

Foreign trade and foreign direct investment in food industry enterprises in Russian regions

The purpose of this work is to study the distribution of FDI in the Russian regions and the effects of FDI on foreign trade and manufacturing activities of the Russian regions in the selected industries on the historical data of Rosstat regional statistics for selected industries (food industry). The results of the study are expected to help in the search for answers to the following question: “Is it possible to attract foreign investors to the food industry in Russia to stimulate export while there is a decline in import, or, in other words, is there any reason for the success of the export-oriented import substitution policy in this industry?”

Problem statement

In the context of open export-oriented development economic policy the FDI is a traditional effective tool to upgrade the production and management technology and come into international markets. Traditionally the growth in the import of technologies, equipment, experts and specific raw materials related with the inflow of FDI is not considered as a negative process because the increase in foreign exchange earnings to the budget helps to cover these expenses. In addition, it creates favorable conditions for economic growth if this process does not lead to job losses uncompensated by creation of new jobs in the modernized enterprises and the gradual suppression of the domestic business because of their competition with companies that have FDI, if it promotes the competitiveness of domestic business, stimulating its export activity and expansion, followed by the creating new vacancies. However international experience shows that such an ideal course of events is not always observed.

Under conditions of import substitution policy the FDI is not an explicitly effective tool because it can be accompanied by the influx of import of materials, equipment and technology that is generally contrary to the policy objectives. However the necessity to ensure the process of establishing a competitive local production of goods and services, and strategic objectives of exporting some products of domestic processing to international markets requires investments, technological innovation and networking with foreign partners that is very difficult to carry out without attracting FDI.

Lubomudrov in his paper (2010), devoted to FDI in China, said about the close relationship between the FDI and import of raw materials and components. FDI helps to solve the problem of establishing its own production in the recipient country and at the same time leads to the growth of imports necessary for production materials and equipment (that is not always desirable for a recipient economy). And not always the benefit from FDI compensates the cost of financing the import purchases.

In this research we investigate the ongoing process of FDI distribution in the regions of Russia on empirical regional data and understand how they are consistent with:

- import of materials and components;
- import of technology;
- capability to come into global markets, to export.

Research hypotheses

Hypothesis 1. The presence of FDI in region's enterprises in the food industry accompanies with the growth of the region's competitiveness in the industry and the activity of enterprises on global market.

- a. The more FDI the region has the more the possibility to export is;
- b. The more the region exports the more attractive it is for foreign investors.

Hypothesis 2. The presence of FDI in region's enterprises in the food industry accompanies with the related to the food industry import activity of a region.

- a. The more FDI the region has the more there is the necessity to import resources and semi-manufactured goods;
- b. The more FDI the region has the more there is the necessity to import technology;
- c. The more the region can import the more attractive it is for foreign investors;

Hypothesis 3. Increase in import of raw materials and components leads to the increase in the region's competitiveness in the industry and the activity of enterprises on global market.

Hypothesis 4. Increase in import of technologies accompanies with the improvement of the region's competitiveness in the industry and the activity of enterprises on global market.

Hypothesis 5. There is a dependence of the inflow of FDI and foreign trade related to the industry on the previous level of FDI activity in other regions (investment climate or investment potential).

Roadmap of the research

The empirical analysis of FDI factors on regional data at the level of one particular industry can be summarized as the following study road map:

- The primary analysis of original data - analysis of descriptive statistics, graphical analysis;
- Creating integrated indexes of investment attractiveness of Russian regions for a single industry;
- Clustering of regions;
- Investigation of statistical Granger causality among variables: export and import flows related with the industry and FDI;
- Estimation of the system of equations (the SUR - seemingly unrelated regressions, 3SLS);
- Estimation of model on subsamples (based on identified clusters);
- Evaluation of the sensitivity of FDI to exports and imports;
- Construction and investigation of localization indices for FDI indicators and factors of interest (export, import of materials and technology);
- Study of the effects of FDI in the food industry in Russia according to the regional statistics.
- Construction and estimation of demand models for FDI in the Russian regions in the food industry.

Data

Variables of interest (for the industry "Manufacture of food products and beverages"), source – authors' calculations based on data from Russian Federal State Statistic Service (Rosstat), panel data for regions from 2007 to 2013	
Accumulated FDI	Accumulated FDI (from all partner countries and from offshore zones)
Spatial lag of accumulated FDI	Accumulated FDI from all partner countries in other regions $SpatialLag(FDI) = W \cdot FDI$, where W is a spatial weighting matrix based on inverse squares of distances between capitals of regions
Inflow of FDI	Received FDI (from all partner countries and from offshore zones)
Im_{Mat}	Expenses for the purchase of imported raw material and semi-manufactured goods for the production and sale of goods (works, services)
Im_{Tech}	Import of technology from foreign countries
Exp	Shipped goods for export
Output	Shipped goods of own production, works and services on their own

Econometric analysis

Within clusters obtained we evaluated the system of equations. Each equation represents one regression with one of 4 dependent variables of interest. Thus, the robustness of results was tested and the differences in determinants of inward foreign investment in the food industry in Russia were identified in terms of the impact on the following values: the values of the accumulated FDI from all countries (total), inflows of FDI from all countries (total), volume of accumulated and inflow of "Net foreign" FDI (from countries not included in the list of offshore zones, according to the order of the Ministry of Finance of the Russian Federation). The rest of the regression equations in the system have the variables of foreign trade as the dependent variables.

Additional explanatory variables in the regressions are the characteristics of the region, reflecting the potential motives of foreign investors, taking into account the specifics of the food industry. As control variables the values of investment attractiveness indices of the food industry (regional risk and potential, described above) were included.

To avoid problems of endogeneity and be able to talk about dependencies (at least in time sequence), covariates were taken for the period preceding the observation period of dependent variable.

The system was analyzed with two steps:

- 1) The first step was to assess the proposed system of equations to determine the feasibility of relationships for further meaningful research - a statistical study of Granger causality.

$$\begin{cases} FDI_t = \alpha_0 + \sum_{j=1}^2 (\alpha_{1j} \cdot FDI_{t-j} + \alpha_{2j} \cdot Im_{Mat_{t-j}} + \alpha_{3j} \cdot Im_{Tech_{t-j}} + \alpha_{4j} \cdot Exp_{t-j}) + \varepsilon_t \\ Im_{Mat_t} = \beta_0 + \sum_{j=1}^2 (\beta_{1j} \cdot Im_{Mat_{t-j}} + \beta_{2j} \cdot FDI_{t-j} + \beta_{3j} \cdot Im_{Tech_{t-j}} + \beta_{4j} \cdot Exp_{t-j}) + u_t \\ Im_{Tech_t} = \gamma_0 + \sum_{j=1}^2 (\gamma_{1j} \cdot Im_{Tech_{t-j}} + \gamma_{2j} \cdot FDI_{t-j} + \gamma_{3j} \cdot Im_{Mat_{t-j}} + \gamma_{4j} \cdot Exp_{t-j}) + v_t \\ Exp_t = \delta_0 + \sum_{j=1}^2 (\delta_{1j} \cdot Exp_{t-j} + \delta_{2j} \cdot FDI_{t-j} + \delta_{3j} \cdot Im_{Mat_{t-j}} + \delta_{4j} \cdot Im_{Tech_{t-j}}) + \mu_t \end{cases}$$

- 2) On the second step the system itself was estimated to determine the direction and strength of the relationship between foreign trade factors and FDI. The following general scheme was

modified for each case, so the right parts of the equations are different. Also the test for interdependence of residuals was provided.

$$\begin{cases} FDI_t = \alpha_0 + \alpha_1 \cdot FDI_{t-1} + \alpha_2 \cdot Im_{Mat}_{t-1} + \alpha_3 \cdot Im_{Tech}_{t-1} + \alpha_4 \cdot Exp_{t-1} + \alpha_5 \cdot FRisk_{t-1} + \\ \quad + \alpha_6 \cdot FPotential_{t-1} + \alpha_7 \cdot SpatialLagOfAccumulatedFDI_{t-1} + \varepsilon_t \\ Im_{Mat}_t = \beta_0 + \beta_1 \cdot FDI_{t-1} + \beta_2 \cdot Im_{Mat}_{t-1} + \beta_3 \cdot Im_{Tech}_{t-1} + \beta_4 \cdot Exp_{t-1} + \beta_5 \cdot FRisk_{t-1} + \\ \quad + \beta_6 \cdot FPotential_{t-1} + \beta_7 \cdot SpatialLagOfAccumulatedFDI_{t-1} + u_t \\ Im_{Tech}_t = \gamma_0 + \gamma_1 \cdot FDI_{t-1} + \gamma_2 \cdot Im_{Mat}_{t-1} + \gamma_3 \cdot Im_{Tech}_{t-1} + \gamma_4 \cdot Exp_{t-1} + \gamma_5 \cdot FRisk_{t-1} + \\ \quad + \gamma_6 \cdot FPotential_{t-1} + \gamma_7 \cdot SpatialLagOfAccumulatedFDI_{t-1} + v_t \\ Exp_t = \delta_0 + \delta_1 \cdot FDI_{t-1} + \delta_2 \cdot Im_{Mat}_{t-1} + \delta_3 \cdot Im_{Tech}_{t-1} + \delta_4 \cdot Exp_{t-1} + \delta_5 \cdot FRisk_{t-1} + \\ \quad + \delta_6 \cdot FPotential_{t-1} + \delta_7 \cdot SpatialLagOfAccumulatedFDI_{t-1} + \mu_t \end{cases}$$

Localization indices

Localization index (LI) - the ratio of the proportion of the area (region, group of regions) in the country in terms of one industry to proportion of the area in country in terms of all industries.

For a factor X the localization index is calculated by the following formula:

$$LC_r^X = \frac{\frac{X_r^i}{X_r^{all_i}}}{\frac{X_{all_r}^i}{X_{all_r}^{all_i}}}$$

X_r^i – Value of the factor X for the industry i in the area r (region, group of regions);

$X_r^{all_i}$ – Value of the factor X across all sectors (all_i) in the area r;

$X_{all_r}^i$ – Value of the factor X for the industry i in the country as a whole (all_r);

$X_{all_r}^{all_i}$ – Value of the factor X across all sectors (all_i) in the whole country (all_r).

The interpretation of the index: if the value of localization index for the factor X is greater than 1 it indicates that in the industry i of a selected group of regions r the indicator X is more important than it is for this group of regions in terms of all industries. For example, for the FDI it means that the investor is interested in the allocation of capital in sector i of this group of regions. Similar analysis can be done for the volume of shipped products and import of raw materials in the food industry to identify the regions that are the most and the least active in comparison with the whole country and all sectors as a whole involved in this kind of foreign trade activities.

Results and conclusion

As a result, strict dependence of FDI and flows of foreign trade (exports of industry, import of technologies and materials for food production) is absent. The mechanisms of the spread of FDI and trade flows are different and have different tendencies. This is confirmed by the analysis of localization indices and econometric analysis of systems of regression equations. The hypotheses could be confirmed for some groups of regions while in general there is no definite tendency.

Some persistent patterns may be noted: if the food industry in the region has high FDI figures, the export and import of raw materials will be intensive there (the share of the food industry, as a rule, is higher than the average for the region); leading positions of the food industry by the export of products combined with the lack of FDI is observed in the regions

where export as a whole is small, so that the presence of such regions would not be the reason to proof the idea of the possibility of high export performance in the absence of FDI.

Econometric analysis of SUR also gives the controversial general results. However deeper investigation allows making some comments. Excluding from a sample of capital regions (City of Moscow, Moscow region and Saint Petersburg) has a great effect on the results. The hypotheses are more likely to be confirmed in these subsamples (for example, in these subsamples there is a positive influence of international trade activity on future FDI inflow to food industry).

The analysis of localization indices also allows concluding that in the regions the relationship of foreign trade and FDI varies. However, in all regions it can be noted that this dependence is weak and, in particular, the role of FDI in production of the industry is small. This dependence is stronger is in regions dominated by industries that need imported raw materials (usually relatively new subindustries for the Russian food industry, which have no sufficient raw materials in Russia).

There is almost no dependence on the FDI level in neighboring regions (spatial lag) except import of technology in noncapital regions (it can be explained as the proxy for investment climate of surrounding regions for future business).

This heterogeneity suggests the possibility of a successful import-substitution policy with future cooperation with foreign investors, but not in all the regions.

References

Lubomudrov A.V. (2010) Foreign direct investment to China economy. Russian politic herald. No 2, 3-7.

Buccellato T., Santangelo F. (2009) Foreign Direct Investments Distribution in the Russian Federation: Do Spatial Effects Matter? Economics Working Papers 99. London: Centre for the Study of Economic and Social Change in Europe, SSEES, UCL, 2009.

Faeth, I. (2009). Determinants of foreign direct investment a tale of nine theoretical models. Journal of Economic Surveys, Vol. 23. No 1, 165-196.