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FACTORS AFFECTING FARM PRODUCTION IN THE MOSCOW REGION

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The behaviour of Russian farms is an essential factor of uncertainty of both Russian and European food markets and of the transitional process results. Although there is a large body of literature about the factors affecting production decisions of Russian farms, this issue has not been studied systematically. In particular, there is a lack of studies of Russian farms utility functions.

We drop the idea to estimate a fully specified utility function, as the reliability of such an estimation is doubtful. Instead, we approach a tangent T to a true utility function in a given state of a specially defined case farm. T is a linear function of the utility components. Given a multy-objective theoretical model of an economic agent and assuming utility components to be a priory uncomparable, the general reciprocity theorem (Lourier, 1966) suggests that T should be defined as a value of each utility component weighted by its shadow price when one of the utility components (book value of profit in our case) is maximized.

The technological set of the case farm is assumed (at the current stage of the study) to be consistent with Leontieff technologies. It is defined by means of linear regression. The production programme of the case farm is defined by maximising one utility attribute subject to the actual amount of fixed inputs and the actual value of other utility attributes. Six case farms are defined in order to cover the most of actual variety of farm production patterns in the Moscow Region (the production pattern of a farm is a set of Leontieff technologies that are available this farm).

The data of 1999 were used representing 407 large-scale farms of the Moscow Region. The data set includes 18 variables on outputs, inputs and financial indicators. After dropping the farms producing more than 25% of "other" output, there are 311 farms left in the data set that is used for estimation purposes.

We consider six marketable products: milk; meat; cereals; fodder; potatoes; vegetables; other production. The production patterns are defined as follows: I –

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everything but vegetables; II – everything but potatoes and vegetables; III – all the six products; IV – milk, meat and other production; V – everything but cereals; VI – everything but cereals and vegetables. Each case farm is assumed: to have average on the whole data set technological capabilities; to be specialised in accordance to one of the production patterns that are most widely spread in this region; to have an average amount of resources and an average level of utility attributes. For each case farm we define two model specifications. In the first of them the other production is a utility attribute, while the in second it is not.

Table 1: Tangents to utility function of the case farms

Pattern	**Utility function**	**Pattern**	**Utility function**
a) Other production is a utility attribute		b) Other production is not a utility attribute	
I	$\omega_0 + \omega_1 + 0.241\omega_3 + 0.081\omega_4 + 0.865\omega_5$	I	$\omega_0 + \omega_1 + 0.241\omega_3 + 0.081\omega_4$
II	$\omega_0 + \omega_1 + 0.431\omega_2 + 0.068\omega_4 + 0.858\omega_5$	II	$\omega_0 + \omega_1 + 0.431\omega_2 + 0.068\omega_4$
III	$\omega_0 + \omega_1 + 1.380\omega_2 + \omega_3 + 0.124\omega_4 + 0.911\omega_5$	III	$\omega_0 + \omega_1 + 1.380\omega_2 + \omega_3 + 0.152\omega_4$
IV	$\omega_0 + \omega_1 + 1.380\omega_2 + \omega_3 + 0.188\omega_4 + 1.101\omega_5$	IV	$\omega_0 + \omega_1 + 1.380\omega_2 + \omega_3 + 0.188\omega_4$
V	$\omega_0 + 0.758\omega_1 + 1.380\omega_2 + \omega_3 + 0.194\omega_4 + 1.151\omega_5$	V	$\omega_0 + \omega_1 + \omega_3 + 0.156\omega_4$
VI	$\omega_0 + \omega_1 + 1.380\omega_2 + \omega_3 + 0.189\omega_4 + 1.117\omega_5$	VI	$\omega_0 + \omega_1 + 1.380\omega_2 + \omega_3 + 0.190\omega_4$

Notations: ω_0 is profit after taxation, ω_1 is depreciation, ω_2 is wages, ω_3 is social costs, ω_4 is milk production and ω_5 is other production.

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Table 2: Case farms: Shadow prices of resources, thousand roubles per unit of resource

Production patterns (according to Appendix)	Arable land, hectares	Machinery, thousand roubles	Fodder, thousand roubles	Operating capital, thousand roubles	Total costs, thousand roubles
I	–	0.064; 0	0.304	0.673	–
II	–	0.064; 0	0.304	0.812	–
III	0.960; 1.532	–	0.304	0.366; 0	0.449; 0.623
IV	–	–	0.010	–	0.816
V	0; 0.150	–	0.014; 0.095	–	0.811; 0.503
VI	–	0; 0.028	0.034; 0.022	–	0.772; 0.808

Two figures in the same cell relate to different utility funciton specifications (including and not including other production). If there is a single figure then the estimation is the same for both specifications.

Workers are the limiting factor of farm's utility only for the farm VI when the utility function includes other production. The corresponding shadow price is 4.163 thousand roubles per worker.

Table 1 presents the estimated local properties of T for each case farm. In Table 2 there are the shadow prices of the resources. Fodder availability is the most common limiting factor of agricultural production. However, the fodder purchase is not effective unless its price would drop three times, thus getting comparable to the cost of internal fodder production. Other two major limiting factors of farm production are operating capital and total expences. They have quite a similar nature, originating in a lack of turnover assets. This situation results from lower rate of return to capital in agriculture than in other sectors of national economy. Due to that the turnover assets, which are the most liquid part of farms' assets, flow to non-agricultural businesses.

Actual vegetable production is systematically less than optimal, that indicates presence of market failures. To allow for them in the models related to patterns III and V, the upper bound of vegetables production is set at its actual level. The corresponding shadow prices are 0.152 and 0.137 when other production is a utility attribute or 0.137 and 0.136 otherwise. The elasticity of vegetables price with respect to supply, calculated on the base of these shadow prices, is –0.461 and –0.415 respectively.

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CONCLUSIONS

1. The study has supported the hypothesis that the utility of case farms includes depreciation, wages and social costs. Milk production and other production are sources of hidden utility.
2. Increasing turnover assets is the most common way of increasing the amount and profitability of agricultural production.
3. This study has provided evidence that the Moscow Region farms hire extra workers, as social motivation prevails over economic motivation when decisions about hiring and discharge are made.
4. High fodder price is a limiting factor for agricultural production. As the internal production of fodder is little less expensive than purchase, the question arises how to improve the existing market structure.
5. Long-term credit is expected to have less impact on the economic situation at the studied farms compared with short-term credit.
6. Vegetable market oligopoly, which is caused by a high elasticity of prices with respect to supply, hampers vegetables production in the region.

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