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MEASURING SUPPLY CONCENTRATION ON THE SERBIAN OIL AND OIL DERIVATES MARKET BY HERFINDAHL-HIRSCHMAN INDEX

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Abstract. *One aspect of the intensity of competition analysis of the national oil market is the measurement of the concentration of supply, to which this paper is dedicated. That is why it is not surprising that there are different interpretations of these economic categories. The analysis of these phenomena dates back to the emergence of production relations and production forces. The relaxation of regulatory measures on the national oil market has opened the space for building quality competitive relationships between the participants. Market opportunities, conditions and competition in practice are determined by concentration in the certain observed market. Competitive relations between market participants change over time. Those changes impact on concentration level of certain and well defined market, in this case the oil market of the Republic of Serbia. As the competition changes, the concentration level changes as well. This is the reason why this paper is focused on concentration level measurement and analysis. In measuring and expressing the concentration level of the certain market, many concentration indicators could be applied. Our choice was Herfindahl-Hirschman Index.*

Key words: *oil and oil derivatives market, concentration indices, competition level*

JEL Classification: L13

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INTRODUCTION

Each relevant market could be described and characterized by a certain level of competition between participants. The market strength of participants in the observed market can be determined based on competitive relations. For this reason, this paper focuses on the competitive relationships between participants, on the level of market concentration, and on the market power that arises from such relationships.

Market strength can be defined as the ability of a company, or several of them, to profitably increase the price of the product(s) in a certain market, above the marginal costs, i.e. competitive prices (Zdravković et al., 2013). According to Kostić, "From the fact that every company operates in the market area and that its market power is expressed in it, it follows that the relevant market should be precisely defined, firstly in a place in which a particular company operates, and then the market power of the company itself", (Kostić, 2013, p. 41), it could be said that the relationship between competitors within a particular relevant market largely determines the degree of concentration in a certain market. Therefore, when studying the concentration and market power of market participants, it is necessary to first determine the framework of the market itself, i.e. the relevant market, and then select an adequate form for its measurement, which is done in this paper.

However, according to Kostić (2016), "The level of concentration in a given relevant market is influenced by various factors, such as competitors, dispersion of market share, barriers to entry/exit from the market, economic potential, geographic size of the market, level of regulation of trade flows, regional integration, technological development, rapid information flow, legal regulations, etc." (Kostić, et al., 2016, p. 94). Thus, the importance of concentration indicators is relative over the time dimension, bearing in mind that they are influenced by many different factors, and the influence of many factors itself changes its intensity over time. However, their importance in measuring the market power of economic entities and pointing out inequalities in the relevant market is not negligible, because they indicate the nature of the branch (market) and the ability of consumers to choose which product to buy. The technological factor and the fast flow of information can have a positive effect on the course of the analysis because it is easier and faster to get the desired data, information, calculations, and possible changes in the relevant market. In economic theory, many examples of measuring the market power of companies could be found that determine the degree of limitation of the observed market. (Veselinović, 2016).

Research by Kostić provides and promotes a large number of indices that could be used for this purpose; we have considered to include in this analysis the Lerner index, cross-elasticity of demand index, and concentration indices. This paper is dedicated to concentration indices. As such, they are used in the implementation of antitrust policy measures, which gives the results presented in this paper practical significance (Kostić, 2009). Antitrust policymakers often rely on the calculated values of these indicators to make important decisions regarding the appearance of certain economic entities in the relevant market. They enable the analysis of the current market situation, taking into account the changes that are happening in it, and they are also used to predict and analyze future market trends.

What we would especially like to point out in this paper is that concentration indices are subject to changes that economic entities go through, and they are related to their market share in the relevant market. Therefore, under these changes, the value of the concentration index also changes. For the concentration indices to be comparable between different branches and periods, they are often subject to appropriate mathematical operations to reduce their value to the interval from 0 to 1 (Zeigenfuss, 2000).

There is a long list of indicators of concentration that economic experts may use to describe as accurately as possible the degree of concentration in the market, or restrictions on competition in the market. The analysis could include the following indicators:

1. Concentration ratio;
2. Herfindahl-Hirschman index;
3. Dominance index;
4. Hal-Tidman and Rosenblatt index;
5. Comprehensive branch concentration index;
6. Gini coefficient;
7. Lorentz curve;
8. Entropy coefficient, etc.

Generally, the image of the level of restrictions on competition in the market, above all, depends on market participants and the distribution of market share, sales, revenue, region, resources in one market, but also the availability of data. If the level of concentration of the four largest companies in the relevant market is methodologically accurate, the difference in the size of market share between all companies in the relevant market is accurate, as well as the uneven distribution of market shares between companies, the image of the level of competition restrictions in the relevant market can be much clearer. Then a series of conclusions and/or further decisions could be extracted regarding the strengthening of competitive relations within the branch. Taking into account the above, and according to the available data, in this paper, we decided to analyze the results obtained by calculating the Herfindahl - Hirschman index.

1. HERFINDAHL-HIRSCHMAN INDEX – THEORETICAL BACKGROUND

This concentration index takes into account the difference in the size of market share between companies. Also, in the calculation of concentration through this index, all companies operating within the branch are taken into account. The Herfindahl-Hirschman concentration index (hereinafter HHI) represents the sum of market shares of companies weighted by their market share:

$$HHI = \sum_{i=1}^{n} WiSi = \sum_{i=1}^{n} (Si)^2 \quad (1)$$

where Wi represents ponder, and Si is the market share of the i-th company (Waldman & Jensen, 2011).

Each firm is assigned a specific weight that corresponds to its market share (wi = si). Mathematically speaking, according to Kostić, „HHI represents a convex function of market shares, so it is very sensitive to inequality in the distribution of market share“, (Kostic, 2013, p. 122).

HHI respects market shares in the industry, with the focus on companies with higher market shares, and a larger number of such companies affect the growth of this index. As can be seen in Table 1, its value ranges from 0 to 1, or from 0 to 10,000, (Begović et al., 2002). In the case of an unlimited number of companies with a very small market share, its value will be equal to 0. Conversely, its value will be equal to 1 if a monopoly

structure operates in a particular market. More detailed levels of concentration are given in the following Table 1.

Table 1 Herfindahl-Hirschman concentration index levels

HHI value	Level of the concentration
HHI less than 1,000 (0.1)	low concentrated supply
HHI between 1,000 (0.10) and 1,800 (0.18)	medium concentrated supply
HHI between 1,800 (0.18) and 2,600 (0.26)	highly concentrated supply
HHI between 2,600 (0.26) and 10,000 (1.00)	very highly concentrated supply
HHI greater than 10,000 (1.00)	monopoly concentrated supply

Source: Begović, B., Bukvić, R., Mijatović, B., Paunović, M., Sepi, R., Hiber, D., 2002. Antitrust Policy in FR Yugoslavia, Center for Liberal-Democratic Studies, Belgrade, p. 35.

The application of HHI enables a clearer analysis of the observed market. The Herfindahl-Hirschman concentration index or HHI is widely accepted in the economic theory and practice of many countries, because it is very easy to calculate and interpret, and it also provides additional info-benefits. Namely, its reciprocal value shows how many economic entities of the same size can achieve a given value on the observed market, (Kate, 2006).

The reciprocal value pattern ($\frac{1}{HHI}$) is as follows:

$$n(2) = \left(\sum_{i=1}^{n} Si^2\right)^{\frac{1}{1-2}} = \left(\sum_{i=1}^{n} Si^2\right)^{-1} = \frac{1}{\sum_{i=1}^{n} Si^2} = \frac{1}{HHI} \tag{2}$$

The value of the reciprocal value of HHI can be from 1 to *n*. If its value is 1, then there is one dominant company in the market, and if it is n, then in the market all economic entities have the same size and the same market share, (Waldman & Jensen, 2011).

In practice, a special form is sometimes used when expert bodies cannot determine market shares for all companies in the observed market. This is the following pattern:

$$HHI = \sum_{i=1}^{n} Si^2 + m\left[\frac{100 - \sum_{i=1}^{n} Si^2}{m}\right]^2 \tag{3}$$

In this form, *n* represents the number of identified and m the number of unidentified companies. For this form to be expedient, it is necessary for the number of identified companies to be higher than the unidentified ones. If there are a large number of unidentified companies, this pattern loses relevance in assessing the concentration of the observed market, (Maksimović, et al., 2011).

2. Methodology, Data Collection and Market Concentration Measurement Procedure

The concentration of the market on the supply side reflects the degree to which the total sales (supply) in a particular market is under the control of a small number of companies, i.e. only one company in the last resort. Starting from the theoretical basis presented in the previous part of the paper, research was performed that includes an analysis of the domestic market of oil and oil derivatives to examine the degree of concentration and conditions of competition. The analysis covers the market of oil and oil derivatives on the territory of the Republic of Serbia. The research was conducted in the period from December 21st, 2018, to July 31st, 2020, and included the following research steps:

1. developing hypotheses and defining subjects and goals, as well as preparing research;
2. data collection, the definition of the relevant market and selection of variables;
3. data processing and analysis;
4. presentation of data gained and conclusions.

Setting hypotheses and defining goals was the starting point in the research. In addition to the active ones, the most important oil companies have been defined, which stand out from other companies in the domestic market of oil and oil derivatives in terms of revenue, and which will be the focus of research. Also, the forms of data that will be collected are defined based on the possibilities of data collection, planned methods of application, and their significance, (Kostić, 2014). During each step, certain actions were realized that were planned for each step, so we will explain them first.

The null and alternative hypotheses from which we started are:

H_0: In the relevant oil and oil products market there exists a high concentration between participants;

H_1: In the relevant oil and oil products market a high concentration between participants does not exist.

Taking into account the views from the null and alternative hypotheses, it is clear that the focus is on concentration in the relevant market. The subject of this paper is the analysis of market circumstances in the domestic market of oil and oil products and the verification of initial hypotheses. The period of 9 years of business, 2010-2018, was observed. A large number of oil companies operate on the market of oil and oil derivatives of the Republic of Serbia. Based on the data of the Serbian Business Registers Agency, in the period 2010-2018, a total of 16 representative economic entities were identified and thus selected, which in that period operated on the domestic market of oil and oil derivatives (Veselinović, 2016). In the meantime, one business entity was excluded from the survey due to the initiated bankruptcy procedure, so the final total number of oil companies for the observed period was 15.

The aim of the research should be a more realistic assessment of the degree of market constraints and market power of certain companies in a given market in order to assess

market circumstances, as well as giving recommendations to strengthen competition. The results of the research will also be used to undertake economically based activities. Therefore, the research aims to determine the level of limitations of the market of oil and oil derivatives under the obtained results, but also at the measures that should be applied. The measures should take into account the size and complexity of the Serbian market of oil and oil derivatives, but also the economy size itself.

3. DEFINITION OF THE RELEVANT MARKET FOR THE CONCENTRATION MEASUREMENT

In the process of measuring the concentration and market power of participants in a particular market, it is necessary to define a framework within which to analyze the competitive positions of economic entities themselves. The market to be determined, to which the concentration indicators will relate, is the relevant market. The purpose of its definition, i.e. determining its boundaries, is to identify economic entities that will be in the focus of the application of economic analysis as mutual competitors in that market (Gerald & Ewin, 2008).

Determining the domain of analysis implies determining the relevant market. The relevant market is closely related to the elasticity of supply and demand, depending on the nature of supply and demand of the market itself. Also, the relevant market has a subject and a spatial dimension. Therefore, the determination of the relevant market implies its determination both from the geographical aspect and from the aspect of the product sold on that market. Thus, from the aspect of the activity of participants in a certain market, we distinguish between the relevant product market and the relevant geographic market (Zeigenfuss, 2000).

The area dealing with the definition of the relevant market uses data on price movements, production, domestic consumption, and total sales to form the boundaries of the relevant product market and the relevant geographic market. To define the relevant product market, we used the correlation test in price movements, and for defining the boundaries of the relevant geographic market the Elzinga-Hogarthy test. The data used for these tests were taken from secondary sources, and the methodology and results are presented below.

In determining the relevant product market, we started from the conclusion that there are no very close substitutes for oil and petroleum products. Starting from the manner and representation in meeting the same or similar needs, one of the substitutes could be electricity. To examine the correlation, we started from statistical hypotheses:

H_O: There is no statistically significant correlation between the movement of average retail prices of oil and oil derivatives and electricity;

H_1: There is a statistically significant correlation between the movement of average retail prices of oil and oil derivatives and electricity.

Table 2 Movement of current prices, annual inflation rate, and adjusted prices of fuel and electrical energy in the period from 2006 to 2015

Year	The average retail price of fuel (per liter)	Average retail price el. energy (per kilowatt-hour)	Average annual inflation (%)	Average the retail price of fuel (per liter) in 2006 prices	Average retail price el. energy (per kilowatt-hour) in 2006 prices
2006	80.2	5.1	12.7	80.2	5.1
2007	83.3	5.3	6.5	80.1	5.6
2008	112.1	6.8	12.4	126.0	7.6
2009	99.8	6.9	6.7	186.5	7.4
2010	110.4	6.8	6.6	117.7	7.2
2011	121.4	7.5	5.5	128.1	7.9
2012	124.6	7.6	4.9	130.7	8.0
2013	133.2	7.8	4.4	109.1	8.1
2014	131.5	7.9	4.3	137.2	8.2
2015	130.1	8.1	4.2	135.6	8.4

Source: Republic Bureau of Statistics, review, http://webrzs.stat.gov.rs/WebSite/Public/PageView.aspx?pKey=3, visited on July 5/2019

The level at which average retail prices of oil and petroleum products and electricity correlate over ten years (2006-2015) is estimated (Table 2). The correlation testing is performed through prices adjusted to the 2006 level. To eliminate the effect of image distortion provided by testing, we have canceled the effect of inflation. We did this by using data on the calculation, i.e. correctors on the inflation rate, which were determined through the movement of consumer prices obtained from the website of the European Bank for Reconstruction and Development and the Republic Bureau of Statistics website.

Based on the obtained results on the degree of correlation and indicators of statistical significance, we rejected the zero and accepted the alternative hypothesis. It turns out that there is a direct correlation between the prices of the observed products (Table 3). The relationship is statistically significant, which confirms the probability value of r, which is less than 0.05 (0.042 / 0.027). However, the value of the correlation coefficient that we obtained indicates that these two products are not substitutes (0.661), i.e. the value of r is not above 0.8 (0.661 / 0.685). We believe that similar results would be obtained if similar potential substitutes were taken into account. Thus, the market for oil and oil derivatives independently constitutes the relevant product market.

Table 3 Correlation coefficient of the movement of average retail prices of fuel and electrical energy in the period from 2006 to 2015

MPC2006	Pearson Correlation	1	.661*
	Sig. (2-tailed)		.042
	N	10	10
MPCee2006	Pearson Correlation	.685*	1
	Sig. (2-tailed)	.027	
	N	10	10

* Correlation is significant at the 0.05 level (2-tailed).

Source: Author's calculation based on the database of the European Bank for Reconstruction and Development, public stat., Http://www.ebrd.com/where-we-are/serbia/overview.html, accessed 22.11.2019

Furthermore, the data required for the Elzing-Hogarthy test were also collected from secondary sources, i.e. Statistical Yearbooks of the Republic of Serbia, the Energy Balance of the Republic of Serbia, and the European Bank for Reconstruction and Development web site, where the statistical calendar of important variables is presented. Based on the results of LOFI, i.e. LIFO tests, it is clearly determined where the domestic market of oil and oil derivatives belongs (Table 4 and 5). The LOFI test measures the share of exports in the production of the relevant market, and the LIFO test measures the share of imports in the consumption of the relevant market. This statement can be followed by the fact that during the last fifteen years, several European well-known oil companies have entered the domestic market, such as Lukoil, OMV, Gazpromneft, Eko. Namely, "Frech argued while the computation of LIFO and LOFI in a given area is a straightforward task, an area in which both the LIFO and LOFI criteria are simultaneously satisfied need not be unique. For example (using zip codes as the "building blocks" with which to construct a geographic market, as is common in practice), suppose that for a given zip code, LIFO and/or LOFI does not meet the 0.75 thresholds. This implies that this zip code in isolation does not constitute a geographic market according to the Elzing-Hogarthy criteria, and thus to create a geographic market, additional zip codes need to be included. The choice of which zip code(s) should be incrementally added to the initial zip code can potentially affect the size of a market and the number of competitors. For example, adding zip codes based on a fixed radius from an initial geographic point can produce a different market than if one were to iteratively add zip codes based on the zip code that contributes the most to either the LIFO or LOFI statistic", (as cited in Gaynor, 2012, p. 9).

Table 4 Relevant geographic market depending on the value of Elzinga-Hogarty test results (LOFI/LIFO test)

LOFI /LIFO value	Description of the relevant geographic market
< 10%	Highly relevant market
10% - 25%	Poorly relevant market
>25%	Share of the wider relevant market

Source: Hendry, L.C., Eglese, R.W. 1990. Data Envelopment Analysis. Operational research Society. The United Kingdom.

Table 5 Values of the Elzing-Hogarthy test (LOFI/LIFO test) for the period from 2011 to 2014

Year	LOFI values	LIFO values
2011	0.091	44.6
2012	0.063	44.5
2013	0.059	43.3
2014	0.052	40.2

Source: Author's calculation based on the database of the European Bank for Reconstruction and Development, public stat., Http://www.ebrd.com/where-we-are/serbia/overview.html, accessed 22.11.2016

Starting from the fact that the territory of the Republic of Serbia is a rounded territory where the legal framework, antitrust regulations, and numerous oil companies operate, we concluded that the relevant geographic market of oil and oil derivatives is independently

constituted in the Republic of Serbia. The relevant geographic market of oil and oil derivatives on the territory of the Republic of Serbia is also confirmed by the results of the Elzinga-Hogarti test (LOFI/LIFO test), obtained based on the collected data. To make the results more objective, we took into account the period longer than two years (2011-2014), which is part of the time frame of the analysis itself. Based on the criteria presented in Table 4 and based on the data shown in Table 5, it can be concluded that the domestic market of oil and oil derivatives is a very relevant geographic market viewed from the aspect of exports, i.e. part of the wider relevant market from the aspect of imports. Namely, the values for the observed period moved between 5.2% and 9.1% (Table 5).

After collecting, supplementing, and verifying data obtained from the Serbian Business Registers Agency, the Serbian Republic Bureau of Statistics, and the European Bank for Reconstruction and Development, the survey included 15 oil companies. The representative sample is also included. Namely, there is a belief that taking a large number of economic entities into the analysis can reduce the analytical significance of this concentration indicator by increasing the value of this index, and for that reason, we followed the recommendations in the instructions for calculating selected indicators.

The representative sample contains four to seven large, medium, and small companies, depending on the methodology and instructions for calculating the indicators themselves. In addition to NIS i.e. Gazprom Neft, OMV, Lukoil, Eko, and Knez Petrol also stand out as large companies. Some of the above also deal with the wholesale trade of oil and oil derivatives, for example, the Transnafta company. In addition to larger oil companies, a large number of small oil companies have been registered. According to the collected data, a larger number operate unprofitably and are on the verge of bankruptcy, while a certain smaller number successfully manage the market and generate significant revenues.

4. Market Concentration Analysis by Using Herfindahl-Hirschman Index

After defining the relevant market, the obligatory step is the selection of the appropriate variable through which the degree of concentration of competitors in the relevant market will be measured. The variable is used to calculate the market share of each economic entity in the relevant market. Taking into account the subject and goal of economic analysis, but also the availability of primary and secondary data sources, in practice it can be used through variables such as profit, realized income, and production for a certain period, number of employees, total assets, number of branches, sub-branches, and their turnover, distribution of organizational units, number of subcontractors, etc. Combining variables is possible, but only under specific circumstances.

In general, economic analysis can also yield contradictory conclusions if different variables are used. At the very least, such results may be seemingly accurate, but substantially far from the desired objectivity. For that reason, it must be borne in mind that each variable brings with it certain limitations. The practical application of the obtained results often depends on the analytical and subjective assessment of the researcher, but also on the circumstances under which the analysis itself is realized. For the purposes of this paper, the results obtained based on the analysis could be applicable only if, when determining the domain of the analysis, they put market power in the foreground. As market power is reflected through the realized income on the relevant market, the focus of this research is in the first place the realized income that the companies realized on the relevant market for the observed period.

Annual realized income is taken as an adequate indicator for many reasons: it gives us information about the value of sales on an annual basis, regardless of whether the product/service was created in the observed or previous year, and sales revenue is related to the core business of oil companies and excludes revenue generated on the other bases. Annual realized incomes of oil companies can be found in the attached link addresses, and the percentage shares of realized incomes of individual oil companies in the total realized revenue for the period 2010-2018, which we will rely on in the assessment, are given in Table 6.

Table 6 The percentage share of realized incomes of individual oil companies in the realized total income of all oil companies for the period 2010–2018

Company/Year	2010	2011	2012	2013	2014	2015	2016	2017	2018
NIS/Gazprom Novi Sad	55.1	52.7	54.4	60.2	59.9	57	54	56.6	58.8
Lukoil Serbia Belgrade	13	12.4	10.9	7.2	8.4	9.1	8.8	7.4	7.6
OMV Serbia Belgrade	11.1	9.8	9.2	7.4	7.2	9.2	8.5	8.0	8.0
Knez Petrol Serbia Belgrade	6.4	8.8	9.7	8.9	9.7	6.2	7.7	10.6	9.7
Intermol Serbia Belgrade	3.9	3.7	4.3	4.8	4.9	10	11	10.3	9.8
Nafte Serbia Belgrade	3.2	3.6	1.3	1.2	1.3	0.9	0.3	0.0	0.0
PC Transnafta Pancevo	0.17	0.13	0.14	0.20	0.16	0.0	0.0	0.0	0.0

Source: Made by the author based on data from the Business Registers Agency of the Republic of Serbia, http://www.apr.gov.rs, visited 7.5. 2020

Based on the data about the market shares of oil companies shown in Table 6, it can be said that the market of oil and oil derivatives of the Republic of Serbia is an oligopolistic market with one dominant company (about 55% market share), several large ones that follow it (about 10% market shares), several smaller (followed by 5-10% shares), and a group of small businesses (less than 1% shares). In the following, based on the collected information, the level of limited competition on the market of oil and oil derivatives of the Republic of Serbia for the period 2010-2018, will be determined by estimating the Herfindahl-Hirschman index.

The HHI index for the relevant market in the observed period 2010-2018 ranged between 3,100 and 3,840, which can be seen in the attached Table 7 and on the graph in Figure 1.

Table 7 Herfindahl-Hirschman index of supply concentration in the relevant market of oil and petroleum products in the period 2010 – 2018

Year/HHIndex	HHI	ΔHHI
2010	3360.45	
2011	3133.17	-227.28
2012	3286.19	153.02
2013	3838.34	552.15
2014	3793.49	-44.85
2015	3638.90	-154.59
2016	3212.98	-425.92
2017	3538.72	325.74
2018	3768.37	229.65

Source: Author's calculation based on the data of the Business Registers Agency of the Republic of Serbia, http://www.apr.gov.rs, visited 7.6. 2020.

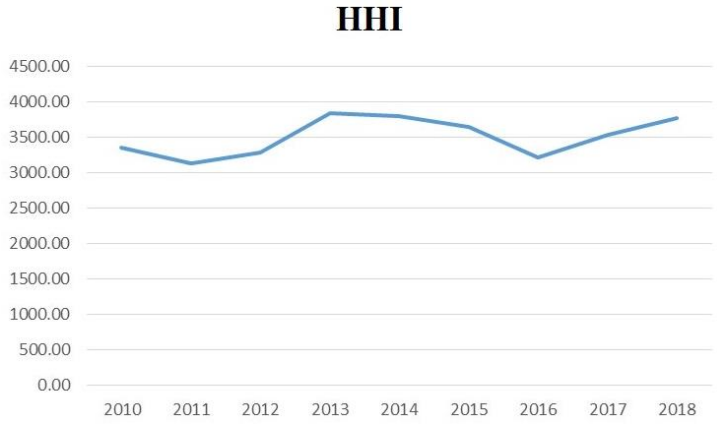

Fig. 1 Herfindahl-Hirschman supply concentration index in the relevant market of oil and oil derivatives in the period 2010 - 2018

Source: Graphic presentation based on the author's calculation based on the data of the Business Registers Agency of the Republic of Serbia, http://www.apr.gov.rs, visited 7.6. 2020

NIS/Gazprom Neft, Lukoil, OMV, Knez Petrol, and Mol are big players in the domestic supply market. This is confirmed by the data on the market share of each oil company in the realized income, which is shown in Table 1. Therefore, the obtained values of the Herfindahl-Hirschman concentration index objectively reflect the distribution of market share and market power concentration in the relevant market (Table 7). According to the value of HHI, it is obvious that the offer on the relevant market is very highly concentrated.

CONCLUDING REMARKS

The obtained results of the conducted research give us a basis for drawing interesting conclusions. The results of the analysis of the relevant market for the period from 2010 to 2018 unequivocally indicate a high level of concentration, and resume may be in the next form: HHI index for the relevant market in the observed period ranged between 3,100 and 3,840.

It is unequivocally clear that the supply of the oil and oil derivatives market of the Republic of Serbia is very highly concentrated. The obtained values of the calculated coefficients and the specific state of uneven distribution are caused by the high concentration of supply on the domestic market of oil and oil derivatives. This is confirmed by the data on the market share of each oil company in the realized incomes, shown in the first table. Of course, NIS/Gazprom Neft with 55%, and the group Lukoil/Knez Petrol/Mol/OMV stand out in terms of the percentage share of the realized incomes, and together hold over 85% of the participation in total realized incomes. More specifically, the oil and oil products market is an oligopolistic market with one dominant company NIS/Gazprom Neft (about 55% market share), several large ones following it (about 10% market share), several smaller ones following them (5-10% participation) and the group of the smallest companies (less than 1% participation). As a reflection of these relations on the market, the upward growth of the trend of uneven distribution of market share stands out.

The high values of the HHI also reflect structural changes and developments in the domestic market of oil and oil derivatives. During 2010, the program of transformation and modernization of NIS/Gazprom Neft was realized, which enabled a profitable and stable position of this oil company. Since 2011, the already large market share of NIS/Gazprom Neft has gradually increased. Thanks to investments and support from the state, NIS/Gazprom Neft has become a vertically integrated company since 2013. The complete process from research and development, through production and logistics, all the way to wholesale and retail represents one closed functional system of NIS/Gazprom Neft. That is why it is not surprising that this oil company dominates the relevant market of oil and oil derivatives of the Republic of Serbia. The relative decreases in the values of certain indicators during 2011 and 2016 are related to the decrease in the number of gas stations (supply quantity) of NIS/Gazprom Neft concerning the decrease/increase in the number of gas stations of other serious market participants (Lukoil, OMV, Eko) during the observed period.

It is logical that this analysis also results in a better understanding of the competitive behavior of the leading oil companies in the market. As the market for oil and oil derivatives is relatively small, no increase in the number of participants on the supply side is expected. For this type of market, it is typical for companies to use a limited market to install a large profit margin, and to make as much profit as possible, all at the expense of customers. This kind of situation in the domestic oil and oil derivatives market is subjected to the anti-monopoly policy of both domestic and foreign legislation. Commission for Protection of Competition should pay special attention to the policy of the retail price formation. Appropriate implementation of the regulation for forming prices in the oil and oil derivatives market is only possible under the strict control of the Commission, because the chances of an agreed performance in the relevant market are really big, which is supported by indicators. In this context, we draw attention to the potential for the agreed performance and the agreed price.

Formal and tacit agreements certainly exist, but they are difficult to prove. This practice should be stopped as soon as possible by adequate and systematic measures. The

strengthening of competitive relations, and thus the increase of business efficiency between companies is not expected unless the state reacts. Based on the derived conclusions and findings, appropriate measures can be taken to increase competition and the business efficiency of oil companies. In such circumstances, maintaining and raising the quality of products and services is questionable, and it would be best to encourage competition between oil companies and increase their economic efficiency.

However, it should be emphasized that large companies, such as NIS/Gazprom Neft in the observed market, greatly contribute to increasing efficiency across the branch. We should keep in mind that restricting the operations of NIS/Gazprom Neft and/or Lukoil may be wrong, and the applied measures could be ineffective and wrong. Large companies, such as NIS/Gazprom Neft, by investing in the development of efficient business, set a good example of how to plan in the long run and strategically. Then, large companies, by taking over small and unsuccessful companies and turning them into successful ones, contribute to increasing the quality of the branch's supply The focus of preventing abuse is the impact of large oil companies on the business of smaller companies, but also on customer choice as well. Finally, the market for oil and oil products can be further monitored and researched to reach additional conclusions.

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MERENJE KONCENTRACIJE PONUDE NAFTE I NAFTNIH DERIVATA U REPUBLICI SRBIJI HERFINDAL-HIRŠMANOVIM INDEKSOM

Jedan od aspekata analize intenziteta konkurencije na određenom tržištu jeste merenje koncentracije ponude, čemu je ovaj rad i posvećen. Zato i ne čudi činjenica da postoje različita tumačenja ovih ekonomskih kategorija. Analiza ovih fenomena datira još od nastanka proizvodnih odnosa i proizvodnih snaga. Liberalizacija domaćeg tržišta nafte i naftnih derivata otvorila je prostor za izgradnju kvalitetnih konkurentskih odnosa. Tržišni uslovi i konkurencija u praksi su određeni nivoom koncentracije na posmatranom tržištu. Konkurentski odnosi između tržišnih učesnika se menjaju tokom vremena. Te promene utiču na nivo koncentracije određenih i jasno definisanih tržišta, u ovom slučaju tržište nafte Republike Srbije. Kako se nivo konkurencije menja, nivo koncentracije se takođe menja. Iz tog razloga je ovaj rad posvećen merenju i analizi nivoa koncentracije. Postoji niz pokazatelja koncentracije koji se mogu primeniti u cilju merenja i prikaza nivoa koncentracije na određenom tržištu. Naš izbor je Herfindal-Hiršmanov indeks.

Ključne reči: *tržište nafte i naftnih derivata, indeksi koncentracije, nivo konkurencije*