



Domestic and Foreign Firms in Russian Food Industry for the Period of 2005-2014

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ABSTRACT

The article studies the economic and social results of companies in Russian (domestic) ownership (RO) and companies in foreign and joint ownership (FJO) in the food industry of Russia. Using economic analysis and analysis of variance we investigated main indicators for 2005-2014 at the level of Russia and Russian regions. The analysis showed that RO firms are dominating in Russian food industry, but in some regions the foreign and joint firms are prevail. We found that the advanced development of foreign firms was observed during the period of 2005-2013, but the joint firms' share decreased for this period. In 2014 the significant growth of RO firms' production volumes was revealed. RO firms in 2005-2014 were characterized by employment decrease and labor intensity fall. The FJO firms' employment was stable but they have significantly less employment and much less labor intensity (lower social results) in a comparison with RO firms.

Keywords: Domestic and Foreign and Joint Enterprises, Food Industry, Economic Analysis, Analysis of Variance, Russia and Russian Regions

JEL Classifications: O100, L660, C100

1. INTRODUCTION

Food industry represents one of the most significant subsections of a country manufacturing industry. It provides satisfaction of the basic and constantly renewed consumer needs and is characterized by a high-level employment and considerable volume of dispatched products. The relationship between two "pillars" of economy namely agriculture and food industry (Hyder and Bhargava; 2016, Arfa and Daniel, 2016) forms the agro-industrial complex, which provides the national food security of the country.

The two determinants of the industry research are the factors and the methods of its evaluation. The analysis of the recent researches shows that the most significant factor of food industry development is still investments. Jambor and Carlos Leitão (2016) find out that the net inflows of foreign direct investments became one of the most significant factors of food vertical inter-industry trade in

EU. Koussani and Tozanli (2014) on the basis of 48 foreign food processing industries in Tunisia differentiated its characteristics, such as investors' nationality, mode of production, location etc. The main driver of the food industry development becomes the market and investment liberalization (Koussani and Tozanli, 2014; Pray and Fuglie, 2015). According to Pray and Fuglie (2015) food and agriculture complex should be stimulated not only the market liberalization but also scientific advances causing higher commercial opportunities.

The other important factor of food industry development is employment. Gollin and Probst (2015) highlighted the basic tendency in food industry as shift from home-based production with higher labour intensively to market-based production with higher intensively of capital. Shorshani et al. (2015) researched the anti-productivity behavior of employees in food industry and had indicated a significant difference between men and women,

classes, age, education and work experience, organizational position and type of the staff.

Apart from basic indicators of an industry as investments, dispatched goods, employment level, labor and material intensity within structural and dynamic analysis, one of the most recent researches by Hirsch et al. (2016) on EU food industry firm profitability has identified that the firm itself is the basic force of food processors' performance. The result of the study by Reardon (2015) shows the growth and restructuring of food industry midstream segment in Asia causing the ingress of large foreign food enterprises ('modern revolution') and the growth of small and medium-sized companies accompanying the investments by them ('quiet revolution').

The methodology base of the most recent researches on food industry is still quite traditional. Hirsch et al. (2016) used the classical approach of variance decomposition (ANOVA and COV) that helped to define the negligibility of macroeconomic fluctuation, country effects and industry characteristics. Arfa and Daniel (2016) applied two-stage least squares method for the spatial structure analysis of the French food industry. The results of the research allowed defining the following main factors of food and agriculture industries clustering: Employment, infrastructure and urbanization.

In our research we investigate Russian food industry. The purpose of work is to compare the economic and social results of companies in dependence to ownership (companies in Russian (domestic) ownership [RO] and companies in foreign and joint ownership [FJO]). This comparative analysis is actual for Russian Federation because the dependence on import products, lack of financial resources and technological backwardness in Russia in 2000-2008 were result in successful entry and development of foreign enterprises and their branches. Lapina et al. (2015) underline the considerable level of food security at Russian national market, whereas the regional one, on the contrary, is experiencing decline in stocks up to 58% (in grains, meat, eggs). In this case the comparative analysis of national and foreign enterprises in food industry will allow defining the basic trends in Russian food industry and core factors of its development.

2. RESEARCH METHODOLOGY

In our research we investigate and compare for enterprises in RO and FJO of Russian food industry:

- Economic results;
- Social results;
- Dynamics the main indicators during the period 2010-2014.

The food industry is the subsection DA according to NACE (Statistical Classification of Economic Activities in the European Community) Rev. 1.1 or C10+C11+C12 according to NACE Rev. 2 (Eurostat, 2015). This sector provides about 16% (more than 4200 billion rubles) of the total production and 16% (more than 1, 2 million employees) of the total employment in the Russian manufacturing industry (UniSIS, 2015). The production volumes of FJO enterprises reached 32% in 2013. The research

period is 2005-2014 (unfortunately there is no available data for 2015). The research is based on the federal and regional statistical data of Russia (UniSIS, 2016).

Six indicators (Table 1) were used for the analysis.

In our research we applied economic analysis, graphics and analysis of variance (ANOVA).

The economic analysis was made at the level of Russia. We calculate the indicators mentioned above broken down by forms of ownership and study their dynamics for the period 2005-2014.

The ANOVA was carried out at the level of the Russian regions. Two samples of the regions for the subsection DA were formed:

- The sample of regions in which foreign and joint enterprises produced significant volumes of products (more than 2,5 billion rubles in 2014);
- The sample of regions in which domestic (Russian) enterprises produced significant volumes of products (more than 6,0 billion rubles in 2014).

Some regions with insufficient data for the analysis or irregular values of the relative indicators were excluded.

The following samples of the regions with different ownership forms of enterprises were received:

- Russian enterprises (RO) – 60 regions
- Foreign and joint enterprises (FJO) - 43 regions.

Each sample of the regions covered more than 95% of the total production value of the subsection DA by the same ownership form.

We used the package Statistica for the ANOVA of obtained data according to the methodology (Hill and Lewicki, 2007; StatSoft, 2013). We earlier applied the ANOVA and found significant differences between RO and FJO companies in Russia for the transport equipment industry and electronics (Spitsin et al., 2016; Spitsin et al., 2015).

Table 1: Indicators and their calculations

No	Indicators
1	Production value (production volumes) of RO and FJO firms at Russia and Russian regions level
2	Number of employees of RO and FJO firms at Russia and Russian regions level
3	Labor intensity (number of employees/production value) of RO and FJO firms at Russia level
4	Share of RO and FJO production value in total production value
5	Investment intensity (share of investment in fixed capital in production value) at Russia level
6	Share of value added ([production value–costs of raw materials]/production value) at Russia level

RO: Russian (domestic) ownership, FJO: Foreign and joint ownership

3. RESULTS OF ECONOMIC AND STATISTICAL ANALYSIS

Economic and social results of Russian food industry broken down by forms of ownership.

The main economic and social indicators of the food industry in Russia are represented on Figure 1, investment intensity and share of values added are shown on Figure 2.

The foreign firms were advanced developing in 2005-2013. Their share in shipped products was rising. The joint firms share, on the contrary, was decreasing. The foreign and joint firms characterized by significantly less employment and much less labor intensity (lower social results) but the number of employees did not decrease.

RO firms in 2005-2014 were characterized by employment decrease and labor intensity fall reasoned by employment decrease and products prices increase. Also we found the significant growth in domestic firms' production volumes in 2014. This trend may be reasoned by the imposition of economic sanctions and the dollar against the ruble exchange rate rise.

FJO firms investing activities were higher in 2005-2014. So, we can suppose the less financial restrictions for them than for domestic firms. Investments were especially intense before the 2008 crisis. After this period FJO firms' investment intensity become comparable with the RO firms' level. Economic efficiency (as share of value added) of domestic and foreign firms is closely equal – near 50% of production value. Joint firms' economic efficiency is lower and fluctuates from 38% to 48% of production value.

Dynamics of production value in the context of Russian regions for the 2010-2014 years.

We tested the dynamics of production value of food industry in the context of Russian regions for the 2010-2014 years using ANOVA.

To correct application of the ANOVA criteria the hypothesis of the normal distribution were checked for annual volumes of production on the set of ownership forms using Pearson's χ^2 -test. This test revealed highly significant (at significance level $P < 0.0005$) difference from the normal samples distribution for the period 2010-2014.

Figure 1: Main economic and social indicators of the food industry in Russia

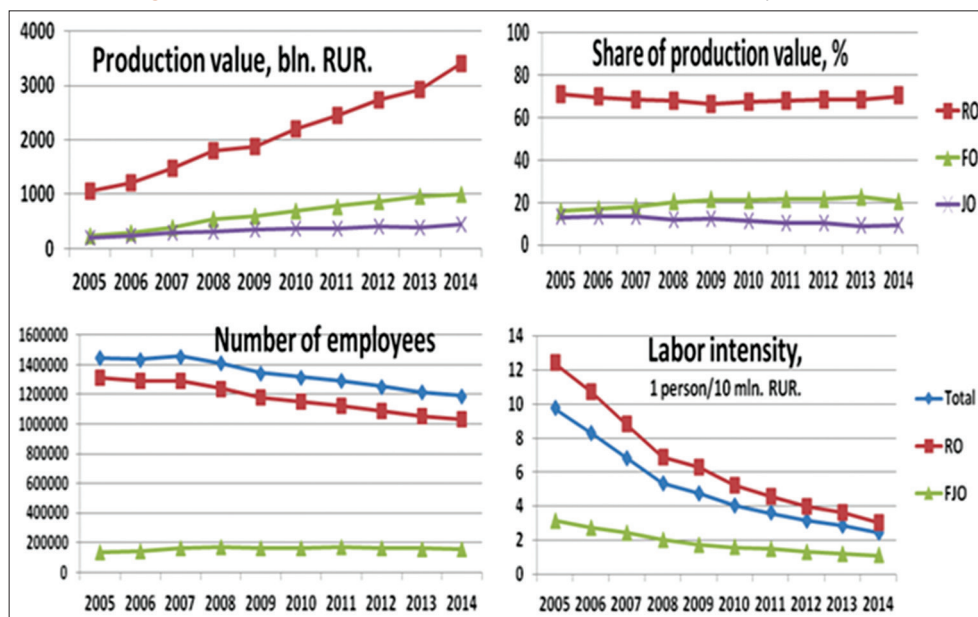


Figure 2: Investment intensity and share of value added in the food industry in Russia

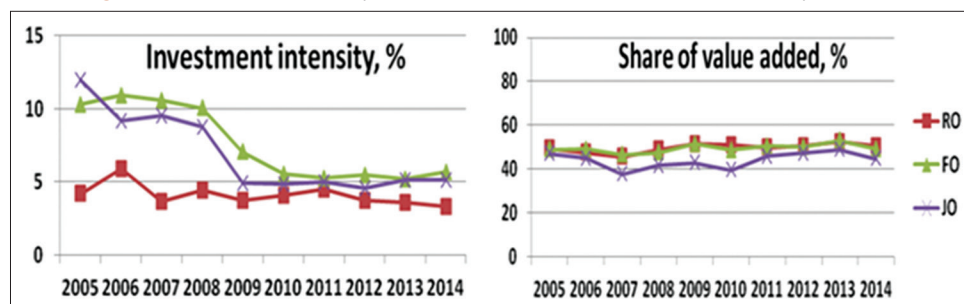
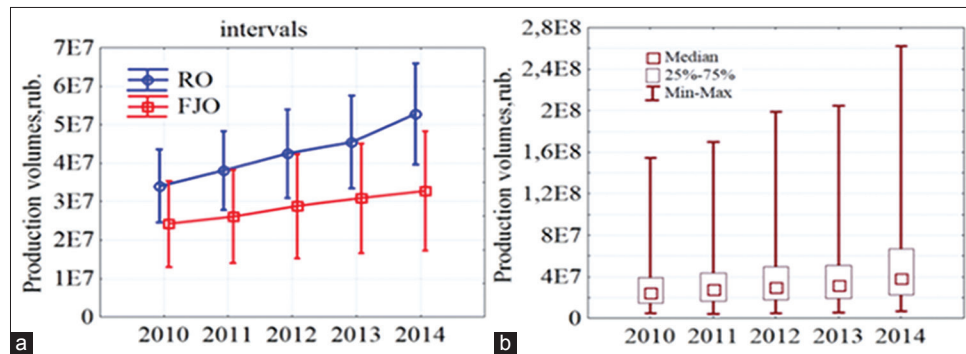


Figure 3: Dynamics of production value for the 2010-2014 for Russian (domestic) (RO) ownership and foreign and joint ownership companies.
(a) Group means values with 95% confidence interval. (b) Boxplots for RO companies



Dynamics of production value for the 2010-2014 broken down by forms of ownership is shown on Figure 3.

Using ANOVA we found for the regions with RO companies statistically significant positive dynamics ($0.005 < P < 0.05$) between the indicators 2010-2011 and 2012-2013, strongly significant ($0.0005 < P \approx 0.002 < 0.005$) between 2011 and 2012, a highly significant ($P < 0.0005$) between 2013 and 2014. For the regions with FJO companies there were statistically significant positive dynamics ($0.005 < P \approx 0.049 < 0.05$) between 2011 and 2012 and non-significant dynamics ($P > 0.1$) for other years. Non-parametric Wilcoxon test amplifies the level of significance of the parametric analysis to highly significant ($P < 0.0005$) for the RO for all periods and for FJO - to a statistically significant ($0.005 < P < 0.05$) between 2010-2011, 2012-2013 and 2013-2014 and to a highly significant ($P < 0.0005$) between 2012 and 2013.

The annual growth rates of production value at the Russia level generally confirm these results (Figure 4).

Using ANOVA we compared the production volumes of RO and FJO companies at the regional level (Figure 5).

The parametric ANOVA of independent samples were identified insignificant differences ($0.1 < P$) between the production volumes of regions with RO and FJO companies for 2010-2014 (Figure 5). However, the non-parametric Mann-Whitney and Kolmogorov-Smirnov tests amplify these differences to highly significant (at significance level $P < 0.0005$) (Figure 5).

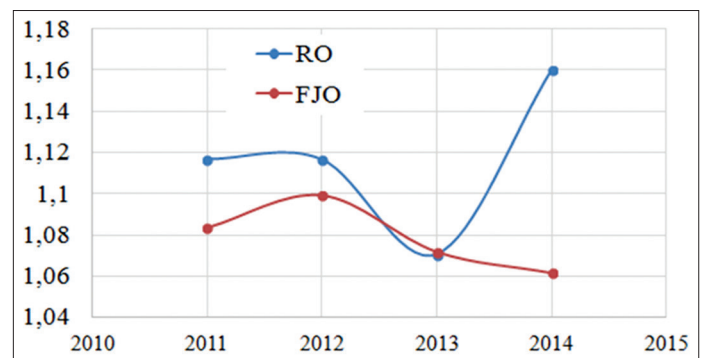
The results for the period 2010-2014 years show that at the regional level the production volumes of the RO companies is more stable increases than that of FJO companies.

Dynamics of employment in the context of Russian regions for the 2010-2014 years.

We tested the dynamics of employment of food industry in the context of Russian regions for the 2010-2014 years using ANOVA.

To correct application of the ANOVA criteria the hypothesis of the normal distribution were checked for annual number of employees

Figure 4: Annual growth rates of production value (2010-2014) for Russian (domestic) ownership and foreign and joint ownership



on the set of ownership forms using Pearson's χ^2 -test. This test revealed highly significant (at significance level $P < 0.0005$) difference from the normal samples distribution for the period 2010-2014.

Dynamics of employment for the 2010-2014 broken down by forms of ownership is shown on Figure 6.

We found for the regions with RO companies statistically significant negative dynamics ($0.005 < P < 0.05$) between the employment 2011-2012 and 2012-2013 and weakly significant ($0.05 < P < 0.1$) between 2010-2011 and 2013-2014. Non-significant dynamics was revealed for FJO companies ($P > 0.1$) between all years (Figure 6). Non-parametric Wilcoxon test amplifies for the RO companies the level of significance of the parametric analysis to highly significant ($P < 0.0005$) between 2012 and 2013 and strongly significant ($0.0005 < P < 0.005$) between 2010-2011, 2011-2012 and 2013-2014. For FJO companies non-significant ($P > 0.1$) dynamics is preserved.

Using ANOVA we compared the employment in RO and FJO companies at the regional level (Figure 7).

Parametric ANOVA of independent samples showed highly significant differences between the RO and the FJO ($P < 0.0005$) for employment 2010-2014 (Figure 7). Nonparametric Mann-Whitney and Kolmogorov-Smirnov confirm the highly significant difference ($P < 0.0005$) (Figure 7).

Figure 5: Production value for the 2010-2014 for Russian (domestic) ownership and foreign and joint ownership companies. (a) Group means values with 95% confidence interval. (b) Boxplots for 2014

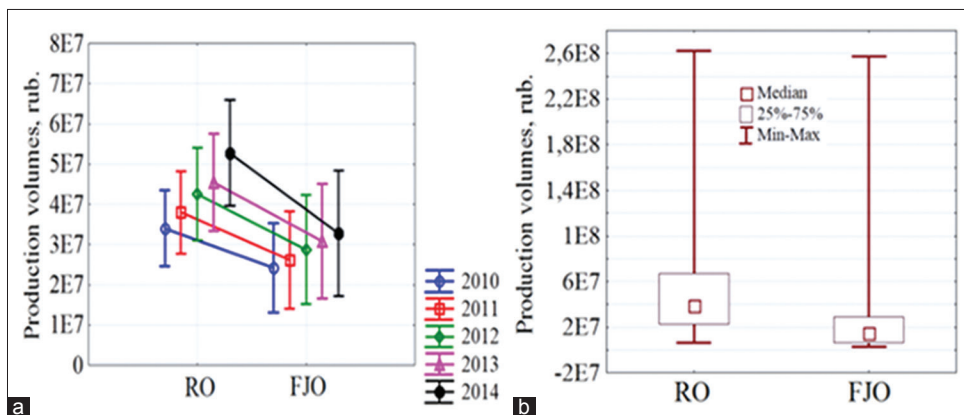


Figure 6: Dynamics of employment for the 2010-2014 for Russian (domestic) (RO) ownership and foreign and joint ownership companies. (a) Group means values with 95% confidence interval. (b) Boxplots for RO companies

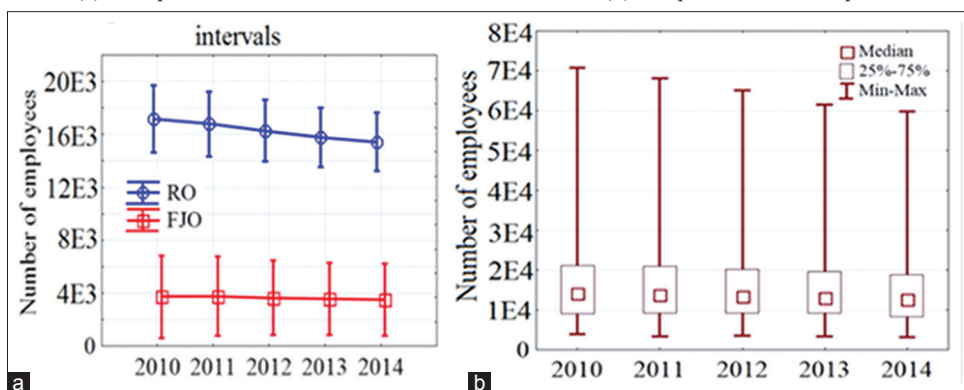
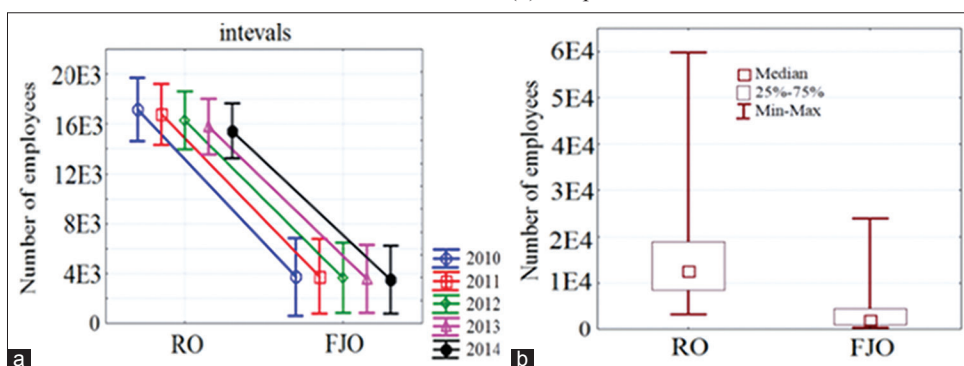


Figure 7: Employment for the 2010-2014 in Russian (domestic) ownership and foreign and joint ownership companies. (a) Group means values with 95% confidence interval. (b) Boxplots for 2014



4. CONCLUSIONS

Based on the results of our research we can make the following conclusions.

1. The analysis showed that domestic firms are dominating in Russian Federation food industry, but in some regions the foreign and joint firms are prevail.
2. The advanced development of foreign firms was observed during the period of 2005-2013. Their share in production volumes increased. At the same time, the joint firms' share decreased. That's why the growth of RO firms production volumes looked more stable than of FJO firms at the region level. In 2014 the significant growth of RO firms' production volumes was revealed. It is supposed to be reasoned by the imposition of economic sanctions and the dollar against the ruble exchange rate rise.
3. The FJO firms had lower financial restrictions and performed investments more active than RO firms at 2005-2008, later their investments activities became comparable with RO firms. Economic efficiency (as a value added share) of domestic and foreign firms is closely equal – near 50% of production value.
4. RO firms in 2005-2014 were characterized by employment decrease and labor intensity fall. These trends on the regional level are confirmed by data variance analysis for the period

2010 – 2014. The FJO firms' employment was stable (did not decrease) both for Russian Federation and on Russian regions level. However, the FJO firms have significantly less employment and much less labor intensity (lower social results) in a comparison with RO firms.

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