

Economics of agriculture

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THE STUDY OF RUSSIAN AGRIBUSINESS DEVELOPMENT FACTORS APPLYING STATISTICAL MODELS¹

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Abstract

The dynamics of Russian agribusiness on the basis of the dynamics of agricultural production is overviewed in the article. Using these statistical models the author studies the factors affecting the development of Russian agribusiness.

Key words: *innovative constituent, agribusiness development, Cobb – Douglas models, Russia.*

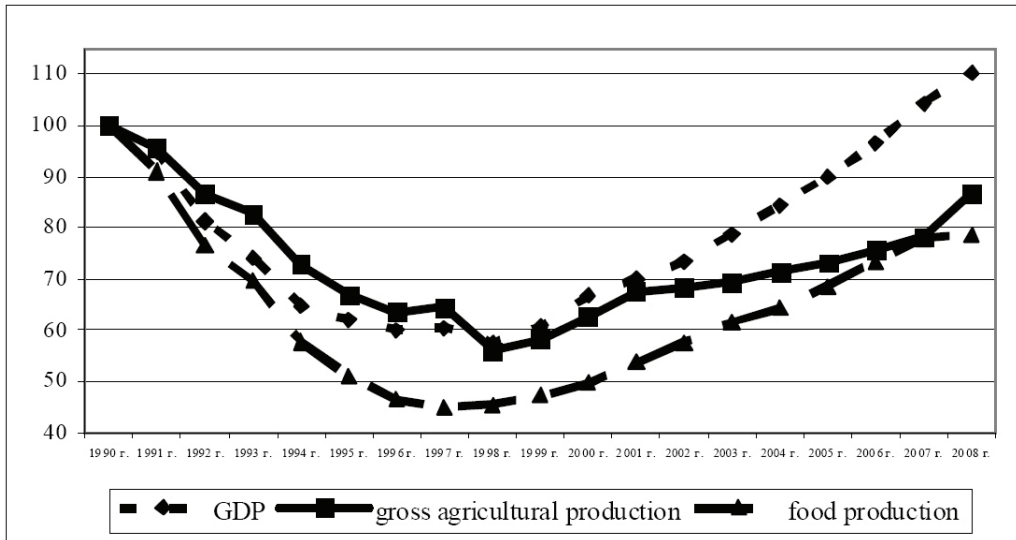
Introduction

Having looked upon Russian agricultural development dynamics over the last decades one may mark 2 essentially different stages of its production decrease.

Before 1999 agriculture found itself in transformational crisis, accompanied by the redivision of institutional industry's structure, elimination out of economic turnover, main economic indicators, decreasing of production factors, state support and growing competition together with agricultural raw materials import and processed production.(figure1)

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Figure 1. - Agribusiness development dynamics of Russian Federation [3]

Average yearly damp rates during this period constituted more than 6 per cent. Beginning after the default of 1998 the period of stable growth was characteristic of all economic spheres of agro production sector as well. Nevertheless, average year growth rates of agricultural production were 2,3 per cent lower than GDP what stipulated inaccessibility of prereform development level. Given dynamics witnesses, firstly, the development of agribusiness has more inertia character, secondly, specific conditions and growth barriers.

Applied methodology

In order to study Russian agribusiness development factors and estimate the innovative constituent several different as for parameters used and the ways of econometric models assessments were built by the author of the article and the best one was chosen.

In the calculations there were used different combinations of such growth factors as the number of work force employed in agriculture, the cost of fixed production funds, the size of investments into the fixed capital stock, weather conditions (for the quantities estimation of this factor the grains yielding capacity indicator has been chosen), the level of state support (estimated by consolidated budget spending indicator in agriculture). In the models described characteristic feature was gross agricultural production output, the dynamics of which was considered as agrarian sector economic growth.

Researching results with discussion

To study Russian agribusiness development factors and estimate its innovative constituent the author built several different models as for parameters and evaluation means used. The best one has been chosen. (Table1).

Table 1- Models' characteristics on the estimation of Russian agricultural economic growth factors

№	Model	Equation	Regression statistics
1.	Cobb-Douglas function	$Q=28,61*L^{0,47}*K^{0,36}*S^{0,12}$	R ² - 0,92 Standard error - 0,31 Observation - 76
2.	Solow model	$Q=18,81+1,51L+0,11K+0.49Y$	R ² - 0,84 Standard error. - 94,87 Observation - 10

The first variant of calculations was based on building up of modified (taking into the account agricultural production specifics) production function of Cobb-Douglas. The analysis was conducted on the territorial survey data using indicators of 76 Russian Federation subjects: Q – gross agricultural production output, mln. rubles; L – annual number of employed, thousand men; K – fixed capital assets, mln. rubles; S – agricultural lands' square, thousand hectares. Coefficient of multiple regression R² in the model confirms a very high degree of resultant feature connection with factor feature. Acquired link equation shows that 1 % increase in labor costs results in 0,47 % agricultural production volume increment, the same figure in capital inputs increase promotes 0,36 % output rise, 1% land resources increase correspondingly leads to 0,12% gross output production increase. As the sum of degree indicators is less than 1 (0,95), this means that simultaneous factors' increase per 1% leads to gross output increase up to 0,95%, that is, has decreasing payback. The coefficients' elasticity comparison model in agriculture with analogical industrial indicators shows that capital-labor ratio in the former has lower capital endowment, its productivity as well as in industry grows slower than capital endowment, but is less dependent of its dynamics.

As one of the ways of determining the sources of economic growth neoclassical theory of economic growth by R.Solow is traditionally used [6]. In accordance with the above mentioned theory, the part of output growth rate, which can't be explained by the alteration of costs of production factors (labor and capital) is called Solow's remainder and includes into itself together with a lot of other things the influence of scientific technical progress [1]. The author made the second variant of calculations which is given in the table 1. All the variants were statistically important. But the best from the point of view of regression statistics and meeting the sustainability and evaluation shift criteria should be recognized Solow model's modification. The model represents time survey data with the use of 1999-2000 indicators where Q –gross output production indicator, mln. rubles; L – annual number of employed, thousand men; K –fixed capital assets, mln. rubles; Y –grain yields capacity as indirect indicator of weather conditions influence.

Conclusion

Conducted calculations made it possible to formulate the following deductions as regards characteristics of the Russian agribusiness growth type:

- Its extensive character, when the growth of production output is caused by the growth of the main factors;
- Changes in the results of agribusiness sphere activities were mainly because of the input of labor resources. Scientific technical progress and fixed assets indicators have reciprocal ratio connection with resulting feature;
- Favorable weather conditions influenced most of all agricultural growth during the last decade;
- Ranging according to significance of the impact on economic growth in agrarian sphere of all factors examined showed that essential influence on economic dynamics is made by the level of governmental support (elasticity coefficient is three times higher than fixed assets elasticity).

Thus, calculations prove that Russian agribusiness despite last decade positive dynamics has very low economic growth qualitative indicators. Even taking into account the difficulties in defining of scientific technical potential in agriculture, indirect evaluation proves the lack of innovative constituent in the developmental dynamics. It requires all-round restructuring of industry's innovative system including the system of new knowledge generation, distributing innovations, information-consulting provision to overcome this unfavorable situation.

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