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Should Russia comply with EU food safety norms in the wheat sector?

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Abstract. The impressive volumes of wheat production in Russia on the one hand, and the good baking quality of Russian wheat on the other hand enabled Russia to become one of the important wheat producers and exporters of the world since the recent few years. However Russia has a long way to go in the “front” of Sanitary and Phytosanitary (SPS), i.e. food safety, standards. As part of a larger study, financed by the German Research Foundation, the current research addresses the objective of estimating the potentials of wheat production in Russia under more stringent food safety standards as the current Russian national SPS regulations are. The comparative advantage analysis based on the Domestic Resource Cost approach (DRC) is applied to estimate the possible compliance of Russian norms with EU SPS standards.

The DRC analysis resulting in a ratio of 0,37 provides evidence of high social profitability of wheat chain in Stavropol region. Also the scenarios of compliance of Russian food safety norms with those of EU offers plausible solutions with DRC ratios varying within the range of 0,49 – 0,96 dependent on the fluctuations of model parameters.

This is the third paper from the series of analysis of competitiveness of the Russian wheat sector under different food safety policies. The first paper estimated the policy of the full enforcement of national SPS regulations. The second work assessed the policy of compliance with the international SPS norms and considered also the sensitivity analysis under this policy. As far as the EU SPS norms are more stringent as the international standards, there is a necessity to assess also this policy option.

Keywords: DRC, wheat, food safety standards.

1. Introduction

In the literature it is much discussed about safety characteristics of food as one consisting part of food quality. As quality is composed of various attributes including safety, food safety enhancements can improve overall product quality. But enhancing non safety quality attributes does not necessarily lead to food safety improvements (CHO, 2004). Russian wheat is particularly distinguished with its good baking characteristics, like protein content, which does not automatically mean that it has satisfactory safety characteristics, like low residual limits of mycotoxins in wheat corn.

The favourable whether conditions of the recent several years allowed Russia to enter the world wheat market as an important wheat producer and exporter. However the Russian wheat very often fails to meet the stringent food quality and safety standards set by the European Union. The high portion of confiscated shipments of wheat (because of mycotoxin contamination) at EU borders, constituting yearly 20-30% of total wheat exports from Russia, makes the problem evident and urgent.

This investigation represents the part of a larger study, financed by the German Research Foundation (DFG) and aims at the assessment of the potential of the Russian wheat sector in complying with the stringent food safety standards on mycotoxin residual limits for the case of Stavropol Region.

The study area represents the southern regions of Russian Federation which are the major wheat producers of the country, with production amounts constituting more than 40% of total Russian wheat production.

To estimate the efficiency of wheat chain under the policy of full compliance with EU food safety standards on mycotoxin we applied the methodology of comparative advantage analysis based on the Domestic Resource Cost approach (DRC).

2. Domestic Resource Cost analysis of wheat chain in Stavropol region

Applied comparative advantage analysis seeks to answer the following question: for a given country which, among the set of alternative production activities or technologies is relatively the most efficient (measured in terms of contribution to national income), ignoring the effects of distortions.

Relative efficiency in production depends on three factors: 1) technology (which determines production possibilities and influences rates of product transformation); 2) resource endowment (which determines the value of domestic resources), and 3) international prices (which determine the value of all other inputs and outputs), (MORRIS, 1990, p.6).

To determine the comparative advantage of the “production-elevator” segment as well as “production-elevator-exporter” segment of the Stavropol wheat chain the study implements the method of DRC estimation described

by MONKE and PEARSON (1989), as a ratio of opportunity costs of domestic factors of production per unit of value added in world prices. The social value of additional domestic output is thus the foreign exchange saved by reducing imports or, in our case, earned by expanding exports.

It indicates the efficiency of production in using domestic resources to earn (or save) one unit of foreign exchange. For outputs and inputs that are traded internationally the social valuations are given by world prices, and, for domestic factors, by their alternative uses.

The DRC is calculated using the formula, (MORRIS, 1990):

$$DRC_C = \frac{\sum W_P F_P}{P_C F_P - \sum P_j T_i} \quad (1)$$

where:

F_P - coefficients for domestic resources or non tradable intermediary inputs

T_i - coefficients for tradable inputs

F_P - quantity produced of tradable output

W_P - shadow price (opportunity cost) for domestic resource or non tradable input

P_j - border price for tradable input

P_C - border price for tradable output

The DRC results conclude whether the production of a certain commodity has a comparative advantage for a certain country, i.e. reveal the efficiency of the use of domestic resources to save (or earn) one unit of foreign exchange. The interpretation of DRC ratios is presented in Table 1.

Table 1. Interpretation of DRC Ratios

DRC Ratios	Interpretation	Conclusion
DRC = 1	The economy neither gains nor saves foreign exchange through domestic production	Economy on balance
$0 < DRC < 1$	Value of domestic resources used in production is less than value of foreign exchange earned or saved	Comparative advantage
DRC > 1	Value of domestic resources used in production is greater than value of foreign exchange earned or saved	No comparative advantage
DRC < -1	More foreign exchange is used in production of a commodity than the commodity is worth	No comparative advantage

Source: Author, based on MONKE et al (1989), TSAKOK (1990), MORRIS (1990), Khachatryan (2000)

The data required for the DRC methodology come from primary and secondary sources. The direct interviews with the specialists from the wheat sector of Stavropol region were the most valuable primary sources of data, providing details on production technology, capital stock, labour force, capacity utilisation, etc. for the production budget. Further primary data, obtained from interviews with farmers, included actual information on farm-level technical coefficients, such as quantities of agricultural production inputs and outputs, yield levels, prices paid and received by farmers, etc. Of particular importance are the details obtained by the other actors of the wheat supply chain (owners of wheat storage capacities¹, intermediary traders, millers, bakers and consumers). Secondary data (containing information for the previous 5 years) are obtained from annual financial reports of the agricultural ministry. Accounting records of large wheat producing cooperatives provided quantities and values of opening and closing stocks, raw material inputs and other intermediate inputs, as well as production outputs.

The first step in the DRC analysis requires assembly of the production budget. The budget represents the observed costs and returns for one period of the “production-elevator” segment of the wheat chain.

The second step in the DRC analysis requires classification of the inputs and outputs into tradable and non-tradable factors. Several non-tradable inputs (hired machinery, transport requirements, etc.) consist of tradable and non-tradable components and are further disaggregated, so that ultimately all component costs are classified

¹ From now on used the term “elevator”, as usually the storage capacities are called in Russia

as tradable inputs or domestic factors. In our case machinery, maintenance spares, fuel and depreciation are considered as tradable inputs. Maintenance labour, rent for machinery and capital costs are non tradable inputs. After having the production budget with the actual market (private) prices of commodities and after classifying all the budget entries into tradable and domestic factors, the next step is to construct the social prices, which are also known in literature as shadow, efficiency, accounting, economic, opportunity cost prices or value of marginal physical product, (Khachatryan 2000). The social prices are expressed in Euro using official exchange rates.

The *social values* for tradables, i.e. inputs (e.g. seeds), and output (wheat) that are traded internationally, are given by world prices – c.i.f. import prices for goods or services that are imported or f.o.b. export prices for those that are exported². World market prices represent the opportunity cost to the country of producing the commodities (Tsakok, 1990). The social value of a traded commodity is determined by converting the long-run trend value of the commodity into the domestic currency equivalent using the official foreign exchange rate and adjusting it for internal transportation and marketing margins. The resulting value is the border price³.

The social price for wheat as well as for tradable inputs is the border price – the price at which foreign suppliers would deliver wheat to the Russian market or the price that foreign consumers would pay Russian exporters to deliver wheat to their markets (Monke and Pearson 1989).

Social values of domestic factors: The services provided by domestic factors of production – labour, water, capital and land – do not have world prices because the markets for these services are considered to be domestic. The efficiency value of a non-tradable input is given by its contribution to output in the next best alternative use. For the assessment of the social value of each non tradable factor we estimated the net income forgone because the factor is not employed in its best alternative use.

Labour: There is a legislated minimum-wage law, but the labour market ignores it and the market is completely unregulated. Despite the rather high rate of urban unemployment and some differences in wage levels between regions and sectors there are no interregional labour movements in Russia, because of high costs of travelling and housing. The labour, therefore, is considered as fixed factor. The labour market is competitive; there is a surplus of labour relative to available opportunities. The opportunity cost of labour is approximately equal (or somewhat higher if taken the average wage in non agricultural fields) to the private wage.

Capital: The shadow price of capital (agricultural machinery services, rental of farm implements, and use of transportation) is estimated using the demand approach. There is a free, competitive market for capital use. The opportunity cost of tractor services, for example, is approximated by the rental fee, which in fact indicates the marginal product of these services. This is what the farmers believe the services will contribute to their production and what they are willing to pay.

Land: The land market in Russia is in its formatting stage and the rental value is considered as economic value of land.

Sensitivity analysis

The DRC framework lends itself readily to sensitivity analysis, which is a good tool for revealing the changes in comparative advantage rankings, when the individual parameters change. It is also used to assess the effects of possible errors in evaluation of technical coefficients or estimation of social values. Sensitivity analysis is carried out to examine the effects of the changes of two parameters: world reference prices of wheat and labour costs. The DRC ratios have been calculated inducing plausible changes of the values of the basic model parameters to assess the impact of possible changes.

3. Interpretation of results of DRC analysis

The analysis represents the base run (reference data) first for the segment of “production-elevator” and then for the segment “production-elevator-exporter” under the policy of full compliance with the EU norms.

1. The DRC ratio of wheat production in Stavropol region including expenses for storage, marketing and transportation to the elevator (“production-elevator” segment) is calculated considering the actual level of enforcement of the existing SPS norms of various mycotoxins. The analysis resulted in a DRC ratio of 0,37 in the base run.

Sensitivity analysis has been carried out to identify how the DRC ratios for wheat production in Stavropol react on changes of wheat world reference prices and labour costs.

² The f.o.b. (free on board) and c.i.f. (cost, insurance, and freight) prices for a given economy serve as reference prices because they represent what the commodity can earn as an export or what it costs the economy as an import.

³ Tsakok (1990) defines the border price as follows “When the international or world price is translated into domestic currency at a given exchange rate, the resulting price is called the border price”.

The results of calculations of DRC ratios for wheat involving 3 different scenarios, which reflect possible changes of model parameters, are presented in Table 2.

Table 2. DRC ratios for wheat

S C E N A R I O S		DRC Ratios production-elevator	DRC Ratios production-elevator- exporter
B A S E R U N		0,37	0,83
World price of wheat	0,7*base	0,79	2,76
	1,3*base	0.24	0,49
labour	3*base	0,47	0,96

Our analysis of the dynamics of the prices of wheat on the world market during the last 10 years showed that they are varying dramatically. For the reference period the world prices of wheat were changing with the amplitude of 30%. Therefore we considered two scenarios with 30% higher and lower prices of wheat correspondingly. The scenario with wheat world prices higher than the reference price of the base run, increase the competitiveness of Stavropol wheat by 27% with a DRC ratio equalling 0,24. The scenario of lower wheat prices although decreases the profitability substantially, but wheat production in the region still remains competitive, as far as the value of DRC (0,79) does not cross the threshold of 1,0.

Analysing the overall economic situation of the Russian Federation especially the developments in the labour market we found it plausible to assume that the labour force in the agricultural sector has a potential to rise three times in the not far future. This scenario also delivers rather promising results of DRC ratio of 0,47.

2. The calculation of the DRC of wheat of the “production-elevator-exporter” segment for the case of full EU compliance has resulted in a ratio of 0,83 (Table 2) in the base run, which is although competitive, however decreases the profitability more than twice compared with the non-compliance situation.

For this case the competitiveness becomes vulnerable depending highly on the world market prices. Thus, a 30% lower wheat price in the world market, results in DRC ratio of 2,76 (more than 1,0) and will have dramatic consequences on Russian wheat exports. Also the scenario with three times higher expenses for the labour force can cause substantial losses in competitiveness (DRC ratio 0,96).

The results of DRC analysis of wheat value chain under different scenarios show that the policy of compliance of Russian SPS norms with those of the EU will decrease the international competitiveness of the Russian wheat and make it largely dependent on fluctuations of the wheat prices on the world market. However the sector remains competitive and has a potential to increase its profitability, which however requires certain improvements and modernisation.

4. Conclusions

Based on the results of the DRC ratios for wheat value chain under different scenarios, we can conclude that the export segment of Russian wheat sector under the policy of full compliance with EU SPS norms on mycotoxin is competitive in Stavropol Region, given the conditions are favourable, i.e. if the reference values of the parameters (especially the world price of wheat) remain stable. Under this policy any slight reduction in the world wheat prices will turn the sector into non-competitive on the international market.

Our recommendation to Russian policy makers would be therefore to follow the option of the compliance with EU norms initially only for a special export oriented segment (moreover, a special EU market oriented segment), which will allow the Russian wheat exporters to increase the share of their shipments to the EU markets on the long run. This segment however needs technological modernisation and improvements especially in the food safety enforcement, monitoring and control mechanism.

For the segment supplying the local market or the market of CIS, Asian and African countries the compliance with the international SPS standards (which are looser than those of the EU) will be more reasonable.

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