ANALYSIS OF THE SUPPORT MECHANISM OF THE PILLAR I AND THE RESULTS IN THE ROMANIAN AGRICULTURAL EXPLOITATIONS SOUTH-MUNTENIA REGION

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Abstract

The European Community support agriculture in the pre- and post-accession was represented by the funds allocated to our country in the two pillars of the CAP. Pillar 1 – who was defined by the direct payments to farmers under EAGF and Pillar 2 – made of SAPARD Funds and EAFRD RDP 2007-2013. The following analysis is based on upon the income inequality decomposition methodology that allows, on one side, to assess the degree of concentration of income categories of farms and, on the other side, to assess the effect of the change on the income sources that constitute the total farm income. By taking into account the Gini coefficient and decomposing the income inequality by using a series of criteria such as: the standard value, the main production type obtained etc. we have reached a series of interesting conclusions that may well prove useful to both academia and decision makers. Summarizing the results below, we can see that the support through Pillar II leads to disparities but its influence is very low. Grants awarded by Pillar I are of the utmost importance to the formation of income and therefore they influence more directly the inequalities between farms. Under these circumstances we believe that in order to improve the distribution of income between farms is necessary to increase the subsidies, especially those granted trough complementary national payments that allow the alleviation of general disparities from the prices of the agricultural production between different agricultural sectors and the support of land consolidation in order to achieve a more equitable distribution of the direct payments at the farm levels.

Key words: *analysis, agricultural holding, Pillar I, Pillar II, support mechanism*

INTRODUCTION

During the 2007-2014 period, the Agency for Payments and Intervention in Agriculture (APIA) has implemented support measures for farmers financed through the European Agricultural Guarantee - EAGF as direct payments under the Single Area Payment Scheme - SAPS as well a support measures financed from the national budget and the European Agricultural Fund for Rural Development - EAFRD as complementary national direct payments - PNDC (2014 TNA-transitional national aid).

The direct payment schemes and the complementary national direct payments were regulated trough Government Emergency Ordinance no.125/2006 approving the direct payment schemes and the complementary national direct payments, which are granted in the agricultural sector since 2007 and to amend art. 2 of Law no. 36/1991 on agricultural companies and other forms of association in agriculture, approved with amendments by Law no. 139/2007, as amended.

The direct payment schemes granted since 2007, as mechanisms to support agricultural producers are:
 - Single Area Payment Scheme (SAPS);
 - Payment scheme for energy crops;
 - Separate sugar payment scheme;
 - Complementary national direct payments (PNDC) in the vegetable;
 - Complementary national direct payments (PNDC) in the livestock sector.

Since 2014 were granted TNA (transitional national aid), mechanisms to support agricultural producers for the two sectors, vegetable and livestock.

MATERIALS AND METHODS

The analysis of income distribution at the farm level is a subject of great interest in the

specialty literature, especially given that one of the objectives of the common agricultural policy is to reduce the inequality among farmers. This topic of research is even more important as support, especially because direct payments are concentrated within the large farms, while small farms are subsidies dependent (Moreddu, 2011). Given that income formation differs by country, region or type of holding, the findings of different studies are contradictory.

Moreover a very topical subject is represented by the concerns about community support evaluation of the influence on income distribution inequality.

Under these circumstances, in order to quantify how much of income inequality change is explained by awarding grants, we applied in the current paper a methodology of breakdown of revenues by source of income calculation which is based on a series of indicators for assessing the concentration and inequality.

The methodology was applied to the data from the database RICA at the level of 2012 and was based on a series of indicators (net income from agricultural production; subsidized crop production; subsidies animal production; rural development and other grants; subsidies intermediate consumption; payments decoupled) selected on three criteria for the classification of agricultural holdings:

- average standard value on a farm:
  2000 - <8.000 EUR
  8000 - <25 000 EUR
  25 000 - <50 000 EUR
  50 000 - <100 000 EUR
  100 000 - <500 000 EUR
  > = 500 000 EUR

- type of production obtained (TF 8 Grouping classification of RICA): field crops; horticulture; wine; other permanent crops; milk; other grazing livestock; other animals granivorous; mixed.

-specialization of production (TF14 classification of RICA): field crops; other field crops; horticulture; wine; orchards – fruits; milk; sheep and goats; cattle; granivorous; mixed animals; mixed crops and livestock.

Each data set was characterized by descriptive analysis indicators generated using functions provided by Excel Data Analysis, one of the most important indicators being the **Gini coefficient**.

The Gini coefficient - an indicator that measures the equity of distributions - if equals '0' we have equality and if equals '1' we perfect inequality (Shryock *et al.*, 1980):

$$GI = (\sum_{i=1}^{n} x_i y_{i+1}) - (\sum_{i=1}^{n} x_{i+1} y_i)$$

The Concentration index is calculated based on the Gini coefficient and may have values between [-1,1]:

$$C = \frac{n}{n-1} GI$$

The Gini coefficient developed by Lerman and Yitzhaki (1985) which identifies how much of the total income inequity is due to the "k" source of income(Lerman *et al.*, 1985):

$$G = \sum_{k=1}^{K} R_k G_k S_k$$

where: Sk - share of their income in total income k; Gk - Gini coefficient of income source k; Rk - k correlation source of income to total income (between [-1.1])(Leibbrandt *et al.*, 1996):

$$R_k = \frac{\text{cov}[Y_k, F(Y)]}{\text{cov}[Y_k, F(Y_k)]}$$

Coefficient of relative concentration of their income (gk) (Adams Jr, 2002):

$$g_k = R_k \frac{G_k}{G}$$

where: gk - relative concentration of income sources k with total income inequality (Interpretation: gk> 1 - inequality increases gk<1 - inequality decreases

Absolute change - change due to changes in their income inequity k (Kaditi *et al.*, 2011):

$$Absolute\_Change = S_k(G_k R_k - G)$$

The percentage change in Gini due to a change of 1% of their income (%)(Adams Jr, 2002):

$$\%Change = \frac{S_k(G_k R_k - G)}{G}$$

RESULTS AND DISCUSSIONS

The analysis of breakdown revenue by source of income in 2012 is based on a series of

indicators selected on three criteria for the classification of farms: average standard value on a farm; type of production obtained (TF 8 classification of RICA); specialization of production (TF14 classification of RICA). Descriptive characterization and inequality indicators (concentration) income is presented in the following table (Table 1).

Table 1. Descriptive analysis and the evaluation of income inequality

		Criteria for group		
		Standard value	The type of production	Specialization
Total income	Minimum	2618	325	325
	Maximum	989771	24467	34913
	Average	208991,8	6047,75	6536,18
	Standard variation	387218	7858,334	9694,725
	Gini coefficient	0,723143	0,558601	0,628647
	Concentration ratio	0,867772	0,638402	0,681034
Net income from agricultural production	Minimum	2049	-983	-983
	Maximum	612194	12065	16599
	Average	122672,7	3710,38	4051,45
	Standard variation	240931,6	4026,871	4644,281
	Gini coefficient	0,734546	0,425317	0,41774
	Concentration ratio	0,881456	0,486076	0,459514
Crop production subsidies	Minimum	0	0	0
	Maximum	7431	160	160
	Average	1358,5	26,13	21,27
	Standard variation	2980,84	56,746	51,086
	Gini coefficient	0,793379	0,816388	0,851593
	Concentration ratio	0,952055	0,933014	0,936752
Animal production subsidies	Minimum	34	0	0
	Maximum	71593	1570	1570
	Average	12230,83	223,25	174,36
	Standard variation	29082,16	546,924	468,234
	Gini coefficient	0,814964	0,836086	0,862451
	Concentration ratio	0,977957	0,955527	0,948697
Other subsidies	Minimum	181	11	10
	Maximum	62037	2585	3801
	Average	15251,17	459,13	523,82
	Standard variation	24060,23	872,954	1099,343
	Gini coefficient	0,676154	0,715389	0,712284
	Concentration ratio	0,811385	0,817588	0,783513
Intermediate consumption subsidies	Minimum	4	0	0
	Maximum	25965	837	1261
	Average	5971,5	168,63	162
	Standard variation	10233,07	308,905	386,829
	Gini coefficient	0,716277	0,761397	0,841853
	Concentration ratio	0,859533	0,870168	0,926038
Decoupled payments	Minimum	350	192	192
	Maximum	208005	8617	12703
	Average	50238,17	1417,63	1557,73
	Standard variation	81208,91	2916,286	3703,026
	Gini coefficient	0,689479	0,691066	0,713871
	Concentration ratio	0,827374	0,789789	0,785258
Rural development	Minimum	0	0	0
	Maximum	4972	312	472
	Average	1269	42,63	45,55
	Standard variation	2075,843	109,316	141,706
	Gini coefficient	0,71189	0,853739	0,898566
	Concentration ratio	0,854268	0,975702	0,988423

Source: Treatments after FADN (RICA)

The high rate data for selected variables among different categories of farms determined as presented above reveal high levels of concentration (Gini coefficient tends to 1) and therefore a high inequality in income distribution, The evaluation of Gini coefficients reveals the following (Fig. 1):
- the inequity of distribution is more reduced in the case of classification in accordance with the type of production;
- the income inequity between very small farms and very large ones is pronounced, but the distribution of income from agricultural production presents a low concentration within the classification by type of production or specialization;
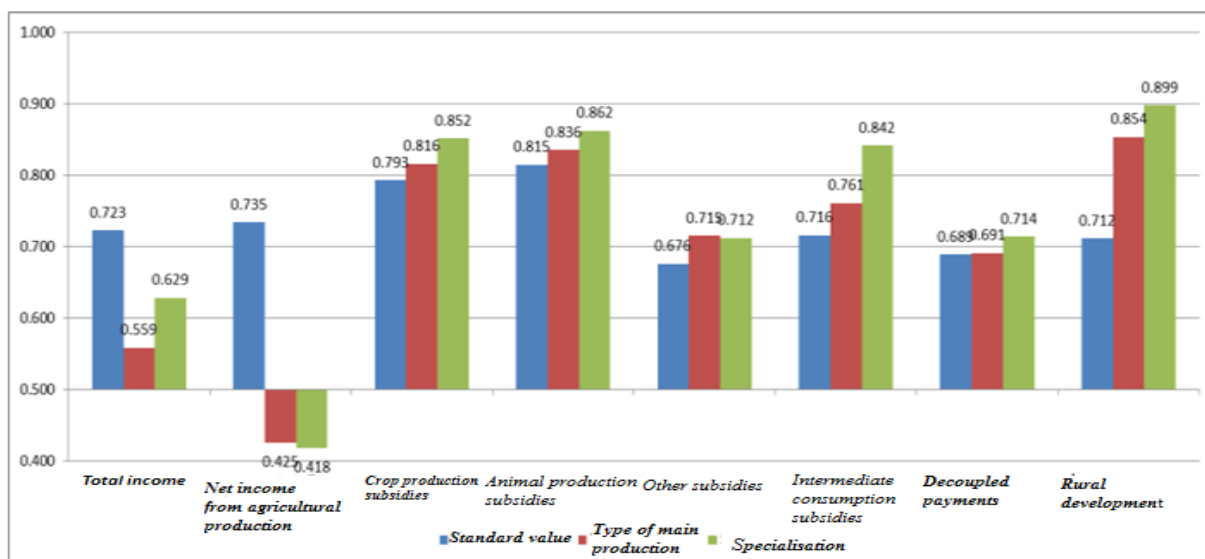
Fig. 1. The evaluation of the Gini coefficient on income categories
Source: Treatments after FADN (RICA)

- the main subsidies granted trough Pillar I (complementary national payments for crop and livestock) have very high Gini coefficients in the three categories of classification;
- decoupled payments presents a fairer distribution at farm level;
- we encounter the same situation in the case of the support provided through Pillar II which has the highest disparities between values and demonstrates the concentration of support only to certain categories of exploitations.

Given the conditions emphasized by the indicators of evaluation of the inequality of revenues distribution at the level of farms we consider that is necessary to identify the degree of influence of each income source over their total income, for each criterion of classification.

Decomposition of income inequality - Criterion: The standard value

The analysis by categories of standard value of the decomposition on income sources reveals that, although the Gini coefficients are high and almost similar, their correlation value with the total income (Rk) was very low for the support trough Pillar II demonstrating that these revenues were more equitable shared between farms (Table 2). The contribution of income sources to the creation of the total income reveals that the value of the agricultural production results in almost 56.7% of the inequality, the rest being grants influence. Of these, the most important contribution is that of the decoupled payments (26.2%).

Table 2. Decomposition of income inequality– Criterion: Standard value

Income	The share of total income (S_k)	Gini coefficient for income source (G_k)	Correlation coefficient (R_k)	Contribution income source of income inequity $(S_k G_k R_k)$	Coefficient relative concentration of their income (g_k)	Percentage of contribution to income inequity $(G_k/G*100)$
Net income from agricultural production	0.587	0.735	0.942	0.406	0.966	56.699
Crop production subsidies	0.007	0.793	0.839	0.004	0.930	0.604
Animal production subsidies	0.059	0.815	0.770	0.037	0.877	5.131
Rural development	0.006	0.712	0.496	0.002	0.494	0.300
Other subsidies	0.073	0.676	1.161	0.057	1.096	7.999
Intermediate consumption subsidies	0.029	0.716	1.070	0.022	1.071	3.060
Decoupled payments	0.240	0.689	1.132	0.188	1.090	26.208
				0.7160		

Source: Treatments after FADN (RICA)

Decomposition of income inequality - Criterion: the main production type obtained
The analysis by type of production of the decomposition by income sources reveals that although the Gini coefficients are high and almost similar, their correlation value with the total income (Rk) was very low for the support through Pillar I - subsidies for crop and animal production - demonstrating that these incomes were more equitable distributed between farms (Table 3).

Table 3. Decomposition of income inequality– Criterion: Type of main production

Income	The share of total income (S_k)	Gini coefficient for income source (G_k)	Correlation coefficient (R_k)	Contribution income source of income inequity ($S_k G_k R_k$)	Coefficient relative concentration of their income (g_k)	Percentage of contribution to income inequity ($G_k/G*100$)
Net income from agricultural production	0.614	0.425	1.156	0.302	1.094	67.107
Crop production subsidies	0.004	0.816	0.234	0.001	0.426	0.184
Animal production subsidies	0.037	0.836	0.052	0.002	0.097	0.356
Rural development	0.007	0.854	0.479	0.003	0.910	0.642
Other subsidies	0.076	0.715	0.652	0.035	1.038	7.878
Intermediate consumption subsidies	0.028	0.761	0.543	0.012	0.921	2.567
Decoupled payments	0.234	0.691	0.590	0.096	0.907	21.266
				0.449		

Source: Treatments after FADN (RICA)

The contribution of the revenue sources at the creation of the total income reveals that the value of the agricultural production leads to approx.67.1% of inequality, the rest being grants influence. Of these the most important contribution is that of the decoupled payments (21.3%), followed by intermediate consumption subsidies and other subsidies.

Decomposition of income inequality - Criterion: Specialization production

The analysis by type of specialized farms of the decomposition on income sources reveals that, although the Gini coefficients are high and almost similar, their correlation value with the total income (Rk) was very low for the subsidies for livestock production and for the support through Pillar II, thus demonstrating that these incomes were more equitable distributed between farms (Table 4).

Table 4.Decomposition of income inequality– Criteria: Production specialization

Income	The share of total income (S_k)	Gini coefficient for income source (G_k)	Correlation coefficient (R_k)	Contribution income source of income inequity ($S_k G_k R_k$)	Coefficient relative concentration of their income (g_k)	Percentage of contribution to income inequity ($G_k/G*100$)
Net income from agricultural production	0.620	0.425	1.274	0.336	1.111	68.839
Crop production subsidies	0.003	0.816	1.399	0.004	2.341	0.762
Animal production subsidies	0.027	0.836	-0.311	-0.007	-0.533	-1.423
Rural development	0.007	0.854	0.472	0.003	0.826	0.576
Other subsidies	0.080	0.715	0.705	0.040	1.034	8.284
Intermediate consumption subsidies	0.025	0.761	0.560	0.011	0.875	2.168
Decoupled payments	0.238	0.691	0.616	0.101	0.873	20.794
				0.488		

Source: Treatments after FADN (RICA)

The negative value of the income subsidies for livestock production reveals a negative correlation with the total income and diminishes the total Gini value. The contribution of the sources of revenue to the creation of the total income reveals that the value of the agricultural production leads to approx. 68.8% of inequality, the rest being the grants influence. Of these the most important contribution is that of the decoupled payments (20.8%) and of the intermediate consumption subsidies.

CONCLUSIONS

By evaluating the effects of the changing sources of income on the total income we

notice the magnitude of the effect of increasing or decreasing inequality of income distribution between farms. The results obtained demonstrate the following:

Criterion: the standard value:

-decoupled payments, intermediate consumption subsidies and other subsidies lead to increased inequality between farms of different economic dimensions;

-1% increase in income from agricultural production leads to increasing inequality by 2%, while increasing by 1% increase in income from decoupled payments lead to increased inequality by 2.17%;

Criterion: type of production:

-income from agricultural production and other subsidies lead to greater inequality between farms that acquire different products (cereals, wine, horticulture, etc.); 1% increase in income from agricultural production leads to increasing inequality 5.76%;

-subsidies generally lead to a decrease in inequality between them, in particular the subsidies for livestock production (a decrease of 3.33%) and direct payments (2.17%);

Criterion: specialization of production:

-income from agricultural production, other subsidies and production subsidies lead to increased inequality between animal farms specializing; 1% increase in income from agricultural production leads to increasing inequality by6.85%;

-subsidies generally lead to lower inequality between farms, particularly subsidies for livestock production (4.1% decrease) and direct payments (to 3.04%).

Summarizing the results above, we can see that the support through Pillar II leads to disparities but its influence is very low. Grants awarded by Pillar I are of the utmost importance to the formation of income and therefore they influence more directly the inequalities between farms. Our results reveals that a 1% change in subsidies granted by Pillar I:

- have a negative effect leading to increased inequalities between farms of different sizes;

- have a positive effect leading to disparities between different farms specialized in specific sectors or products.

Under these circumstances we believe that in order to improve the distribution of income between farms is necessary to increase the subsidies, especially those granted trough complementary national payments that allow the alleviation of general disparities from the prices of the agricultural production between different agricultural sectors and the support of land consolidation in order to achieve a more equitable distribution of the direct payments at the farm levels.

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