

Trends in the Level of Concentration in Bulgarian Agriculture after the Accession to the European Union

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Тенденции в нивото на концентрация и структурата на земеделските стопанства в България след присъединяването към ЕС

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След присъединяването на България към ЕС се наблюдават динамични структурни преобразувания в аграрния сектор. Проведените пълни преброявания на земеделските структури през 2003 г. и 2010 г. дават реална представа за настоящото състояние на отрасъла в страната и влиянието на ОСП на ЕС върху нивото на концентрацията и възможностите за конкурентно и устойчиво развитие на аграрния сектор. ОСП на Общността стимулира увеличаването на размерите на земеделските стопанства, тяхното уедряване и модернизиране, но наред с положителните тенденции се констатират и някои негативни промени.

Целта на разработката е въз основа на сравнителен анализ на структурата на земеделските стопанства, преди и след присъединяването на България към Европейския съюз, да се оцени влиянието на ОСП върху равнището на концентрация на земеделието в страната.

Introduction

After Bulgaria's accession to the EU, dynamic structural transformations in agriculture took place. The agricultural censuses in 2003 and 2010 give a realistic picture of the current state of the sector in the country and the impact of the European Common agricultural policy (CAP) on its concentration level and the opportunities for competitive and sustainable development. The increase of the degree of concentration provides perspectives for economies of scale and economies of scope, as well as receiving more financial support from the national or the European budget.

In Bulgaria the CAP stimulates the increase of farm size and farms consolidation and modernization, but along with the positive trends some negative changes are observed too.

The main objective of the research is to evaluate the influence of the CAP on the concentration of agriculture in Bulgaria, based on comparative analysis of the structure of farm holdings, before and after the accession of the country to the European Union.

For the purpose of this analysis two main methodological approaches are used in order to evaluate the level and the dynamics of the concentration process in agriculture. The first one considers the changes in important for the level of concentration indicators and the second one is about monitoring the dynamics of the process by applying the Gini coefficient.

Methodology

The level of concentration is measured by variety of metrics and indicators. In this study we

use the Gini coefficient, which most closely meets the aim of the analysis and the characteristics of agricultural sector. After Krugman (1991), the index of Gini became a standard measure for the studies related to geographical concentration. In the field of agricultural economics it is used to measure the level of concentration of different locations. The paper applies a modification of the Gini coefficient consistent with the features of agricultural structures (Merce et al., 2010).

The Gini concentration coefficient is calculated by dividing the effective area of concentration and the maximum area of concentration, as follows:

$$C(x) = \frac{\frac{1}{2} \sum_{j=1}^n (F_{j-1} + F_j) \cdot f_j}{\frac{1}{2}} \quad 0 \leq C(x) \leq 1$$

Where $C(x)$ is Gini index for attribute x

The generic form of a distribution is considered in order to illustrate this relationship by creating groups of exploitations:

$$x: \begin{pmatrix} x_j \\ n_j \end{pmatrix}$$

Where: n_j is number of units of j group

x_j is the average interval of the attribute in j group

Starting from this distribution, the derived distributions are constructed

$$x: \begin{pmatrix} x_j \\ f_j \end{pmatrix} \quad \text{and} \quad x: \begin{pmatrix} x_j \\ f_j^* \end{pmatrix}$$

Where:

$$f_j = \frac{n_j}{n} \quad \text{and} \quad f_j^* = \frac{x_j \cdot n_j}{\sum x_j \cdot n_j}$$

f_j is frequency related to the number of units in the aggregation

f_j^* is frequency related to attributes of the study

F_j and F_j^* represent cumulative frequencies (added step by step) of f_j and f_j^* .

The index takes values between zero and one. The closer to one the coefficient, the higher the

level of concentration. In order the analyses to be more accurate two types of indicators (natural and value) are used for the calculation of Gini coefficient. The value indicator applied in the study is the distribution of farms by economic size, and the natural indicator is the Utilized Agricultural Area (UAA).

Results

The study of the trends and changes in the regional structure of agricultural holdings makes possible to monitor the level of concentration of agricultural production in regions of planning and to assess the potential of each of them for sustainable development.

Table 1 shows the main indicators for the concentration level in the six regions of planning, as well as in the whole country.

The land reform which happened in Bulgaria, after the political changes had one main objective – to return agricultural land in the hands of its real owners and to let them cultivate it. The lack of clear vision and political stability during the last years of the 20-th century and in the beginning of the 21-st century made the reform inefficient and led to fragmentation of agricultural land, which created thousands of small farms. During the period of Bulgaria's preparation for EU membership the number of farms began to drop, but their size went up, because of the consolidation.

During 2003–2010 there was a steady downward trend in the number of farms across the country. It was most significant in the North-West and the North-Central regions, while in the South-Central region the change was smallest. The dynamics in the different groups of farms in the regions of planning show that the majority of small farms went out of business and only few of them have expanded. In 2003 most farms were concentrated in the South-Central region (21% of all farms in Bulgaria), followed by the North-West (18.8%) and the South-West (17.7%). On the opposite site was the North-East region, where there were only 12.4% of the holdings. The results from the study in 2010 indicate a significant change in the number of farms at the region-

Table 1. Regional concentration in agricultural sector

Regions of planning	Number of holdings		Average size UAA (ha.)		Average number LSU (number)		Average economic size (thousands Euro)	
	2003	2010	2003	2010	2003	2010	2003	2010
North-West	118076	48642	4.74	15.41	2.5	3.4	1.7	4.2
North-Central	87574	42001	6.86	17.10	3.7	5.5	2.7	5.7
North-East	78035	41675	9.01	17.72	4.1	5.3	3.1	5.8
South-East	97084	54481	4.31	13.42	2.3	5.0	2.4	4.3
South-West	111518	64221	1.27	3.66	1.8	2.0	1.0	1.8
South-Central	134629	106054	1.67	4.19	2.7	2.8	1.9	2.4
Bulgaria	626916	357074	4.22	10.13	2.8	3.6	2.1	4.1

Source: Own calculations based on Ministry of Agriculture and Food, Agrostistics, Agricultural Census.

al level. Regions of North Bulgaria were those with the least number of farms, while in South Bulgaria over 62% of all holdings were situated. In North Bulgaria the level of concentration was most noticeable. In this territory are accommodated the majority of big farms with large UAA. Sizeable changes were observed in the other indicator – the average farm size. For the period 2003–2010 the average UAA in the country increased by 58% reaching 10.1 ha, but remained significantly lower than the average in the EU–27, where it was 179 ha. The highest growth was observed in the North-West and the South-East regions by over 200%, and the lowest was in the North-East region, just 91%. However, it remained on a leading position in average farm size during the whole period. A review of the data shows great regional variations. In 2003 the index for the North-East region was 113% higher than the national average. At the opposite side were the South-Central and South-West region, where UAA per holding was respectively 60% and 69% lower than the average for Bulgaria. In the subsequent years there was a reduction of inter-regional disparities in the level of concentration. The North Bulgarian regions and the South-East region got closer, but the South-Central and the South-West regions continued to lag behind. These results show the lower level of concentration in Southern Bulgaria, which was determined not only by the less arable land available, but also by its greater fragmentation.

Similar trends were established in the indicator “Average livestock units per holding”. Average number of animals in 2003 was highest in the North-Central and the North-East regions, and lowest in the South-West. In 2010 the regions in Northern Bulgaria were leading in that regard, but the largest increase in the number of animals was observed in the South-East region (117%), followed by the North-Central (46%) and the North-West (36%). The South-West and the South-Central regions were the ones with the lowest level of concentration again. In the South-Central the growth was negligible, just 3.7%. This indicator underlines the significant interregional differences, although not as noticeable as in the average size of UAA. The analysis of the data shows that the increase of average life stock numbers per farm doesn't necessary correlate with the decrease in the number of holdings and the increase of business scale. Because of the constant decline in number of livestock units in the country, this trend shows evidence of reducing production potential of the sector. That makes it very difficult to construct a rational concentration model of production systems with optimal size.

The analysis of the parameter “Average economic size”, calculated on the basis of standard production value, shows the leading position of the North-Central and the North-East regions, while in the South-West the lowest levels are found. The results from 2010 clearly outlined the trend of equalization the levels of concentra-

tion in different regions and overcoming the inter-regional differences. The North-West and the North-Central regions increased most significantly the average economic size respectively by 147% and 111%, and the South-East region was close to the other areas in North Bulgaria. Only in the South-Central and South-West regions were registered the lowest levels of the indicator and growth of just 26% and 80%.

Ongoing transformation after the EU accession did not give the expected results and the agricultural structure in Bulgaria remains unbalanced. Despite the positive changes, there is still a low level of concentration in big areas of the country. This trend creates problems in the implementation of the CAP and the absorption of EU funds. There is a serious disparity in the support for different holdings, as the main share of it goes to large structures, while the small farms are deprived, because they do not meet the EU criteria, or the amount of the support is symbolic. This exacerbates the problems and jeopardizes the rational concentration of Bulgarian agricultural sector.

The results from the analysis of the above-mentioned indicators are supported by the values of the Gini coefficient, which is located between the curve of the equal distribution and Lorenz curve. Table 2 presents the values of the Gini coefficient at national and regional level in the two years of study.

There are some differences between the coefficients calculated on the basis of economic size

and that based on UAA, for which several reasons can be outlined. The values of the Gini coefficient calculated by applying natural measures are higher than those on the basis of economic size. These higher values are related to the calculation of the equal distribution and the Lorenz curve based on the size of UAA. These figures present the lower weight of the number of livestock units in animal production systems, which although may have great economic size don't have enough agricultural land. Therefore the Gini coefficient based on this parameter is indicative to a far more significant imbalance between small and large structures. However, it is important to recognize that the trends of both types of coefficients are the same, which makes it possible to do the necessary conclusions in the level of concentration.

In the first coefficient type greater dynamics is registered, as in 2010 the level of concentration increased by 17% in relative value. At regional level, the most significant increase was in the North-West region, while in the North-East region the growth is lowest. In all regions of planning is registered increase of the coefficient, which reached a peak in the second year of analysis. Results indicated a clear difference between North and South Bulgaria. In the northern part of the country are observed similar values of the coefficients and they are higher than the national average. In the South-Central and the South-West regions the results show much lower levels.

Table 2. Gini coefficient by regions of planning

Regions of planning	Gini coefficient based on economic size		Gini coefficient based on UAA	
	2003	2010	2003	2010
Bulgaria	0.694	0.817	0.906	0.932
North-West	0.671	0.848	0.887	0.943
North-Central	0.752	0.854	0.92	0.929
North-East	0.767	0.846	0.923	0.934
South-East	0.752	0.845	0.922	0.935
South-West	0.509	0.664	0.733	0.875
South-Central	0.598	0.736	0.863	0.879

Source: Own calculations based on Ministry of Agriculture and Food, Agrostistics, Agricultural Census.

The values of the Gini coefficient based on the size of the UAA reveal higher levels of the indicator compared to the results based on economic size and are significantly less dynamic. Both types of coefficients share the same trend of changes and regional differences. The values of the Gini index increased by nearly 3% on a national basis, while regionally – highest growth is established in the South-West and the North-West and lowest growth is registered in the North-East and the South-East. In both years of analysis however, the division of North and South-East Bulgaria and South and South-West remains intact.

Conclusions

The analysis of the Gini coefficient leads to several conclusions:

- The results indicate a relatively high level of concentration in the country before and after accession to the EU, but after 2007 the degree of concentration and the average farm size is increasing, as well as the average number of livestock units on a farm.
- The dynamics of the concentration shows growing differentiation between farms at national and regional level after accession to the EU.
- Calculation of the Gini coefficient testifies for division of the country into North and South Bulgaria by level of concentration.
- All indicators show significantly higher concentrations in North Bulgaria compared to the South-West and the South-Central regions. The main reasons lie in the small-scale production in regions of South Bulgaria and the inability for expansion and modernization in these areas. North Bulgarian agricultural producers are specialized in extensive proceedings. The decline in vegetables and fruits, as well as the difficulties and reduced production potential in livestock determine the lower level of concentration in the South regions, where these sectors are dominant.
- While recognizing the positive changes and the increase of the concentration level in differ-

ent regions, the values of Gini coefficient give a real insight into the farm structure at national and regional scale. In the country and in the regions of planning prevails irrational structure of holdings. There are many small farms in Bulgaria with low economic size and little UAA and few large structures with big economic size and UAA. After the EU accession the large production systems continued their intensification, while small farms are diminishing. Although there was a significant transformation in the agriculture after joining the community, the dualistic structure of the sector still remains.

- The direct payments of CAP deepen the differences between agricultural sectors and holdings on key indicators such as productivity, profitability, opportunities for modernization and transformation.
- The increase of public support mainly for large farms and extensive sectors has not only economic but also social and environmental consequences. It is necessary to take steps oriented to overcoming the structural imbalances, increasing the average level of concentration and creation of sustainable market-oriented farms in sectors like fruits and vegetables, dairy and meat livestock. It is necessary to use EU funds and the national budget for helping these strategic for Bulgaria agricultural sectors.
- The main political direction for the new programming period should focus on more equal allocation of public support between farms and raising the level of specialization and concentration.

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(Summary)

After Bulgaria's accession to the EU, dynamic structural transformations in agriculture took place. The agricultural censuses in 2003 and 2010 give a realistic picture of the current state of the sector in the country and the impact of the European Common agricultural policy (CAP) on its concentration

level and the opportunities for competitive and sustainable development. The results from the study show that the CAP stimulates the increase of farms size and their consolidation and modernization, but along with the positive trends some negative changes are observed too.

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Key words: concentration, regions of planning, utilized agricultural area, livestock units, Gini coefficient