs	heads	4935660	4708810	5345050	4234550	4142785	–16.1
Poultry	1000 heads	86552.2	82035.59	80844.86	79440.25	77195.2	–10.8

Source: Eurostat.

At national level, the animal herds are concentrated on the small farms, in the economic size classes under 2000 euros, from 2000 to 3999 euros and from 4000 to 7999 euros. These three size categories had more than 40% of the livestock herds from Romania, in the year 2016. However, in the period 2005–2016, a concentration process of livestock herds took place towards the medium and large farms, and thus the share of herds on the farms in the size category under 8000s euro decreased. The livestock herds on the very large-sized farms, with a production of 500000 euros and over increased by 60% in the period 2005–2016. In the year 2016, they had 17% of total herds, as compared to only 7% in 2005.

In quantitative terms, the largest number of animals in LSU was noticed in the Region North-East in the year 2016 (19% of total country), with a mountain area with extensive pastures and hayfields, the animals being concentrated on small farms, under 8000 euro. At the same time, in certain regions the animals are mainly raised on large and very large farms, and in this context the region Vest stands out, where 35% of the livestock herds are raised on farms with an annual production of more than 500000 euros, mainly due to the presence of the pig raising complex Smithfield.

3.4. FARM ECONOMY – ECONOMIC DIMENSION AND PRODUCTIVE ORIENTATION

The average farm size in Romania was 3537 euros standard output in the year 2016, up from 2500 euros in the year 2005, being the lowest farm size in the European Union. Out of this reason, although one-third of the total number of farms in the EU is found in Romania, the total agricultural output value obtained on the Romanian farms accounts for only 3.8% of the agricultural output value in the EU.

We can see from Table 3 how the utilized agricultural areas were transferred between farms in Romania. Overall, the number of farms in 2016 decreased by about 800 thousand as compared to 2005, while the utilized agricultural area decreased by about 1.4 million hectares. The number of small farms and the area operated by these decreased, while the number and areas of very large, large and medium-sized farms increased instead. But the most significant is the evolution of size categories at the extremes of farm distribution. The number of very small farms (under 2000 euro) was down from 2.7 million in 2005 to 2.3 million in 2016, while the utilized area decreased from 2.7 million hectares to 1.8 million hectares. The number of farms with an output of over 500000 euros increased instead from 740 in 2005 to 1610 in 2016, while the utilized area increased by almost 1 million hectares. Thus, a significant consolidation was produced in the segment of very large farms, while in the segment of medium-sized farms between 8000 euros and 100000 euros the consolidation was quite modest.

Table 3

Variation of the number of farms and utilized agricultural areas in the year 2016 compared to 2005, by economic size of farms

	Number of farms		**Utilized agricultural area**	
	Number (2016–2005)	**% (2016/2005*100–100)**	**Hectares (2016–2005)**	**% (2016/2005*100–100)**
Under 2000 euros	–484250	–17%	–892280	–32%
2000–3999 euros	–326640	–37%	–1076970	–44%
4000–7999 euros	–95240	–21%	–782860	–37%
8000–14999 euros	+32030	+39%	+50650	+7%
15000–24999 euros	+18080	+103%	+90960	+25%
25000–49999 euros	+10000	+105%	+43090	+8%
50000–99999 euro	+3550	+85%	–57880	–7%
100000–250000	+2280	+78%	–25910	–2%
250000–499999 euros	+1080	+98%	+221130	+20%
Over 500000 euros	+880	+120%	+955250	+67%

Source: Author's processing based on Eurostat data.

That is why we can state that in the recent years the bipolar character of the Romanian agrarian structure has been intensified, that is we have a very large

number of small farms and a small number of very large farms, while the medium-sized segment has continued to remain insufficiently developed.

The productive specialization of farms in relation to their economic size indicates that the small farms have a more diversified production mix compared to the large and very large farms. Small farms are mainly specialized in a mix of different crops combined with livestock raising activities, growing field vegetables and permanent crops, fruit trees included. The production of medium-sized farms is oriented to horticulture and raising herbivores, mainly sheep and goats.

The main specialization of large farms is the production of grains, oilseeds and protein crops, which cover 36% of the country's agricultural land area and 57% of the area operated by the large and very large-sized farms. The next specialization is other field crops, which cover 25% of the country's agricultural area and 29% of areas operated by the large and very large-sized farms.

The specialization of large and very large farms in cereals, oilseeds and protein crops has been accentuated after Romania's accession to the EU, due to the increase of prices in cereals, oilseeds and protein crops, due to price increases in grains and oilseeds on the foreign markets and last but not least due to receiving direct payments per hectare, which significantly contributed to production orientation towards crops that benefit from this type of subsidies.

The small farms, with an output under 8000 euros have a diversified specialization, which involves an increased manual labour input: viticulture, fruit farming, horticulture, raising bovines, poultry, dairy cows, combined activities.

The large farms are specialized in growing cereals, oilseeds, protein crops and other field crops. In this context, we can notice that the share of crop production in total agricultural output value permanently increased in the investigated period, from 65% in the year 2007 to 72% in 2016. In the years with very good crop productions, this percentage exceeded 75% (in the year 2013, for instance). This aspect, corroborated with the corresponding decline of the livestock production sector and the excessive importance attached to cereal and oilseed production, implies the orientation towards a mix of products with low value added, which does not valorize the internal resources of the agricultural sector, nor does it provide a diversified and sufficient agricultural supply for the country's population. Unfortunately, the direct subsides received under the form of payments per hectare has mainly stimulated the crop production sector and the large field crops, mainly cereals and oilseeds, which in most cases are exported as raw agricultural products.

In order to measure the productive diversity on the land areas used by different types of farms, we calculated the Berry Index. The Berry Index is constructed by adding the square of the share of areas under different crops in total area utilized by the farms with different specializations:

$$BI = 1 - \sum_{i=1}^{n} \left(\frac{x_i}{X} \right)^2$$

where: x_i is the area utilized by farms on the i specialization and X is the total agricultural area utilized by the category of farms with a certain economic size.

The BI can take values from 0 to 1.0 corresponds to the situation when the farms with a certain economic size would have only one specialization, and 1 to the situation in which each specialization would have 1/n of the agricultural area utilized by the respective farm category. According to Eurostat, 22 possible specializations of farms are considered. The approach based on Berry Index calculation for the assessment of farm specialization diversity by different farm sizes reveals a decrease of productive diversity over time, more pronounced on the medium and large-sized farms. For instance, on the farms over 100 hectares, the diversity index decreased from 0.62 in the year of accession (2007) to 0.56 in the year 2016 (Table 4).

Table 4

Productive orientation diversity, measured by Berry Index, by different farm sizes

	2007	**2016**
Total farms	0.83	0.77
Less than 2 ha	0.87	0.85
From 2 to 4.9 ha	0.87	0.86
From 5 to 9.9 ha	0.87	0.87
From 10 to 19.9 ha	0.88	0.87
From 20 to 29.9 ha	0.87	0.83
From 30 to 49.9 ha	0.84	0.80
From 50 to 99.9 ha	0.79	0.76
100 ha or over	0.62	0.56

Source: Author's own calculations based on Eurostat data.

3.5. FARM INCOMES AND IMPORTANCE OF SUBSIDIES

The value added per farm increased by 31% in the period 2007–2016 (from 1450 euros to 1911 euros), yet this does not represent a sustainable growth, as it significantly and consistently fluctuated from year to year. Labour productivity expressed by the net value added per annual work unit almost doubled in the period 2007–2016 (+80% in 2015 as against 2007), yet this is one of the lowest in the European Union. Thus, in the year 2016, labour productivity in Romania's agriculture represented only 23% of the EU average, but its annual growth rate in the period 2007–2017 was 5.3%, as against 3.6% the EU average.

Farm incomes increased in the investigated period, yet the gaps compared to the EU average were maintained in terms of the gross value added, labour productivity and factor income (Table 5).

Table 5

Comparisons with the EU average for certain key indicators, year 2016

Indicator	UM	EU-28	Romania
Number of farms	Thousand	10468	3422
Utilized agricultural area	thousand ha	173338	12502
Average farm size	Ha	16.5	3.6
Livestock herds	LSU/farm	12.5	1.4
Standard economic size	euro/farm	34785	3537
Labour productivity	euro/AWU	17597	4109

Source: Author's processing of Eurostat data.

Table 6 provides synthetic information on the evolution of agricultural sector indicators in the post-accession period. A first conclusion that can be drawn is that the animal output value systematically decreased, which has already been signalled out. The total agricultural output value featured high volatility, also due to the high share of crop production (variation coefficient for agricultural output value = 10%).

Table 6

Agricultural output value, incomes and production subsidies, in the agricultural sector (million euros, basic prices)

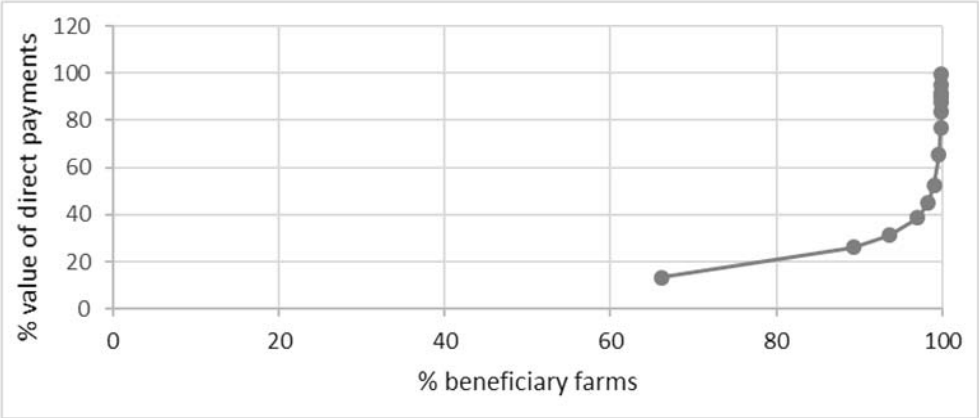
	2007	2016	Average 2007–2016	Minimum 2007–2016	Maximum 2007–2016
Crop output	8612	9689	10429	8428	12781
Animal output	4375	3877	4016	3636	4375
Agricultural output	13192	13743	14616	12835	16877
Total intermediate consumption	8057	8838	9009	7742	10135
Gross Value Added	6244	6333	6946	6209	8362
Fixed Capital Consumption	2259	2266	2440	1927	3018
Taxes on production	57	21	27	21	57
Subsidies on production	491	2628	1260	398	2628
Factor Income	4418	6675	5739	4418	6705

Source: Author's processing of Eurostat data.

The effect of Common Agricultural Policy implementation was mainly materialized into the increase of production subsidies, which practically increased five times in the investigated period. The effect of these subsidies on production was not very much materialized into the increase of production output value. At the same time, the very high volatility of agricultural yields seems to be controlled by the weather conditions rather than by the application of more performant production technologies.

The deterioration of the agricultural production structure, materialized into the decline of the livestock production sector, also leads to high volatility and insufficient growth of agricultural output value. Yet farm incomes constantly increased, but the growth of these incomes is almost exclusively the result of production subsidies

received by farmers, in progressive amount from year to year. In fact, the direct payments per hectare, granted under the SAPS scheme of the Common Agricultural Policy targets the increase of farmers' incomes and decoupling the subsidies from production, and this objective seems to have been reached in Romania. The share of subsidies in incomes increased from 10% in the year 2007 to 40% by the year 2016. In this context, we can appreciate that numerous farms heavily depend on the direct payments received, due to the low productivity of agricultural activities. In fact, this situation where the share of subsidies reached up to 40% of agricultural income was noticed even from 2007–2009 in other European countries as well, such as Denmark, Germany, Ireland (EC, 2011).



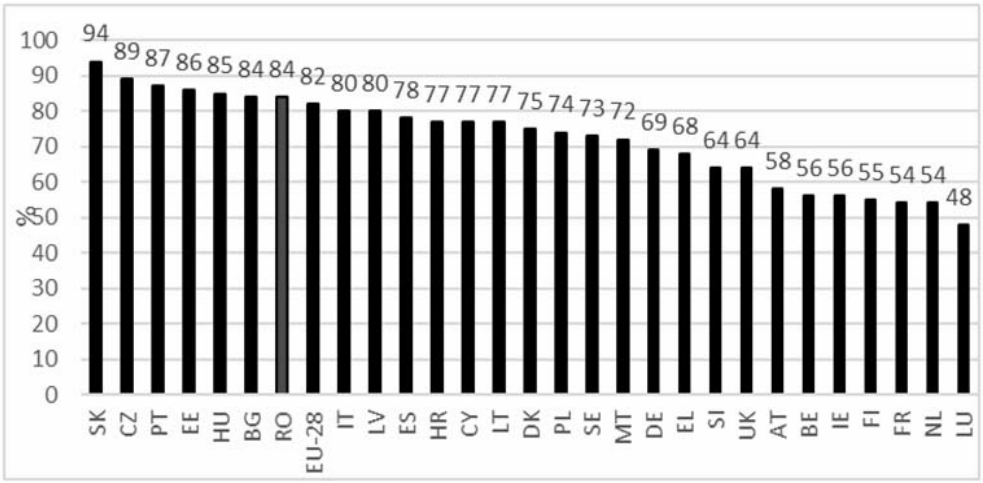
Source: EC-DG AGRI.

Figure 3. Distribution of subsidies received as direct payments to beneficiary farms from Romania, year 2015.

Direct payments represented more than 94% of production subsidies in the year 2015. The way in which these were distributed reflects the strong polarization of the agrarian structure in Romania, i.e. the very large number of small-sized farms, on the one hand, and the relatively small number of very large farms, which practically cover more than half of the utilized agricultural area, on the other hand. From Fig. 3 we can notice, for instance, that 97% of farms receive only 40% of the total amount of direct payments, while the remaining 3% receive 60% of the amount. This phenomenon was intensified at the end of decade, as the number of large and very large-sized farms increased. The number of farms that received direct payments varied from year to year, between 1–1.05 million, while the area covered by these farms totalled 10–11 million hectares. The phenomenon of land concentration into large and very large-sized farms is also present in other ex-communist countries, like the Czech Republic, Slovakia and Bulgaria (Fig. 4).

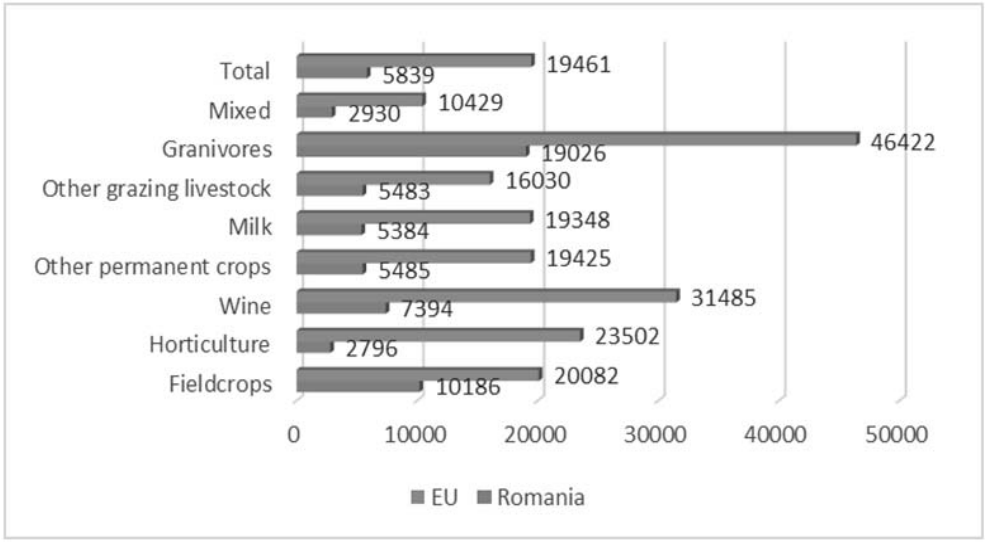
There are significant gaps between the farms from Romania and the medium-sized European farm in terms of economic size, but also in terms of differences brought about by farm specialization (Fig. 5). In the European Union, the farms

with the highest productivity, expressed by net value added per number of AWU, are those specialized in raising granivores (pigs and poultry), followed by horticulture and viticulture. In Romania, the situation is slightly different: the farms specialized in granivores are also on the top position, while the farms specialized in field crops and viticulture come next. Yet there are very great differences in terms of the productivity level in Romania, which represents only one-third of the EU average.



Source: EC-DG AGRI.

Figure 4. Share of direct payments received by the first 20% greatest beneficiaries in the year 2015.



Source: FADN data.

Figure 5. Net value added per farm, by farm specialization, in the year 2016.

According to the indications contained in the Farm Accountancy Data Network (FADN) database, it is not possible to distinguish a certain trend in the evolution of farm economic indicators for the period 2007–2016. The evolutions are rather fluctuating, yet this hierarchy is maintained in terms of the economic results by farm specialization, according to which the farms specialized in field crops and those specialized in raising granivores (pigs and poultry) rank first. The results on farm economy provided by FADN database are still quite volatile due to the gradual expansion of the sample of farms included in this research.

4. CONCLUSIONS

The implementation of the Common Agricultural Policy and of measures under Pillar 1 in particular has as first effect the increase of farm incomes, yet at the same time it produced changes in the farm structure and productive orientation. Under CAP Pillar 1, the farms received consistent finance, under the form of direct payments, coupled payments inclusively, and of market measures.

In the post-accession period, a land concentration process took place, which led to the increase in number of the large and very large-sized farms and to a lesser extent in the number of medium-sized farms. The areas operated by the small farms decreased, while those operated by the large and very large farms increased. At the same time, the subsistence economy remained very present on the Romanian farms. Although it has slightly decreased in recent years, it is still a significant phenomenon, as the number of farms that consume more than 50% of their final output diminished by only 8% in the period 2007–2016.

Farm value indicators experienced some improvements, but these do not seem to be irreversible. The value added increased by 31% in the period 2007–2016, yet this does not represent a sustainable growth, as it fluctuated significantly and consistently from year to year. Labour productivity, expressed by the net value added per annual work unit practically doubled in the period 2007–2016, yet it is one of the lowest in the European Union.

Farm production specialization by economic size reveals that the small farms have a more diversified production mix than the large and very large-sized farms. Small farms are mainly specialized in a mix of *different crops* and *livestock raising, field vegetables and permanent crops*, fruit included. The medium-sized farms are also specialized in *horticulture and raising herbivores,* mainly sheep and goats.

The main specialization of large-sized farms is *cereals, oilseeds and protein crops*, which cover 36% of the country's agricultural area and 57% of the area operated by the large and very large farms. The specialization of large and very large farms in *cereals, oilseeds and protein crops* grew stronger after Romania's accession to the European Union, due to the increase of cereal and oilseed prices on the foreign markets and last but not least to the direct payments provided under the area payment variant.

In this context, we consider that *providing subsidies under the form of direct payments per hectare led to farm production orientation mainly to crop production,* i.e. field crops and mainly oilseeds and protein crops. At the same time, it has amplified the "land grabbing" phenomenon, under various modalities, both by the Romanian and the foreign land owners. In this situation, a re-evaluation and reconsideration of the farm subsidizing modality under Pillar 1 would be useful, envisaging both a real capping of payments that can be received by the large farms and the shift from the direct payment per hectare to the payment per farm.

Livestock production has decreased from year to year, both as total production volume and as share in total agricultural production. This is an unfavourable evolution, as it contributes to agriculture orientation towards products with low value added and to the Romanian consumers' higher dependency on imports. The deterioration of agricultural production structure materialized into the decline of the livestock sector also led to high volatility and insufficient growth of agricultural output value.

The effect of Common Agricultural Policy implementation has been mainly materialized into the increase of farmer subsidies, which practically increased their value five times in the investigated period. *Farm incomes steadily increased*, yet the increase of the incomes is almost exclusively due to the increase of subsidies received by farmers, in a progressive amount from year to year. The share of subsidies in farm incomes increased from 10% in the year 2007 to 40% in 2016. In this context, we consider that many farms depend quite heavily on the direct payments received, due to the low productivity of agricultural activities.

The way in which the direct payments were distributed was determined by the strong polarization of the agrarian structure in Romania, i.e. the very large number of small farms, on the one hand, and the relatively low number of very large farms on the other hand, which are operating more than half of the utilized agricultural area. Thus, in the year 2015, *97% of farms received only 40% of the total amount of direct payments, while the remaining 3% received 60% of total amount.* This phenomenon was intensified towards the end of the decade, as far as the number of large and very large farms increased. The number of farms that received direct payments varied from one year to the next, around 1 million farms, and the area covered by these farms totalled 10–11 million hectares.

REFERENCES

1. Csaki, C., Jambor, A., (2013), *The impacts of EU accession on the agriculture of the Visegarad country*, Budapest.
2. Eurostat, (2017), Statistical Fact sheet European Union.
3. Eurostat, (2017), Statistical Fact sheet Romania.
4. EC, DG Agri, (2011), Impact assessment, Common Agricultural Policy towards 2020, Annex 3.
5. EC, DG Agri, (2016), EU Farm Economic Overview based on 2013 FADN data.
6. EC, DG Agri, (2017), Farm economy focus, information based on 2014 FADN data.
7. Eurostat, (2016), Agriculture, forestry and fishery statistics.