

CHANGES IN WORK PROFITABILITY IN THE AGRICULTURAL SECTOR IN ROMANIA AND BULGARIA BETWEEN 2007 AND 2014

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Abstract

The main aim of the study was to analyse changes in work profitability in the agricultural sectors in Romania and Bulgaria. The study used the Economic Accounts for Agriculture, which enabled analysis of the economic situation in agriculture according to uniform standards. The study was based on a system of work profitability indexes and factor analysis. The research proved that during the post-accession period (2007-2014) on average work profitability in agriculture increased in real terms by 8.41% per annum in Romania and by 17.1% per annum in Bulgaria. As results from the factor analysis, between 2007 and 2014 favourable changes in work profitability in the agricultural sector in Romania were chiefly caused by greater productivity and reduced remuneration costs. On the other hand, increased productivity and subsidies to production were the main causes of favourable changes in work profitability in the agricultural sector in Bulgaria.

Key words: Economic Accounts for Agriculture, Bulgaria, Romania, work profitability

INTRODUCTION

In 2007 Romania and Bulgaria joined the European Union (EU). The integration with the EU and the resulting implementation of instruments of the Common Agricultural Policy (CAP) in the agricultural sectors in these countries created new and potentially favourable conditions of their functioning. Membership in the EU provides access to a huge market, and thus it provides real opportunities to generate greater income and to receive subsidies to agricultural activity due to the size of the EU market [2, 3, 4, 5, 11]. The main aim of this article is to analyse the conditions of work profitability in the agricultural sectors in Romania and Bulgaria after their accession to the EU. The first part of the article discusses the source materials and methodological assumptions. It presents a calculation of generating income based on the Economic Accounts for Agriculture [7] and the system of indicators used for analysis of changes in work profitability in agriculture. The second part presents the research findings, including: an analysis of generating income, a systemic analysis of work profitability and a factor analysis of changes in work profitability in the agricultural sectors

in Romania and Bulgaria between 2007 and 2014.

MATERIALS AND METHODS

The analyses were based on the Economic Accounts for Agriculture (EAA), i.e. financial statements applicable in the EU, which enable analysis of the economic situation in agriculture according to uniform rules [7]. The main goal of the EAA is to monitor income in agriculture by analysis of many income categories, i.e. gross and net value added, operating surplus and net agricultural entrepreneurial income (see Tables 1 and 3). The first income category in the EAA, i.e. gross value added, measures the value generated by all agricultural entities. On the one hand, the next category, i.e. net value added, measures the value generated by all agricultural entities, which is corrected by depreciation. In general, value added is an indicator of the capacity to bring new values in relation to material costs and it is an important indicator of the quality and quantity of human capital [8, 10].

When net value added is corrected by the amount of other taxes on production and other production subsidies, we receive another

income category, i.e. value added in the costs of factors of production (income from factors of production). This income category is a measure of the value generated by factors of production, i.e. land, capital and labour. The labour factor is shown in the form of all labour resources engaged in the agricultural activity – it encompasses both farmers’ own work and the hiring of labour. Hired labour is directly related with another income category, i.e. net operating surplus (mixed income). It measures the value generated by land and capital resources as well as unpaid labour. It is less than the value added in the costs of factors of production as it is reduced by the costs of hired labour.

The last and most important income category in the EAA is net agricultural entrepreneurial income. Its value is calculated by correcting the operating surplus with the balance of financial costs and income and with land lease costs. Net agricultural entrepreneurial income is a synthetic measure of the level of remuneration for unpaid labour resources, remuneration for capital employed and rent for land ownership.

The abovementioned EAA calculation was used to analyse the level, trend, dynamics and causes of changes in work profitability in agricultural sectors in Romania and Bulgaria and present them as a system of indicators. The systemic approach to work profitability in agriculture results from four basic premises, i.e. a high degree of synthesis of this income category, the need to respect the sequential character of income categories in the EAA, the key or accessory character of these categories, the possibility to make cause-and-effect analyses and to apply quantitative methods. In the systemic approach work profitability in the agricultural sector can be shown as the following equation [4]:

$$\frac{DR}{ZN} = W_1 \times W_2 \times W_3 \times W_4 \times W_5 \times W_6 \times W_7 \times W_8$$

$$\frac{DR}{ZN} = \frac{WB}{ZO} \times \frac{WN}{WB} \times \frac{WN - PD}{WN} \times \frac{DCZ}{WN - PD} \times \frac{NO}{DCZ} \times \frac{NO + SO}{NO} \times \frac{DR}{NO + SO} \times \frac{ZO}{ZN}$$

where:

DR/ZN – work profitability indicator [agricultural entrepreneurial income

(DR)/number of unpaid employees (ZN)], $W_1=WB/ZO$ – labour productivity indicator measured by gross value added [gross value added (WB)/total number of employees (ZO)], $W_2=WN/WB$ – indicator of costs of depreciation of fixed assets [net value added (WN)/gross value added (WB)], $W_3= (WN - PD)/WN$ – tax costs ratio [(net value added (WN) – taxes (PD))/net value added (WN)], $W_4=DCZ/(WN - PD)$ – indicator of subsidies to agricultural production [**factor income** (DCZ)/(net value added (WN) – taxes (PD))], $W_5=NO/DCZ$ – indicator of payroll expenses [operating surplus (NO)/**factor income** (DCZ)], $W_6= (NO + SO)/NO$ – indicator of financial income and costs [(operating surplus (NO) + balance of received and paid interest (SO))/operating surplus (NO)], $W_7=DR/(NO + SO)$ – indicator of lease costs [agricultural entrepreneurial income (DR)/(operating surplus (NO) + balance of received and paid interest (SO))], $W_8=ZO/ZN$ – indicator of employment resources structure [total number of employees (ZO)/number of unpaid employees (ZN)].

The analysis of changes in work profitability in the agricultural sectors in Romania and Bulgaria is based on factor analysis – the logarithmic method [4]. The application of this method enables investigation of the dependence between the work profitability indicator and the factors determining profitability. Apart from that, it enables concretisation of the strength and direction of the influence of these factors on the variable under analysis [8, 9].

RESULTS AND DISCUSSIONS

Table 1 shows the basic EAA in Romania between 2006 and 2014, i.e. the period following Romania’s accession to the EU and its beginning to use the CAP instruments. The table also includes information about the employment level and structure, work profitability measured by the relation between the agricultural entrepreneurial income per unit of unpaid labour resources as well as the share of subsidies in income.

As results from the data in Table 1, between 2007 and 2014 the income of the agricultural

sector in Romania, measured with the value of output at producers' prices, **made an** average yearly increase of 1.10% in real terms. However, it is noticeable that the changes in the income did not result in a permanent

increasing tendency and they were subject to multidirectional variation during the period under analysis.

Table 1. The Economic Accounts for Agriculture – agriculture in Romania in 2006-2014 (real value in million €)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2014/ 2006 (%)	R _g (%)
Output at producer price	12,478.3	10,268.6	12,431.2	10,655.9	11,125.1	12,744.1	10,222.8	12,065.6	10,984.4	88.0	2.15
Subsidy on products	169.2	228.2	355.2	319.3	41.9	0.0	0.0	0.0	0.0	-	-
Taxes on products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Output at basic prices	12,647.5	10,496.8	12,786.5	10,975.3	11,167.0	12,744.1	10,222.8	12,065.6	10,984.4	86.9	1.89
Intermediate consumption	6,469.3	5,913.9	6,909.3	6,011.9	6,356.5	7,018.2	5,818.0	6,861.8	6,493.3	100.4	1.83
Gross value added	6,178.2	4,582.9	5,877.2	4,963.3	4,810.5	5,725.9	4,404.9	5,203.8	4,491.1	72.7	1.97
Fixed capital consumption	1,796.0	1,658.2	1,412.5	1,496.5	1,697.8	1,940.4	1,854.8	2,050.5	1,835.3	102.2	1.11
Net value added	4,382.2	2,924.7	4,464.7	3,466.8	3,112.7	3,785.5	2,550.1	3,153.3	2,655.8	60.6	2.44
Taxes on production	29.3	42.1	31.7	17.0	16.9	15.5	14.8	14.3	13.8	47.3	-8.90
Subsidies on production	448.9	360.5	279.9	552.2	738.8	844.7	962.5	1 131.4	1 217.9	271.3	17.52
Factor income	4,801.8	3,243.0	4,712.9	4,002.0	3,834.6	4,614.7	3,497.7	4,270.4	3,859.9	80.4	4.70
Compensation of employees	1,420.8	1,289.5	1,467.9	1,643.5	2,000.2	248.2	249.3	205.1	199.6	14.0	-7.97
Operating surplus	3,381.0	1,953.6	3,245.0	2,358.5	1,834.4	4,366.6	3,248.5	4,065.3	3,660.3	108.3	10.41
Rent paid	33.6	38.4	47.5	46.8	57.6	81.2	100.9	99.6	96.6	287.8	14.21
Interest paid	9.0	5.1	41.7	69.6	71.0	78.6	92.9	89.0	86.2	954.8	88.31
Interest received	3.0	3.0	7.1	9.2	9.9	5.8	8.1	7.9	7.6	252.7	21.01
Entrepreneurial income	3,341.4	1,913.2	3,162.9	2,251.2	1,715.8	4,212.6	3,062.8	3,884.5	3,485.1	104.3	9.89
Total agricultural labour input (thous. AWU)	2,527.0	2,205.0	2,152.0	2,152.0	1,639.0	1,532.0	1,573.0	1,564.0	1,444.0	57.1	-4.79
Non-salaried agricultural labour input (thous. AWU)	2,264.0	1,994.0	1,931.0	1,925.0	1,429.0	1,326.0	1,349.0	1,386.0	1,279.0	56.5	-5.30
Work profitability (thous. €/AWU)	1.48	0.96	1.64	1.17	1.20	3.18	2.27	2.80	2.72	184.6	17.11
The share of subsidies in income (%)	18.5	30.8	20.1	38.7	45.5	20.1	31.4	29.1	34.9	188.9	0.40

¹average annual rate of change in the 2007-2014 years

Source: own elaboration based on the Economic Accounts for Agriculture

Apart from that, since 2011 there was a systematic decrease in the income at producers' prices. In 2014 (2714 million euros) it was even 15.6% lower than before the accession (3,247 million euros). Between

2007 and 2014, in consequence of a considerable increase in subsidies to products (4.95%) the income of agriculture in real terms, measured with the value of production at base prices, increased by 1.17% per annum

on average. However, it is noticeable that in 2014 there was a significant decrease in the subsidies and thus, they had marginal effect on the value of income at base prices. There was a relatively more favourable trend in changes in the gross value added, which on average increased by 1.64% per annum. However, it is noticeable that the average yearly dynamics of changes in the gross value added (1.64%) was noticeably greater than the dynamics of changes in the value of production (1.17%). This means that between 2007 and 2014 the efficiency of intermediate consumption outlay increased. As results from Table 1, during the entire post-accession period, in real terms the gross value added in the agricultural sector in Romania was lower than before the accession. For example, in 2014 it was 1,105 million euros, whereas in 2006 it amounted to 1,383 million euros, so it was 25% greater. On the other hand, there was a very low increase in the net value added (on average by 0.62% per annum), which points to marginal changes in the income efficiency of agriculture in Romania. This poor dynamics of changes was caused by a dynamic increase in depreciation costs. During the period under analysis the value increased from 98.3 million euros to 158 million euros, i.e. by more than 60%, so on average it increased by as much as 9.82% per annum. Although it was an unfavourable situation in view of the EAA, but on the other hand, it indicated progressing technological modernisation in the agricultural sector in Romania. The income from the factors of production increased much more than the net value added in Romania. The strong dynamics of changes in this income category was relatively less related to changes in taxation, because it chiefly resulted from the amount of other production subsidies received due to the implementation of the CAP instruments. Between 2006 and 2014 in consequence of Romania's accession to the EU there was a nearly nine-fold increase in the value of subsidies in real terms. These changes were decisive to the dynamics of changes and the income from the factors of production. In the post-accession period in real terms its value increased by 3.39% per annum. In

consequence, in real terms the income from the factors of production increased from 1,167.5 million euros (2007) to 1,409 million euros (2014), i.e. by 21%. In the post-accession period there was a noticeable rising trend in the remuneration costs in the agricultural sector in Romania. On average they increased by 5.48% per annum, so in 2014 they were 49.8% greater than in 2006. This means that the remuneration costs more and more strongly reduced the income from the factors of production. It resulted in an increase in the operating surplus of 3.10%, which was lower than the increase in the value of income from the factors of production. As results from Table 1, similarly to the income categories discussed above, there was high variability of the value of the operating surplus in real terms in Romania. Apart from that, at the end of the period under analysis it was only slightly greater than before the accession to the EU. Between 2007 and 2014 there were considerable changes in the values of lease costs and financial costs and income in the agricultural sector in Romania. As far as the resulting reduction of the operating surplus is concerned, the lease costs were of primary significance. Their value increased from 73.6 million euros in 2007 to 236.1 million euros in 2014, i.e. more than three times. Such a high increase in the lease costs was chiefly caused by minimal changes in agricultural entrepreneurs' income in real terms. On average their income increased only by 1.36% per annum. Apart from 2008, in most of the years under study the income was lower than before Romania's accession to the EU. In spite of the generally poor dynamics of these changes there was a significant increase in work profitability, measured with the ratio between agricultural entrepreneurs' income and the number of unpaid employees. As results from the data in Table 1, between 2006 and 2014 the work profitability ratio increased from 2.49 thousand euros (2006) to 4.27 thousand euros (2014), i.e. by about 72%. Simultaneously, it is necessary to stress the fact that the favourable and dynamic increase in work profitability in the agricultural sector in Romania chiefly resulted from reduced

employment. During the period under study on average agricultural entrepreneurs' income increased only by 1.36% per annum, whereas

employment in agriculture decreased by 5-6%.

Table 2. Factor analysis of changes in work profitability (DR/ZN) in Romanian agriculture in 2007-2014 years

Years	$\frac{WB}{ZO}$	$\frac{WN}{WB}$	$\frac{WN - PD}{WN}$	$\frac{DCZ}{WN - PD}$	$\frac{NO}{DCZ}$	$\frac{NO + SO}{NO}$	$\frac{DR}{NO + SO}$	$\frac{ZO}{ZN}$	$\frac{DR}{ZN}$
	W ₁	W ₂	W ₃	W ₄	W ₅	W ₆	W ₇	W ₈	
value of ratios									
2006	2,445	0,709	0,993	1,103	0,704	0,998	0,990	1,116	1,476
2007	2,078	0,638	0,986	1,125	0,602	0,999	0,980	1,106	0,959
2008	2,731	0,760	0,993	1,063	0,689	0,989	0,985	1,114	1,638
2009	2,306	0,698	0,995	1,160	0,589	0,974	0,980	1,118	1,169
2010	2,935	0,647	0,995	1,239	0,478	0,967	0,968	1,147	1,201
2011	3,738	0,661	0,996	1,224	0,946	0,983	0,981	1,155	3,177
2012	2,800	0,579	0,994	1,380	0,929	0,974	0,968	1,166	2,270
2013	3,327	0,606	0,995	1,360	0,952	0,980	0,975	1,128	2,803
2014	3,110	0,591	0,995	1,461	0,948	0,979	0,973	1,129	2,725
average	2,445	0,709	0,993	1,103	0,704	0,998	0,990	1,116	1,476
partial deviations									
2007/2006	-0,195	-0,127	-0,009	0,024	-0,187	0,001	-0,012	-0,011	-0,516
2008/2007	0,346	0,221	0,009	-0,072	0,170	-0,012	0,006	0,010	0,679
2009/2008	-0,235	-0,117	0,003	0,121	-0,216	-0,021	-0,008	0,004	-0,469
2010/2009	0,286	-0,091	-0,001	0,078	-0,247	-0,009	-0,015	0,030	0,031
2011/2010	0,491	0,044	0,003	-0,024	1,385	0,035	0,028	0,015	1,976
2012/2011	-0,779	-0,358	-0,005	0,323	-0,050	-0,026	-0,036	0,025	-0,906
2013/2012	0,436	0,115	0,003	-0,035	0,062	0,016	0,018	-0,083	0,532
2014/2013	-0,186	-0,068	-0,002	0,197	-0,011	-0,004	-0,006	0,001	-0,078
average	0,020	-0,047	0,000	0,076	0,113	-0,003	-0,003	-0,001	0,156
structure of partial deviations ¹ (%)									
2007/2006	34,44	22,41	1,66	4,18	33,09	0,16	2,09	1,98	100
2008/2007	40,92	26,11	1,11	8,48	20,03	1,45	0,74	1,16	100
2009/2008	32,37	16,08	0,42	16,71	29,80	2,92	1,09	0,60	100
2010/2009	37,77	11,98	0,08	10,27	32,69	1,24	1,94	4,02	100
2011/2010	24,25	2,16	0,13	1,19	68,43	1,71	1,40	0,73	100
2012/2011	48,63	22,37	0,29	20,15	3,14	1,62	2,24	1,55	100
2013/2012	56,67	15,01	0,42	4,61	8,12	2,06	2,33	10,78	100
2014/2013	39,26	14,22	0,40	41,51	2,25	0,90	1,16	0,30	100
average	38,05	14,68	0,45	11,26	30,00	1,60	1,65	2,31	38,05

¹partial structure of the partial deviations was calculated on the basis of the absolute values of partial deviation
 Source: own elaboration

Table 2 shows the results of factor analysis of work profitability in the agricultural sector in Romania between 2007 and 2014. As can be concluded from the data, the positive trend of changes in work profitability in agriculture, measured with agricultural entrepreneurs' income (DR/ZN), was chiefly caused by two factors, i.e. greater productivity (W₁) and increased share of the operating surplus in the **factor income** (W₅), which points to reduced payroll costs. As results from the logarithmic method, between 2007 and 2014 on average the changes in productivity and reduced

payroll costs determined the changes in work profitability by 38.05% and 30.0%, respectively. The data in Table 2 also show that the variation in work profitability in Romania was also considerably positively influenced by subsidies to agriculture (W₄), but it was negatively influenced by increasing depreciation costs (W₂). These factors determined the variation in work profitability in 11.26% and 14.68%, respectively. The data in Table 2 also indicate that the other factors had marginal effect on changes in work profitability. The analysis of partial

deviations and their structure in tax costs (W_3), financial costs (W_6), lease costs (W_7) and employment structure indicator (W_8) indicates that on average these factors determined changes in work profitability only by about 0.45-2.31%.

Table 3 shows the EAA in Bulgaria between 2006 and 2014. As results from the data in the table, between 2007 and 2014 the income of the agricultural sector in Bulgaria, measured with the value of production at producers' prices, increased on average by 2.15% per annum. However, like in Romania, there was not any permanent rising tendency in the income and it was subject to many fluctuations. Apart from that, except 2008 in most of the years after Bulgaria's accession to the EU the income at producers' prices was lower than before the accession. On the other hand, in consequence of lifting subsidies to products, between 2007 and 2014 there was an increase in the income of the agricultural sector in real terms, measured with the value of production at base prices (on average by 1.89% per annum). At the same time, it is noticeable that between 2007 and 2009 subsidies to products significantly determined income in the agricultural sector in Bulgaria, as they amounted to 228-355 million euros.

The absence of a noticeable tendency can also be observed in changes in the gross value added. Between 2007 and 2014 it increased on average by 1.97% per annum. However, the dynamics of changes in the gross value added was slightly greater than the dynamics of changes in the value of production at base prices (1.89%). This means that the efficiency of intermediate consumption outlay increased. As results from the data in Table 3, like in Romania, during the entire post-accession period, the gross value added in the agricultural sector in Bulgaria was lower than before the accession. For example, between 2013 and 2014 it ranged from 4,491 to 5,203 million euros, whereas in 2006 it amounted to 6,178 million euros, so it was 19-27% greater. On the other hand, the increase in the net value added (on average 2.44% per annum) points to a relatively better dynamics of changes in the income efficiency of agriculture in Bulgaria. In consequence of a

low increase in the depreciation costs (1.11%) between 2007 and 2014 the net value added increased on average by 2.44% per annum, so it increased at a faster rate than the gross value added (1.97%).

There was much higher increase in the income from factors of production than in the net value added in the agricultural sector in Bulgaria. The relatively strong dynamics of changes in this income category with high variation in individual years was chiefly caused by the amounts of subsidies and, to a lesser extent, by reduced taxes. Bulgaria's accession to the EU resulted in a nearly three-fold increase in the value of subsidies in real terms between 2006 and 2014. These changes were decisive to the dynamics of changes and income from factors of production. On average in the post-accession period its value increased by 4.70% in real terms per annum, but there was high variation in individual years (3,243-4,713 thousand euros). In the post-accession period there was a relatively noticeable decreasing trend in the remuneration costs in the agricultural sector in Bulgaria. On average they decreased by about 8% per annum. This means that the remuneration costs decreasingly reduced the income from factors of production. In consequence this resulted in a 10.4% average yearly increase in the operating surplus. It was significantly greater than the increase in the value of income from factors of production (4.70%).

As results from the data in Table 3. similarly to the income categories discussed above. in real terms the value of the operating surplus in the agricultural sector in Bulgaria was characterised by high variation in time. At the end of the period under analysis its value was similar to the value before the accession to the EU. Between 2007 and 2014 the agricultural sector in Bulgaria saw significant changes in the values of lease costs and financial costs and income. As far as the effect of reduction in the operating surplus is concerned. the lease costs were of primary significance as they increased from 38.4 million euros in 2007 to 96.6 million euros in 2014. i.e. more than 2.5 times. Such a high increase in the lease costs was chiefly caused by lower

dynamics of the increase in entrepreneurs' income (on average 9.89% per annum) than the dynamics of the increase in the operating surplus (10.41%). It is also noteworthy that during the period under analysis there was high variation in the agricultural entrepreneurs' income in Bulgaria.

Table 3. The Economic Accounts for Agriculture – agriculture in Bulgaria in 2004-2013 (real value in million €)

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2014/ 2006 (%)	R _g ¹ (%)
Output at producer price	3,247.2	2,789.9	3,493.5	2,813.8	2,758.1	2,994.5	2,933.5	2,929.3	2,740.0	84.4	1.10
Subsidy on products	0.0	50.7	59.1	73.6	58.3	65.9	82.0	90.5	25.8	51.0	4.95
Taxes on products	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-	-
Output at basic prices	3,247.2	2,840.5	3,552.6	2,887.4	2,816.4	3,060.4	3,015.5	3,019.8	2,765.9	85.2	1.17
Intermediate consumption	1,863.9	1,789.0	2,062.0	1,905.5	1,817.4	1,929.5	1,882.4	1,855.3	1,660.9	89.1	0.90
Gross value added	1,383.3	1,051.5	1,490.7	981.9	999.0	1,131.0	1,133.1	1,164.5	1,105.0	79.9	1.64
Fixed capital consumption	129.7	98.3	98.1	134.9	155.7	188.0	209.1	170.9	158.2	122.0	9.82
Net value added	1,253.6	953.2	1,392.6	846.9	843.3	942.9	924.0	993.6	946.7	75.5	0.62
Taxes on production	0.8	0.3	4.2	1.3	1.7	1.2	0.8	1.3	1.2	157.6	41.53
Subsidies on production	52.9	214.6	382.4	314.5	343.4	321.8	420.6	585.8	463.2	876.2	13.16
Factor income	1,305.7	1,167.5	1,770.8	1,160.1	1,184.9	1,263.6	1,343.7	1,578.2	1,408.7	107.9	3.39
Compensation of employees	137.7	138.0	149.7	173.0	159.3	175.8	192.1	216.5	206.3	149.8	5.48
Operating surplus	1,168.0	1,029.6	1,621.1	987.1	1,025.6	1,087.8	1,151.6	1,361.7	1,202.4	102.9	3.10
Rent paid	52.4	73.6	96.8	127.2	172.4	196.1	286.0	267.0	236.1	450.2	21.70
Interest paid	9.5	33.3	49.1	32.0	8.5	7.3	5.0	27.2	23.9	252.2	-8.33
Interest received	87.9	2.5	6.7	22.1	0.3	2.3	1.1	7.4	1.1	1.3	18.56
Entrepreneurial income	1,194.1	925.1	1,481.9	850.0	845.0	886.7	861.8	1,074.9	943.6	79.0	1.36
Total agricultural labour input (thous. AWU)	563.5	494.4	465.1	435.8	406.5	375.8	347.4	321.2	299.0	53.1	-5.18
Non-salaried agricultural labour input (thous. AWU)	480.0	421.1	393.0	364.9	336.8	303.2	272.9	245.6	221.0	46.0	-6.26
Work profitability (thous. €/AWU)	2.49	2.20	3.77	2.33	2.51	2.92	3.16	4.38	4.27	171.6	8.41
The share of subsidies in income (%)	4.4	28.7	29.8	45.7	47.5	43.7	58.3	62.9	51.8	1171	10.77

¹ average annual rate of change in the 2007-2014 years

Source: own elaboration based on the Economic Accounts for Agriculture

Apart from that. in most of the years under study (2007-2010. 2012) the income was lower than before the accession to the EU. In spite of these conditions and similarly to the agricultural sector in Romania. there was a significant increase in work profitability in the

agricultural sector in Bulgaria. which was measured with the ratio between agricultural entrepreneurs' income and the number of unpaid employees. As results from the data in Table 3. between 2006 and 2014 the work profitability ratio increased in real terms from

1.48 thousand euros (2006) to 2.72 thousand euros (2014). i.e. by about 85%. Like in Romania. the favourable and dynamic increase in work profitability in the agricultural sector in Bulgaria resulted chiefly from reduced employment. During the period under analysis a 9.89% average yearly increase in the agricultural entrepreneurs' income corresponded to about 5% average yearly reduction of employment in agriculture.

Table 4 shows the results of factor analysis of work profitability in the agricultural sector in Bulgaria between 2007 and 2014. As can be concluded from the data. the positive trend of changes in work profitability in Bulgarian

agriculture. measured with agricultural entrepreneurs' income (DR/ZN). was chiefly caused by two factors. i.e. greater productivity measured with gross value added per total number of employees in agriculture (W_1) and increased subsidies to agriculture (W_4). As results from the logarithmic method. on average the changes in productivity and subsidies to agriculture determined changes in work profitability in the agricultural sector in Bulgaria by 45.85% and 19.93%. respectively. The data in Table 4 also show that the variation in work profitability in Bulgarian agriculture was relatively strongly (11.35%) negatively influenced by lease costs (W_7).

Table 4. Factor analysis of changes in work profitability (DR/ZN) in Bulgarian agriculture in 2007-2014 years

Years	$\frac{WB}{ZO}$	$\frac{WN}{WB}$	$\frac{WN - PD}{WN}$	$\frac{DCZ}{WN - PD}$	$\frac{NO}{DCZ}$	$\frac{NO + SO}{NO}$	$\frac{DR}{NO + SO}$	$\frac{ZO}{ZN}$	$\frac{DR}{ZN}$
	W_1	W_2	W_3	W_4	W_5	W_6	W_7	W_8	
value of ratios									
2006	2.455	0.906	0.999	1.042	0.895	1.067	0.958	1.174	2.488
2007	2.127	0.907	1.000	1.225	0.882	0.970	0.926	1.174	2.197
2008	3.205	0.934	0.997	1.275	0.915	0.974	0.939	1.183	3.771
2009	2.253	0.863	0.998	1.372	0.851	0.990	0.870	1.194	2.329
2010	2.458	0.844	0.998	1.408	0.866	0.992	0.831	1.207	2.509
2011	3.009	0.834	0.999	1.342	0.861	0.995	0.819	1.239	2.925
2012	3.262	0.815	0.999	1.456	0.857	0.997	0.751	1.273	3.158
2013	3.625	0.853	0.999	1.590	0.863	0.985	0.801	1.308	4.377
2014	3.696	0.857	0.999	1.490	0.854	0.981	0.800	1.353	4.270
average	2.899	0.868	0.999	1.356	0.871	0.995	0.855	1.234	3.114
partial deviations									
2007/2006	-0.335	0.001	0.001	0.378	-0.034	-0.223	-0.079	0.000	-0.291
2008/2007	1.195	0.088	-0.008	0.117	0.109	0.012	0.039	0.023	1.574
2009/2008	-1.055	-0.239	0.004	0.218	-0.219	0.049	-0.228	0.027	-1.441
2010/2009	0.210	-0.052	-0.001	0.063	0.041	0.005	-0.112	0.025	0.180
2011/2010	0.549	-0.034	0.002	-0.131	-0.015	0.009	-0.038	0.072	0.416
2012/2011	0.245	-0.067	0.001	0.248	-0.014	0.004	-0.264	0.081	0.233
2013/2012	0.395	0.169	-0.001	0.331	0.025	-0.042	0.242	0.101	1.219
2014/2013	0.083	0.018	0.000	-0.282	-0.047	-0.019	-0.006	0.147	-0.107
average	0.161	-0.015	0.000	0.118	-0.019	-0.026	-0.056	0.060	0.223
structure of partial deviations ¹ (%)									
2007/2006	31.92	0.07	0.06	36.02	3.19	21.25	7.48	0.02	100
2008/2007	75.16	5.51	0.49	7.36	6.86	0.72	2.44	1.46	100
2009/2008	51.72	11.71	0.21	10.71	10.73	2.41	11.18	1.34	100
2010/2009	41.21	10.26	0.24	12.33	8.11	0.97	21.90	5.00	100
2011/2010	64.61	3.94	0.26	15.39	1.72	1.10	4.52	8.47	100
2012/2011	26.50	7.31	0.12	26.83	1.49	0.40	28.57	8.80	100
2013/2012	30.24	12.96	0.10	25.31	1.93	3.23	18.50	7.72	100
2014/2013	13.76	2.98	0.00	46.90	7.78	3.18	1.02	24.38	100
average	45.85	7.53	0.21	19.93	5.67	4.10	11.35	5.38	100

¹partial structure of the partial deviations was calculated on the basis of the absolute values of partial deviation

Source: own elaboration

The data in Table 4 also indicate that the other factors (W_2 , W_3 , W_5 , W_6 , W_8) had marginal or

minimal effect on changes in work profitability in Bulgarian agriculture. These

factors determined changes in work profitability only by about 0.21-7.53%.

CONCLUSIONS

In the post-accession period the agricultural sectors in Romania and Bulgaria saw a significant increase in work profitability in real terms. Between 2007 and 2014 in Romania work profitability increased in real terms from 0.959 thousand euros to 2.725 thousand euros. i.e. by about 184%. whereas in Bulgaria it increased from 2.197 thousand euros to 4.270 thousand euros. i.e. by 94%. As results from factor analysis. the main determinants of changes in work profitability in agriculture in both countries were: favourable trends of changes in productivity and. to a lesser extent. production subsidies. hired labour costs. fixed assets maintenance costs and lease costs. As far as development perspectives are concerned. further improvement of profitability in the agricultural sectors in Romania and Bulgaria will primarily depend on progress in productivity. This means that the potential for further increase in the income of the agricultural sectors in these countries does not seem very realistic without dynamic structural changes. increase in the size of farms. reduction of employment and faster rate of technical and technological transformation. Although the instruments of the Common Agricultural Policy (CAP) in the form of production subsidies stabilise farmers' income to a certain extent. they cannot be exclusive determinants of the scale of structural changes in agriculture.

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