

Analysis of the Competitive Environment in Motor Fuel Regional Market

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Abstract

The article is dedicated to monitoring the competitive environment in the retail motor fuel markets in order to establish a dominant position vertically integrated oil companies (VIOCs) in regional markets dictating pricing policy to its participants. The methodology is represented by the instructions for preparation of an analytical report on the competitive situation in the small-scale wholesale motor and diesel fuel markets based on the "Procedure for analysing the competitive situation in the product market" approved by the RF FAS Order as of April 28, 2010 No. 220, the concentration index, and the Herfindahl-Hirschman index. The authors conclude that in the context of collective dominance, sales volume of refined petroleum products in terms of value increasingly characterizes the proportion of an economic entity in the market. At that, the methodological guidelines for the preparation of an analytical report on the competitive environment in diesel fuel retail markets shall be supplemented by the correlation and determination indices, allowing evaluation of the closeness of the relationship for the level of profits, export-import operations, government influence on the market participants, and market concentration index.

Keywords: monitoring, competitive environment, motor fuel market, pricing policy, market boundaries, concentration degree

1. Introduction

The main factors determining motor fuel pricing policy shall include not only the growth of the vehicle fleet in almost all regions of the country, and the intensity of its use, but also the volume of sales in monetary terms, of both foreign and domestic manufacturers, the availability of government programs for subsidizing the costs for oil products and concessional lending to small and medium-sized businesses, etc.

Increased demand in the oil products market stimulated by the state support volume, import problems connected with crisis at the global level, and negative phenomena of sectorial nature, tend to contribute to the dynamic growth of prices.

The functions of government regulation for pricing of oil products market are implemented by the Federal Antimonopoly Service (RF FAS), which is the authorized federal executive authority responsible for the adoption of regulations and monitoring of compliance with antimonopoly laws, legislation in the area of natural monopolies (Federal Law as of July 26, 2006 No. 135-FZ (amended as of June 04, 2014 as amended as of July 21, 2014) "On Protection of Competition").

Both retail and wholesale of oil products is checked in order to assess the presence and situation of the competitive environment. The work includes economic entities with dominant position in the local markets, and which, provided the dominant share (over 35 percent) of certain products (motor fuel), form the organizations registry database, the pricing policy of which shall become the object of attention for FAS.

2. Literature Review

Information flows reflecting the content of the economic interests of economic entities have the property of asymmetry generating a competitive start, leading to the emergence of a certain level of consistency in economic interests of the subjects (Rudakova, 2013, p. 23; Kirzner, 1997; Stigler, 2000).

One cannot but agree with the statement that the domestic policies in the modern world are aimed at ensuring fair conditions of competition (Bondarenko, 2013). Generalisation of the world and Russian experience in the application of antimonopoly laws is represented in the works by Shastitko, A. E., Avdasheva, S. B., Skvortsova, V. A., and Medushevskaya, I. E. (Skvortsova & Medushevskaya, 2011; Shastitko & Golovanova, 2013; Shastitko, 2013; Shastitko, 2012).

The legitimacy of the intervention of antimonopoly authorities in the company's activity cannot be assessed solely by measuring the market shares of economic entities. This requires, at least, the presence of anti-competitive behaviour in the market, reducing the prices to a level or below the prime cost, entering into agreements aimed against partners and others. As mentioned by Nikerov, G. I. in his article, this opinion is shared by the American legal precedents (Nikerov, 1999). Moreover, the antimonopoly policy and control, according to Crandall-Winston, do not always have a positive impact on the conditions of competition in certain product markets (Crandall, 2003; Armentano, 2005; DiLorenzo, 1996).

Turov, A. V., while analysing the international experience for proving the dominance, gives the definition of the European Union (EU): "The dominant position (...) means using of an economic power by a large enterprise, which is aimed at impeding effective competition on the relevant product market. Its sense is in regulating the actions of competitors, customers and, ultimately, in the impact on consumer behaviour" (Turov, 2002, p. 125).

The paper by Ivaldi, M., Jullien, B., Rey, P., and Seabright P. M. explains the position of European antimonopoly authorities in matters of business mergers as the concept of collective dominance, as a result of economic concentration transactions giving the rise to risks in the form of collusion or concerted practices (Ivaldi, Jullien, Rey, Seabright, & Tirole, 2003).

Lyons, Garraud, Davis, Ormosi, et al. (Lyons, 2007), describe the problems of antimonopoly policy and institutional arrangements, as its result, in the papers.

The analysis of these studies confirms the judgment that the empirical evaluation of the competition policy effects shall be in the form of further merger results analysis (Davies & Ormosi, 2010).

3. Materials and Methods

The situation in the regional markets (oil depot, gas stations) is affected by the situation developing in the wholesale sector (oil refineries). Federal wholesale oil products market is characterised by the presence of collective dominance of oil companies (Federal Antimonopoly Service. Report on the competitive situation in the Russian Federation-2012. [Digital resource] URL: http://www.medprivat.ru/doc/fas_concur.pdf).

Monitoring of the activities of the organizations occupying a dominant position on the market is based on the current legislation. The main document are the methodological guidelines for preparation of an analytical report on the competitive situation in the small-scale wholesale motor and diesel fuel markets based on the "Procedure for analysing the competitive situation in the product market" approved by the RF FAS Order as of April 28, 2010 No. 220 (the Order of RF FAS as of April 28, 2010 No. 220 (amended as of March 12, 2013) "On Approval of the Competitive Situation Analysis in the Product Market" http://www.consultant.ru/document/cons_doc_LAW_147180).

The main purpose of the competitive environment analysis in the retail oil products markets is to establish a dominant position of VIOCs in regional markets, as well as standardisation of analysis methods, taking into account the generalisation of the best practices for the retail oil products market analysis of the territorial bodies of the Federal Antimonopoly Service of Russia. VIOCs (vertically integrated oil companies) are the oil companies, with public limited company ownership type, serving as the parent company in relation to other subsidiary refiners and other companies. These are the groups of related organisations with the elements of control, the impact force of which is directly proportional to the parent's ownership interest in the capital of the subsidiary. The least remaining seemingly independent legal entities lose a certain freedom of behaviour in the market. The essential feature of Russian VIOCs is the high degree of state participation and there are signs of collective dominance in the motor fuel markets.

The methodological guidelines for the preparation of an analytical report on the competitive environment situation in the retail motor fuel markets involves the study of the following aspects: the time interval of the study; product boundaries of markets; geographic boundaries of markets; structure of economic entities; calculation of product market volume and shares of economic entities on the market; determining the level of market concentration; identification of barriers to enter the market; and the assessment of the competitive situation.

The time interval of the study is not difficult, since the analysis is retrospective in nature, that is, the analysis is

based on the prevailing trends in the past economic development of a facility for the purpose of its performance forecast.

Product boundaries are defined by the product groups of motor fuel. Geographic boundaries of the market are defined as the boundaries of the region. It shall be noted that the boundaries of the market may be included in terms of sales, adjacent to federal highways.

After determining the composition of economic entities in the market, product market volume and the share of representatives in this market shall be analysed. Based on this data, analysis and assessment of concentration shall be made.

Concentration of sellers reflects the relative magnitude and the number of firms operating in the sector:

- The smaller the number of firms, the higher the concentration.
- At the same number of firms in the market, the less they differ from each other in size, the lower the concentration.

The concentration level influences:

- The behaviour of the firms on the market: the higher the concentration, the more independent firms are of each other;
- The propensity of firms to compete or cooperate: the smaller quantity of firms operates in the market, the easier they realize their mutual dependence on each other, and the more likely they will cooperate.

Thus, we can assume that the higher the concentration, the less competitive market will be.

Evaluation of the product market concentration can be conducted using the following indices: concentration index (CR_n), Herfindahl-Hirschman index (HHI), relative concentration index (K), entropy index (E), market shares logarithms variance (δ²), variation index (v), Gini index (G), Hall-Tidemann index (HT), and Lind index (L) (Parmenenkov, 2011, p. 3).

The methodology of the antimonopoly authorities recommends inclusion of only two indices into the market concentration indices of motor fuel market participants from those presented in the table. These are the concentration index and Herfindahl-Hirschman index.

The concentration index as the sum of the market shares of the largest companies operating in the market is determined by the formula 1:

$$CR_n = \sum_{i=1}^n S_i \quad (1)$$

where S_i is a firm size (e.g., market share), n is the number of firms for which the index is calculated. The concentration index measures the amount of shares n of the largest firms in the market. For the same number of the largest firms, the greater the concentration index is, the further the market is from the ideal of perfect competition.

However, the concentration index is not sufficient to characterise the market because it does not characterise the size of the companies, which were not included in the sample n, as well as the relative size of firms in the sample. This feature of the concentration index is associated with the possible inaccuracy of the results at its use.

Herfindahl-Hirschman index is defined as the sum of the squares of the shares (S_i) of all the firms operating in the market:

$$HHI = \sum_{i=1}^n S_i^2 = S_1^2 + S_2^2 + S_3^2 + \dots + S_n^2 \quad (2)$$

Herfindahl-Hirschman index takes values from 0 (in the ideal case of perfect competition when the market has infinitely many vendors, each of which controls a negligible share of the market) to 1 (when the market has only one company that produces 100% of the product). If we assume the market shares in percentage, the index will take values from 0 to 10,000. The larger the index value, the higher the concentration of sellers in the market.

Fragmentation of the applied methodology of the antimonopoly authorities cannot fully assess the motor fuel market concentration, as it does not consider the impact on this process of a number of factors.

In an open economy and the liberalisation of foreign trade conditions, foreign competition acts as a factor lowering the level of industry concentration and monopoly power of domestic producers on the market. On the contrary, the presence of a stable export channel for the domestic producers lowers their competition level in the internal market, creates opportunities for effective price discrimination, and leads to growth of prices-and hence to the monopoly power-in the domestic market.

In markets with significant import/export, concentration indices calculated excluding foreign competition based on the share of domestic producers in the volume of sales on the domestic market, might not reflect the real picture, but may overestimate or underestimate the presence and level of concentration and the market power. Therefore, all concentration indices for these markets shall be adjusted to the value of imports and exports. When determining the concentration indices in the domestic market, not only the foreign trade operations of firms shall be considered, but also their transfer of finished products under agreements as well.

One of the most difficult stages of the analysis shall be recognized the definition of the barrier to enter the market, since it requires a large amount of information from economic entities on the market that impede getting this information. Such barriers are the economic and administrative constraints. The objective analysis of economic constraints shall be made with the evaluation of each economic entity: the initial capital investments, taking into account the length of the payback period of the investment; costs of exit from the market, including investments that cannot be recovered at the termination of business activities; economically feasible minimum volume of production setting out higher costs per unit of production for economic entities until reaching such production volume.

The administrative restrictions for entering the market include the need to obtain a license, environmental constraints, and difficulties in obtaining land plots.

The presence in the motor fuel retail market of vertically integrated economic entities contributes to the creation of barriers to entering the market assessment of the availability of which involves determining the market share attributable to independent economic entities and dynamics of its change.

The final stage of the analysis includes assessing the state of competition in the local retail motor fuel markets. The analytical report on the competitive situation in the regional retail oil products sales shall reflect the following:

- Peculiarities of the location of customers, defining the restriction to entering the market in the limited demand conditions (economic unsoundness of functioning in certain geographic borders for additional gas stations);
- Presence in the region of a VIOC occupying a dominant position, including the existence of collective dominance;
- Signs of the division of the regional market on a territorial basis by the largest VIOCs;
- The presence of the price leader among sellers and its distribution policy peculiarities;
- Peculiarities of the development strategy of large and dominant economic entities (active expansion of a gas station network due to the absorption of small players, obtaining land for construction and construction of new gas stations).

Analysis of the methodological guidelines for the preparation of an analytical report on the competitive environment situation in the retail motor fuel markets showed that the analytical report will be limited, since the perimeter of analytical calculations will not cover all market participants and not all indices of economic entities will be analysed. Consequently, the question of compliance with antimonopoly laws will remain open.

The methodological guidelines do not involve the use of analytical calculations in the oil products sales volume in terms of value. However, this index, with signs of collective dominance, firstly, largely characterizes the share of an economic entity in the market, and secondly, constituting no trade secret and being presented in the financial statements, may be used in the assessment of market concentration.

4. Experimental Methods

The use of empirical research methods allowed a comparison of the approaches to the analysis of the competitive environment in the oil products retail markets. Correction for competition analysis methods in the small-scale wholesale motor and diesel fuel (motor fuel) markets is made based on the methods of economic and mathematical modelling.

According to the analysis of the local oil products market segmentation, it is possible to calculate the concentration index, using the revenue from the motor fuel sale of companies on the market as a criterion for

assessing. Table 1 shows the total revenue for the analysed period, prepared by the representatives of the local organizations in the oil products market in value terms.

Table 1. Dynamics of selling oil products at the local market, mln RUR

S/N	Name of the organisation	2011	2012	2013	TOTAL
1.	VIOC (1)	3,039.95	3,351.05	3,727.55	10,118.55
2.	VIOC (2)	2,460.03	2,751.38	3,118.16	8,329.57
3.	Enterprise (3)	62.69	67.50	96.66	226.85
4.	Enterprise (4)	12.80	13.83	16.34	42.97
5.	Other operators	197.85	174.66	184.90	557.41
	TOTAL	5,773.32	6,358.42	7,143.61	19,275.35

* RF FAS (FAS Office of the Altai Territory): Review of the results of motor fuel market analysis.

The structural aspect of the sales value and motor fuel market participants is presented in Figure 1.

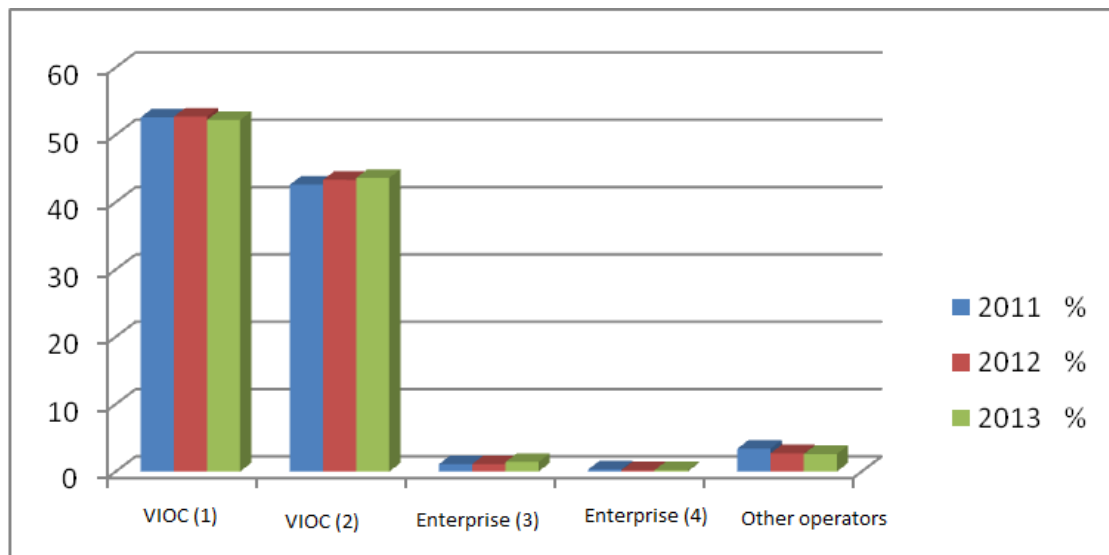


Figure 1. Structure of motor fuels sales in the regional market

* RF FAS (FAS Office of the Altai Territory): Review of the results of motor fuel market analysis.

The biggest revenue from the sale of oil products in the local retail market over the period was obtained by VIOC (1). During two years, the total revenue increased by 22.6%. Comprehensive income of VIOC (2) for the analysed period is 18% less than that of VIOC (1). The revenue of the third and the fourth enterprises is significantly lower than that of the representative enterprises of vertically integrated oil companies.

Figure 2 demonstrates that the representative enterprises of vertically integrated oil companies have a leading position in the local oil products market. The share of VIOC (2) presence in the market for the analysed period grew by 1% at the expense of reducing the share of small independent operators.

Dynamics of changes in concentration index and Herfindahl-Hirschman index for the participants of the local oil products market, calculated according to the formulas 1 and 2, are presented in Table 2.

Table 2. Dynamics of concentration factors of the local oil products market

S/N	Index name	2011	2012	2013
1.	Concentration index (CR_3)	96.3	97.1	97.4
2.	Concentration index (CR_2)	95.2	96.0	95.8
3.	Herfindahl-Hirschman index (HHI)	4,594.38	4,660.72	4,634.56

For the period from 2011 to 2013, the value of all the indices of market concentration increase, thus CR_3 (the concentration index of the three companies) increased by 1.1%. This is due to the growing proportion of VIOC (2) by 1% on the local retail oil products market. Considering the major players in the market, it is sufficient to calculate CR_2 index (concentration index of the two companies), since only two companies have significant revenues from the sale of fuel and lubricants-these are the representatives of vertically integrated oil companies (VIOC (1) and VIOC (2)). The share of these organizations accounts for over 95% of the local retail oil products market.

Thus, in the analysed period we get the following: $CR_3 > 70\%$, $CR_2 > 70\%$, and $HHI > 1800$. It indicates that the local oil product market is highly concentrated, i.e. network and independent operators have too small market share despite the fact that their number is large enough. The presence of small private gas stations in the motor fuel market does not make the market competitive. This market situation requires the intervention of the state, as the rights of small sellers are certainly violated. They are at a disadvantage position with vertically integrated oil companies.

5. Results

In our opinion, assessment of market concentration may be made using the methods of correlation analysis to calculate the correlation and determination indices, the results of which provide an opportunity to assess the closeness of the profit level relationship and market concentration index.

The correlation index is calculated as follows:

$$r(x, y) = \frac{n \sum_i x_i y_i - \sum_i x_i \sum_i y_i}{\sqrt{(n \sum_i x_i^2 - (\sum_i x)^2)(n \sum_i y_i^2 - (\sum_i y)^2)}} \quad (3)$$

where x, y are the assessed values, n is the quantity of pairs to be compared.

The determination index is calculated as follows:

$$D(x, y) = r(x, y)^2 \quad (4)$$

Using these values and parameters in Table 2, we can calculate the closeness of the profit level relationship and market concentration value.

If x is annual profit of the enterprises, and y is market share in terms of revenue, than Table 3 represents the correlation and determination values.

Table 3. Dynamics of correlation and determination factors of the local oil products market

No.	Index name	2011	2012	2013
N				
1.	Correlation index $r(x, y)$	0.91	0.93	0.96
2.	Determination index $D(x, y)$	0.8281	0.8649	0.9216

The result of the comparison of HHI indices' values lines and profitability for the reported years is the correlation value taking values from 1 to -1, at that the closer is the absolute value of the correlation index to 1, the closer is the relationship between the indices. The determination index shows the possible relationship in percent, indicating that in the obtained percentage of cases for the industry, dynamics of the profit level was causing the dynamics of market concentration index.

Correlation indices according to Table 3 are sufficiently close to 1. Thus, we can conclude about the close connection between the market concentration and profit figures. At that, determination indices demonstrate that in 2011, 83% profit level caused the dynamics of the market concentration. In subsequent years, the percentage of relationship grew. We can conclude, the growth rate of profit determines the increase of concentration in the local motor fuel market.

The following index, which is subject, according to the authors, to mandatory monitoring, is the selling price in the retail sale of each economic entity. Significant fluctuations in the index may indicate price discrimination independent operators, as the purchase price for the representatives of the vertically integrated oil companies and independent participants can vary significantly. In addition, the VIOC may generally limit motor fuel sale to independent organizations, as it was in 2011, which triggered a crisis in the regional oil products market in the Altai Territory.

It shall be noted that increased concentration in the product market, according to Kasyanov, Yu. V., and can have positive effects by influencing the positive trend of reducing costs by minimizing the proportion of fixed costs in the prime cost of goods (Kasyanov, 2001. p. 60). This fact may influence the decisions on the possibility of reducing the market price, and we shall agree with this. However, these are only possibility, but not a desire of the heads of the economic entity. This confirms the motor fuel market in the amplification of the concentration level, over the years, demonstrating the dynamics of price growth.

Thus, the methodological guidelines for the preparation of an analytical report on the competitive situation in the small-scale wholesale motor and diesel fuel markets, on the one hand, are the part of the government regulation tools, and, on the other hand, having a fragmented nature, not considering the processes of concentration, may be a tool of the monopoly power.

6. Conclusions

Analysis of revenue of the participating enterprises in the local oil products market demonstrated that the representatives of vertically integrated oil companies have a leading position. The share of their presence in the market for the analysed period continues to grow at the expense of reducing the share of small independent operators.

Analytical report on the competitive environment situation in the retail markets of motor fuel, including local, with signs of collective dominance, shall be supplemented with an analysis of correlation and determination indices, analysis of the prices of oil products in the retail sale of each economic entity (Figure 2).

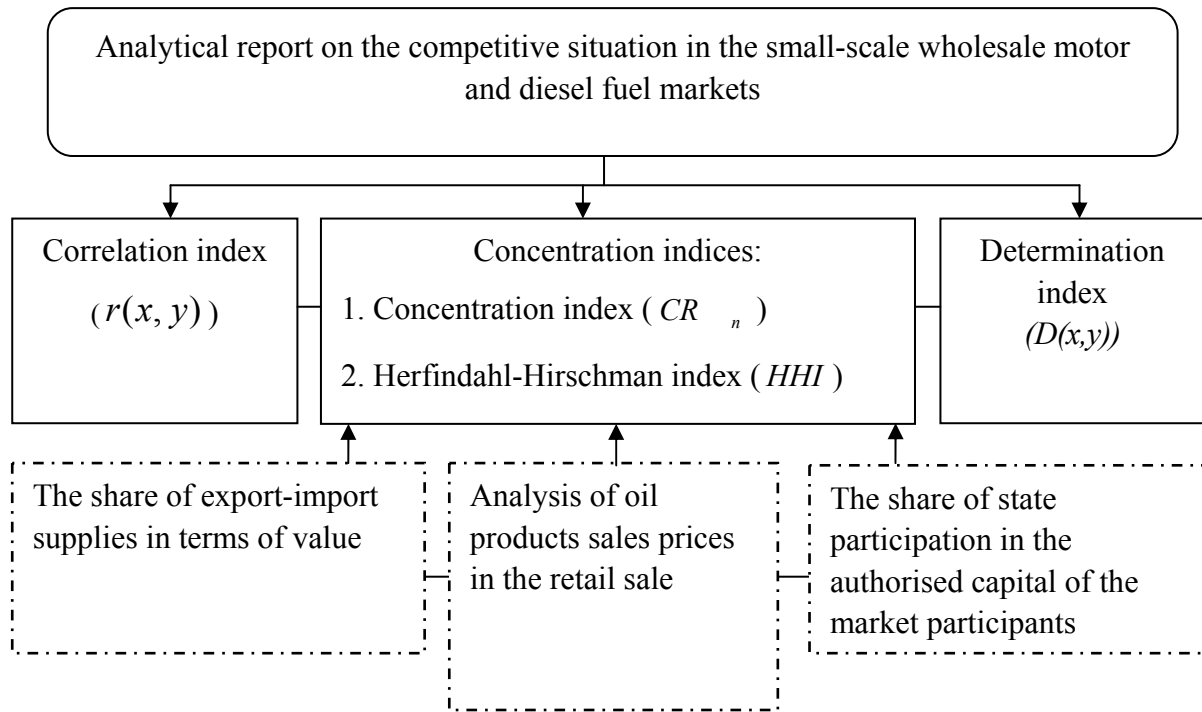


Figure 2. Recommended analytical values of the report on the competitive situation in the small-scale wholesale motor and diesel fuel markets

Indices defining the concentration of motor fuel market shall be adjusted to the share of export-import supplies in terms of value and share of the state’s participation in the authorised capital of the market participants. In this case, the estimated quantities in the correlation and determination indices (formulas 3 and 4) shall be the proportion of state sector involvement in the authorised capital of the organization (x); market share in terms of revenue (y).

Effect of import-export operations and the state’s share of participation in the authorised capital of market participants may be reflected in the algorithm calculating the concentration index and Herfindahl-Hirschman index.

The concentration index may be calculated as follows:

$$CR_g = CR_i + CR_k^{im} + CR_l^{ex} + CR_j = \sum_{i=1}^n S_i + \sum_{k=1}^m S_k^{im} + \sum_{l=1}^p S_l^{ex} + \sum_{j=1}^t S_j \tag{5}$$

CR_i - Concentration index of the market without export-import operations; CR_k^{im} - Concentration index of the market involving import operations; CR_l^{ex} - Concentration index of the market involving export operations; CR_j -Concentration index of the market with the participation of state sector enterprises; S_k^{im} -Market share of foreign companies supplying motor fuel; S_l^{ex} -Market share of the exporting companies; S_j -Share of state-owned companies; $g=n+m+p+t$ is the number of companies included in the perimeter of the market concentration assessment; n is the number of companies not involved in export-import operations and not subject to government influence; m is the number of companies engaged in import operations; p is the number of

companies engaged in export operations; t is the number of companies with state participation. Herfindahl-Hirschman index can be represented by the following model:

$$HHI = \sum_{i=1}^n S_i^2 + \sum_{k=1}^m (S_k^{im})^2 + \sum_{l=1}^p (S_l^{ex})^2 + \sum_{j=1}^t S_j^2 \quad (6)$$

Models modifications make it possible to analyse the changes of each component involved in the algorithm of concentration index and Herfindahl-Hirschman index calculation, and calculation of their impact on the changes in the indices values.

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