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Influence of Power Asymmetry on Economic Growth of Industry Markets: A Russian Case

Influencia de la asimetría de poder en el crecimiento económico de los mercados industriales: Un caso ruso

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ABSTRACT:
The paper examines the influence of the power asymmetry level on economic growth of industry markets. The methodological basis of the study is the synthesis of the Industrial Organization Theory, Neo-institutional Economic Theory and the Theory of Organizational Fields. The authors prove that competition is one of the factors of economic growth and present a three-step method for measuring the power asymmetry level as the main characteristic of the competition level. To establish the link between economic growth of an industry market and the power asymmetry level, we develop a model of multiple nonlinear regression. Interpretation of the model reveals that the level of structural asymmetry and interactional asymmetry positively affects economic growth rates of the industry market. The research results are of interest for researchers and government authorities when formulating competition policy.
Keywords: industry market; on economic growth; power asymmetry; limited competition; institutional environment.

RESUMEN:
El artículo examina la influencia del nivel de asimetría de poder en el crecimiento económico de los mercados industriales. La base metodológica del estudio es la síntesis de la Teoría de la Organización Industrial, la Teoría Económica Neoinstitucional y la Teoría de los Campos Organizacionales. Los autores demuestran que la competencia es uno de los factores del crecimiento económico y presentan un método de tres pasos para medir el nivel de asimetría de poder como la característica principal del nivel de competencia. Para establecer el vínculo entre el crecimiento económico de un mercado industrial y el nivel de asimetría de poder, desarrollamos un modelo de regresión no lineal múltiple. La interpretación del modelo revela que el nivel de asimetría estructural y asimetría interactiva afecta positivamente las tasas de crecimiento económico del mercado de la industria. Los resultados de la investigación son de interés para los investigadores y las autoridades gubernamentales al formular la política de competencia.
Palabras clave: mercado de la industria; sobre el crecimiento económico; asimetría de poder; competencia limitada; entorno institucional.

1. Introduction

Searching for new sources of economic growth, such as support for competition, is among the central tasks of the state economic policy. A number of research studies (Bucci, 2014; Carlin, Schaffer, Seabright, 2014; Latynina, 2013) illustrate that market inequality produces specific institutional interactions between participants and, consequently, affect their performance.

Development of effective competition policy in Russia is one of the most urgent issues. Traditionally, antitrust prohibitions serve as the core tool of competition policy. On the other hand, economists argue that state intervention negatively affects market processes. For example, R. W. Crandall (Crandall, 2001) found that in practice it was rather difficult to distinguish healthy competition from anticompetitive behavior. At the same time, G. A. Hay and G. Werden (Hay, Werden, 1993) assert that "genuine" influence of competition policy on public well-being is positive. Competition policy enhances social protection of the population and encourages companies to abandon anticompetitive behavior without any obvious interference, i.e. constrains them.

This ambiguity in opinions of theorists and practitioners underlies the purpose of the paper – to investigate the influence of market inequality parameters on economic growth of industry markets. To achieve the stated goal, we have to fulfill the following tasks:

1-To perform a theoretical analysis of the approaches to establishing the correlation between the competition's level and economic growth of an industry market;

2-To develop a methodical toolkit for assessing the power asymmetry level as the central characteristic of competitive inequality in an industry market;

3-To devise and test a model of influence of the power asymmetry level on economic growth of an industrial market.

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2. Methodology

Proponents of classical economic theory, who examined the basic approaches to studying behavior under competition and equilibrium dynamics, laid the foundations for modern economic growth theory (for more details, see (Malthus, 1986; Ricardo, 1951; Smith, 1937)). In addition, the studies determined the role of monopolistic power as a stimulus to technological progress.

R. F. Harrod and E. D. Domar (Domar, 1946; Harrod, 1942) continued exploring the problems of economic development and combined Keynesian analysis with elements of the concept of economic analysis. R. M. Solow and T. W. Swan developed the neoclassical form of the production function (Solow, 1956; Swan 1956). Having introduced endogenous saving rates, D. Cass finalized the development of the basic neoclassical growth model (Cass, 1956).

Currently, economic growth is interpreted as:

1. quantitative and qualitative improvement of the social (cumulative) product produced in a certain period of time (Nikipelov, 2013);

2. a process that should be considered in the context of the three aspects: qualitative, quantitative and structural (Babaev, Dubrovsky, 2015);

3. long-term trends towards an increase and qualitative improvement of the national product and factors of its production (Dumnaya, 2010);

4. an increase in real income, including income per capita achieved by changing the quantity and quality of the resources used (Tenyakov, 2016).

All theories of economic growth pay attention to factors that affect its rates and quality. Direct driving forces of economic growth include the quantity and quality of labor (Todorov et al., 2018) and natural resources, the amount of fixed capital, technology and organization of production (Kubeš & Rančák, 2018; Prause & Atari, 2017) and the level of entrepreneurial abilities' development. Indirect factors usually encompass the tax system, the level of efficiency of the monetary and banking systems, growth of consumer, investment and government spending, expansion of exports, opportunities for redistribution of production resources in the economy and the current income distribution system (Latynina, 2013).

Indirect driving forces also embrace the level of market competition which allows market participants to assess the existing alignment of forces, the correctness of their actions and to orient themselves in choosing a development strategy (the fundamental approaches to competition as a driver of economic growth are given in Table 1).

Table 1

Approaches to competition as a driving force of economic growth

Approach	Representative(s)	Approach's characteristics
Classical economic theory	A. Smith, D. Ricardo	The model of perfect competition, the theory of absolute and relative competitive advantages: perfect competition is the main condition for economic development (Boboev, 2013)
Neoclassical economic theory	R. Solow, T. Swan	Solow-Swan model: perfect competition is the basic assumption of the functioning of economy
Keynesian theories	J.M. Keynes	The need for state intervention in the economy and competition processes is grounded
	P. Sraffa, N. Kaldor	Restricting market competition has a positive effect on economic development
	J. Robinson	One of the components of economic growth is competitive conditions: the competitive environment of the territory
Austrian Economic School	L. von Mises	Any state intervention in the free market entails a deterioration and a decline in economic growth
Institutional theories	O. Hart, O. Williamson	The impact of competition on economic growth is indirect and occurs through the impact on the system of institutional factors of economic growth
Economic development theories	J. Schumpeter	"Effective competition" is stimulated by entrepreneurs through the urge to increase profits by reducing production costs and improving the quality of products. Such competition causes the emergence of various innovations that are the driving force of economic growth
Empirical	McKinsey Global Institute	The major factor behind economic development is productivity of the state economy. Productivity is determined by such factors as labor, capital structure, corporate governance, competition (Zaikin, 2014)

In modern studies, empirical analysis is regarded as the most relevant method for assessing the relationship between competition and economic growth. According to (Shastitko, Avdasheva, Golovanova et al., 2012, p. 7), annually GDP in Russia decreases by at least several points due to a low competition level. At the same time, W. Carlin et al. (Carlin, Schafer, Seabright, 2014) have found that the correlation between a competition level and economic growth is of non-linear character, but has a U-shape, i.e. to a certain critical point, intensification of competition causes an increase in output, but after that, it leads to negative results. Moreover, as indicated in the World Bank Report, the impact of competition on economic growth will be differentiated depending on the stage of market development in a particular country. For developed nations, a decrease in state regulation of competitive processes is positive, whereas for emerging markets, there should be a balance between

competition and state regulation (Huggins et al., 2014).

Generalizing the approaches to determining the relationship between competition and economic growth, we draw the two main conclusions:

1. there is a link between the level of competitive inequality and economic growth;

2. empirical research results are always different and determined by the specifics of economic relationships in the market (country), therefore, it is important to take into account the specific features of the research object.

Inequality in the industry market can be best reflected in an integrated approach to assessing the level of power asymmetry. In our opinion, power asymmetry refers to a state of an industry market where some economic agents are mighty enough to influence the decisions of other market agents (including the state) and can directly or indirectly establish the terms of contracts (institutional agreements) (Orekhova, Kislitsyn, 2017).

Synthesis of the existing approaches to assessing market inequality (for more details, see (Orekhova, Kislitsyn, 2017)) and the clarified term "power asymmetry" allows us to identify its three main elements: Structural – market inequality among firms of the same industry market; Interactional – market inequality among firms in related industry markets (organizational fields); Institutional – the degree to which the needs and the trajectory of market development correspond to the institutional environment (needs and the path of the state development).

Based on these elements, we have developed a method for assessing the power asymmetry level. The first step of the algorithm is to measure the level of structural asymmetry. It takes account of direct (the Bain index) and indirect (the Hall-Tideman and Herfindahl-Hirschman indices) indicators of market inequality, which guarantees a comprehensive assessment. The resulting coefficient of structural asymmetry is calculated by formula (1):

$$SA = \frac{r' \times 0,5 + \mathrm{HT}' \times 0,25 + HHI' \times 0,25}{5} \quad (1)$$

Where r' is the Bain index, points; HT' is the Hall-Tideman index, points; HHI' is the Herfindahl–Hirschman index, points.

The second step of the algorithm is to determine interactional asymmetry. One of the fundamental tasks when computing this indicator is to identify the most important related markets. A related market refers to markets of consumers and goods. The object of the study is traditional industrial markets, since this type of market usually demonstrates a limited level of competition. Therefore, we proceed from the assumption that the number of key related markets is small and can vary between 1 and 3. The coefficient of interactional asymmetry takes into account the direct (comparative net profit margin in industry and related fields) and indirect (the ratio between the number of firms in industry and related fields, and the ratio between these markets' capacities) indicators of inequality. The coefficient of interactional asymmetry is calculated using formula (2):

$$IA = \sum_{i=1}^{n} \left(\frac{\mathrm{Re}nt_i' + SE_i' + Vol_i'}{15} \times s_i \right) \quad (2)$$

where $\mathrm{Re}nt_i'$ is the index based on comparative profit margin of the industry and i-th related fields, points; SE_i' is the index based on the ratio between the number of firms in the industry market and that in i-th related field, points; Vol_i' is the index based on the ratio between the capacities of the industry market and i-th related field, points; s_i is the share of i-th related field, where $\sum_{i=1}^{n} s_i = 1$; n is the number of related fields.

Due to the necessity to perform calculations for several related fields, the indicator of the share of a related field is introduced to the formula. It corresponds to the ratio of the industry market goods volume delivered to this market to the capacity of the industry market (total revenue). Each coefficient is assumed to equally affect the resulting indicator of interactional asymmetry, so the calculated sum is divided by the maximum possible value – 15.

The third step of the algorithm is to assess the degree to which the needs and the path of

the market development correspond to the institutional environment, the so-called institutional asymmetry. The logic of this indicator is as follows: the more stimulating factors there are in the industry market and the more prioritized the industry is, the more actively enterprises of this market can advance their interests and the bigger influence is exerted on the formation of the institutional environment. Assessment indicators of the institutional asymmetry level are the volume of investment in fixed capital of the enterprises within the industry out of public funds, as well as the volume of publicly funded loans received by the enterprises operating in the industry market. To compare the data, the indicators' values were normalized using a scale ranging from 1-5, where "5" is the largest volumes of public investment.

Based on the analysis of the state programs and general state industry strategies, we used an expert way to determine the importance of the industry market for the purposes of current industrial policy.

The coefficient of institutional asymmetry is calculated on the basis of scalar indices by formula (3):

$$IE = \frac{I' + Kr'}{10} \times 0,5 + \frac{PI'}{5} \times 0,5 \quad (3),$$

where I' is the index based on the volume of investment in fixed capital, points; Kr' is the index based on the volume of issued publicly funded loans, points; PI' is the industry priority indicator, points.

Such a three-step method for assessing the level of power asymmetry examines all possible reasons behind competition inequality. Moreover, it is founded on the calculation with the use of publicly available statistical data, and consequently, it is universal.

3. Results

To establish the influence of the power asymmetry level on economic growth of the industry market, we use the tools of multiple regression.

Theoretical analysis of the discussion about the competition level and economic growth allows us to put forward a number of hypotheses:

H1 – the lower the level of structural asymmetry (equality of competition in the industry), the higher the economic growth rate of the industrial market;

H2 – the lower the level of interactional asymmetry (equal conditions in the industry and related markets), the higher the economic growth rate of the industry market (since in the absence of asymmetry, the distribution of rents between the markets is approximately the same, which generates greater opportunities for the development of markets);

H3 – the more institutional incentives there are for market development (the higher level of institutional asymmetry), the higher the rate of economic growth.

In the process of developing the model, we have studied the data from 40555 enterprises in 42 industry markets of the extractive and manufacturing industry of the Russian Federation. The data for enterprises were retrieved from SPARK-Interfax Database for 2016. To assess the factors of institutional power asymmetry, the data of Russian statistics were used.

The basic econometric model is as follows (4):

$$T = f(SA, IA, IE), \quad (4)$$

where T is the industry market growth rate; SA is the level of structural asymmetry in the market; IA is the level of interactional asymmetry; IE is the level of institutional asymmetry.

The indicators for constructing the multiple regression model are summarized in Appendix.

During the development of the econometric model by means of the construction of correlation fields, a nonlinear form of the dependence of the resultant variable on the factors was identified. The results of the regression analysis are presented in Tables 2 and 3.

Table 2

Dispersion analysis of the multiple regression model

Indicator	df	SS	MS	F	Significance F
Regression	2	871.4207	435.7103	8599.519	0.00%
Residual	38	1.925339	0.050667		
Total	40	873.346			

Table 3

Results of regression analysis of the multiple regression model

Indicator	Coefficients	Standard error	t Stat	P-Value	Lower 95%	Upper 95%
SA	0.6904	0.0821	8.4136	0%	0.5243	0.8565
IA	0.4654	0.0829	5.6156	0%	0.2976	0.6332

Prior to interpretation of the obtained results, the assessments were checked in terms of unbiasedness, effectiveness and consistency. When analyzing the data in the model, insignificance of the factor of institutional asymmetry was revealed, which disproves the hypothesis H3. Significance F in the regression model is lower than 5%, hence it can be considered reliable and the number of observations is sufficient. P-Value for each coefficient is also not more than 5%. The correlation coefficient of 0.998 indicates a strong correlation between the factors and the dependent variable. Thus, the regression equation taking into account the factors' significance is as follows (5):

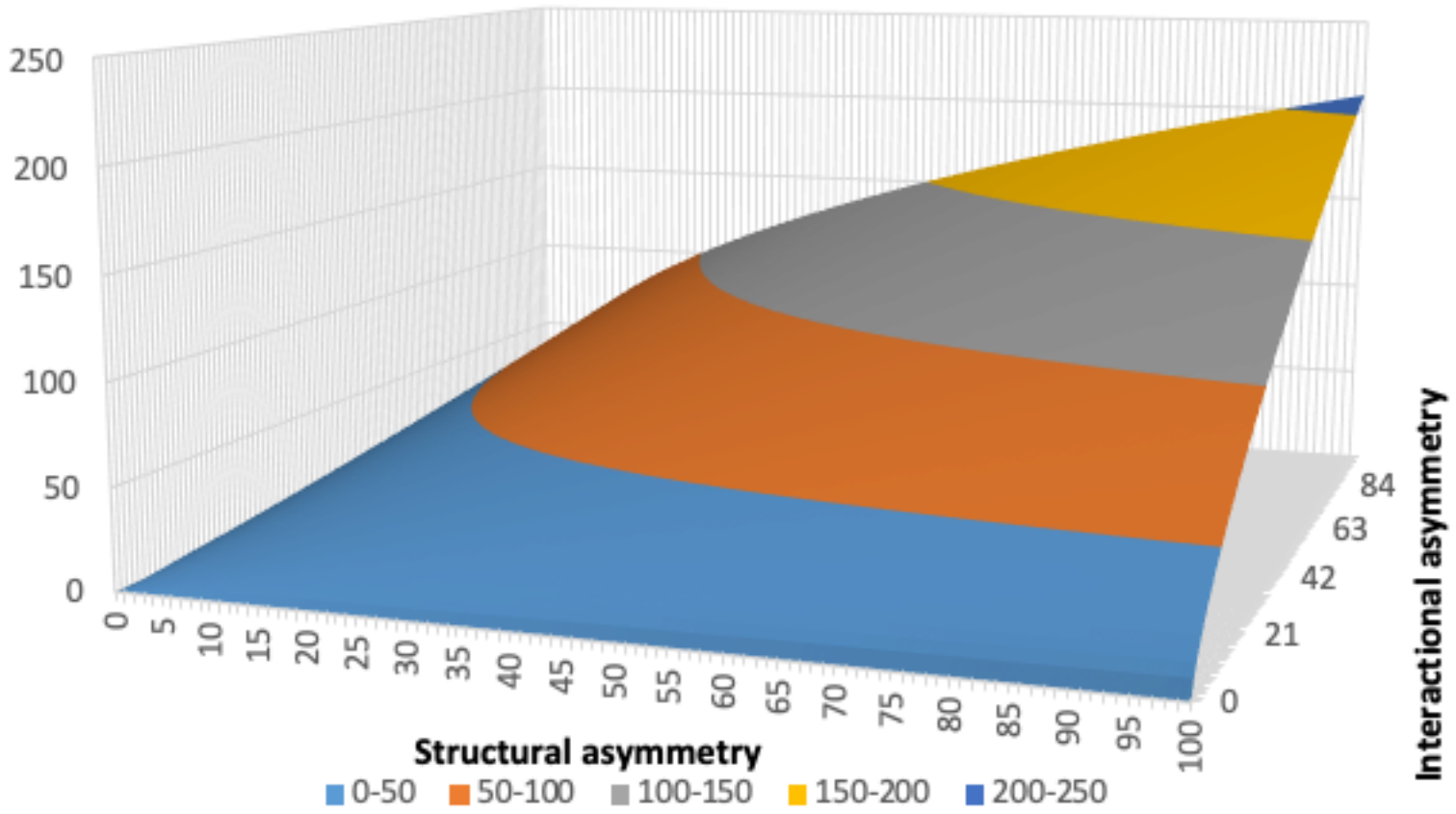
$$T_R = SA^{0,69} \times IA^{0,47} \quad (5)$$

We identified a direct correlation between economic growth of the industry market and the indicators of power asymmetry. The magnitude of the effect of structural asymmetry is 0.69, and that of the interactional asymmetry is 0.47.

The research results demonstrate that the dependence of the industry market's growth rate on the indicators of power asymmetry is not linear, but takes a power form (see Figure 1).

Fig. 1

The graph of the dependence of economic growth rate on the indicators of structural and interactional asymmetry



Thus, if the indicators of structural and interactional asymmetry increase in the interval below 50% (as compared to the interval above 50%), this entails a greater increase in growth rate. This means that for markets with a low power asymmetry level, its increase entails a greater increment in economic growth than for markets with a high level of power asymmetry.

4. Conclusions

Modeling the effect of the power asymmetry level on economic growth of the industry market demonstrates non-trivial empirical results and allows us to arrive at interesting, and new to economic science, conclusions.

The level of power asymmetry has a positive effect on the performance indicators of the Russian industry markets under consideration. In other words, the higher the level of power asymmetry, the faster the economic growth in the industry market.

At the same time, the degree of influence of structural asymmetry is much higher than that of interactional one. The influence of institutional asymmetry within the framework of this model is not established. In addition, it is worth mentioning that we have identified a power form of dependence of economic growth rates in the indicators of structural and interactional asymmetry.

The current research has allowed expanding representations about influence of market inequality on economic growth of the industry market. In our opinion, the research is also valuable due to the development of the methodical tools that make it possible to formulate more effective proposals on competition policy.

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Annexes

Table. Indicators for constructing a multiple regression model of the influence of the level of power asymmetry on economic growth of the industrial market

OKVED*	Industry market	Growth rate, %	SA, %	IA, %	IE, %
05.10	Extraction and beneficiation of coal and anthracite	121.15	56.0	68.0	64.0
05.20	Extraction and beneficiation of brown coal (lignite)	110.49	30.0	68.0	28.0
06.10	Extraction of crude oil and associated petroleum gas	99.28	58.0	68.0	76.0
06.20	Extraction of natural gas and gas condensate	105.12	66.0	60.7	76.0
07.10	Extraction and beneficiation of iron ores	108.30	80.0	72.0	24.0
07.21	Mining of uranium and thorium ores	159.92	50.0	32.0	36.0
08.11	Quarrying ornamental and building stone, limestone, gypsum, chalk and shale	108.43	60.0	68.0	12.0
08.12	Exploitation of gravel and sand quarries, extraction of clay and kaolin	114.83	60.0	25.0	12.0
08.91	Extraction of mineral resources for the chemical industry and production of mineral fertilizers	107.29	90.0	72.0	24.0
08.92	Extraction and agglomeration of peat	103.66	70.0	44.0	12.0
19.10	Coke production	111.60	94.0	60.0	24.0
19.20	Oil products production	92.17	60.0	71.3	60.0
20.11	Production of industrial gases	107.39	50.0	58.0	52.0
20.12	Production of dyes and pigments	117.77	44.0	52.0	52.0
20.16	Production of plastics and synthetic resins in primary forms	108.31	64.0	68.0	76.0
20.17	Production of synthetic rubber in primary forms	102.45	70.0	72.0	92.0
20.52	Glue production	122.28	70.0	61.0	36.0

20.60	Chemical fibers production	106.58	70.0	55.0	64.0
22.11	Production of rubber tires and chambers	113.67	60.0	54.0	48.0
22.19	Production of other rubber products	108.78	60.0	60.0	12.0
22.21	Production of plastic sheets, strips, pipes and profiles	112.97	40.0	58.0	24.0
22.23	Production of plastic products used in construction	103.92	60.0	52.0	16.0
23.14	Production of glass fiber	116.15	66.0	62.0	36.0
23.20	Production of refractory products	111.45	44.0	68.0	16.0
23.31	Production of ceramic tiles	113.16	60.0	68.0	12.0
23.32	Production of brick, roof tiles and other baked clay-made construction products	85.21	44.0	60.0	44.0
23.51	Cement production	96.93	26.0	76.0	36.0
23.52	Production of lime and gypsum	101.74	50.0	62.0	12.0
24.10	Production of cast iron, steel and ferrous alloys	106.07	50.0	62.0	60.0
24.20	Producing steel pipes, hollow profiles and fittings	93.12	60.0	60.0	72.0
24.42	Aluminum production	104.73	50.0	60.7	48.0
24.43	Production of lead, zinc and tin	117.09	74.0	54.0	48.0
24.44	Copper production	96.16	94.0	78.0	60.0
26.51	Manufacture of tools and devices for measuring, testing and navigation	91.69	46.0	62.0	68.0
27.11	Manufacture of electric motors, generators and transformers	117.94	46.0	42.0	68.0
27.12	Manufacture of electrical distribution equipment and control systems	111.17	50.0	32.0	64.0
27.31	Production of fiber optic cables	102.87	84.0	38.0	56.0
27.32	Production of other wires and cables for electronic and electrical equipment	102.39	56.0	44.0	64.0
28.12	Manufacture of hydraulic and pneumatic power systems	103.10	66.0	64.0	80.0
28.15	Manufacture of bearings, gear trains, mechanical transmission components and drives	106.22	50.0	56.0	24.0

28.22	Manufacture of hoisting equipment	102.58	74.0	18.0	64.0
28.41	Metalworking machinery manufacture	119.37	66.0	32.0	72.0

Source: calculated by the authors from SPARK-Interfax Database for 2016.
Note: * OKVED – Russian Standard Industrial Classification of Economic Activities.

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