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METHODOLOGICAL APPROACHES TO DETERMINING THE MONOPOLISATION LEVEL OF PRIMARY RESIDENTIAL REAL ESTATE REGIONAL MARKETS IN UKRAINE

Abstract. In this article the author investigates the typology and main characteristics of the markets and provides the definition of the concept of "competition". Several methodological approaches were suggested in order to determine the magnitude of the monopolisation level of primary residential real estate regional markets as well as the market share belonging to a certain construction company. The aims of these approaches are: to determine the concentration level in the market – the scale of the largest enterprises "threshold market share"; to analyse the state of the competitive environment – "The Index of market concentration"; the Linda index; "The Herfindahl-Hirschman Index"; "The Lerner Index"; "The Dispersion Index"; "The Entropy Index"; "The Lorentz curve"; The Gini coefficient.

Key words: competition definition methodology, real estate market monopolisation, developers competition, residential real estate, housing, primary market, market share of construction, housing construction.

Formulation of the problem

The residential real estate market is a special form of market relations. Its development is one of the decisive directions of the economic system formation in Ukraine based on the private property superiority and self-regulation market mechanisms, economy functioning and development [15, 24]. It is necessary to consider the residential property market an integral system, that is a set of interconnected and interacting elements (sellers-buyers) operating on the basis of the price mechanism, taking into account the legal regime of appropriation, social value, properties, and generic features of real estate [15]. The housing market is subject to the functioning laws of the financial and commodity markets. Special features of the real estate are: its immobility, connection with the land, the natural production form of existence, regular use, gradual value transfer in the operational process, etc.

Due to the realisation of the sale and purchase of real estate operations, the residential real estate market creates an environment and stimulates the development of other types of economic activity. In this context, it can be argued that the real estate market is one of the key markets of national economy [15].

Study analysis of the problem

In the scientific literature, the issues related to theoretical and methodological approaches to the definition of the level of markets monopolisation were studied by such Ukrainian and foreign scientists as N. Bakhvalov [23], I. Beliavska [1], I. Burkun [2], V. Hotra [5], S. Danylina [7], G. Dinz [8], T. Diachenko [9], S. Kireiev [11], I. Kryvovyaziuk [12], V. Lagutin [13], K. Mazaraki [24], O. Miniailo [15], R. Okprepkyi [17], V. Osetskyi [18], O. Strishenets [21]. On the other hand, the questions concerning methodological approaches to determining the monopolisation level of primary residential real estate regional markets in Ukraine require further research.

The purpose and objectives of the article

The purpose of this study is to provide a meaningful and in-depth methodological search for approaches that will help to determine the degree with which construction companies and

organisations exercise a monopoly over primary residential real estate regional markets.

Presentation of the main material and the substantiation of the study results.

The residential property market being an integral part of the general market, all the problems of the Ukrainian economy are characteristic of it: uneven development of its segments, insufficiency of state investments, the presence of a significant shadow sector [11].

Competition is indispensable for a normal market existence. The existence of effective competition, which balances the interests of market relations subjects, stimulates the introduction of innovations and competitions in all spheres of activity, is one of the main conditions for the development of the Ukrainian economy. Such competition opens up new opportunities for production improvement, generates an optimal structure of market demand and supply, and helps to optimise production costs. Competition in the residential real estate market is an important prerequisite for its existence and development, forcing market participants to introduce more efficient ways of production, to offer new concepts and price proposals, as well as to start working in new segments [19].

As we mentioned before, there are different types of markets: the pure (perfect) competition market, the monopolistic competition market, the oligopolistic market and the pure monopoly market. According to the Law of Ukraine "On limiting monopolies and preventing unfair competition in entrepreneurial activity", competition is the competition of enterprises, while individual actions limit the ability of each of them to influence the conditions for the sale of goods and services on the market, simultaneously stimulating the production of goods needed by the consumer [10].

The pure free competition market is characterised by a large number of sellers and buyers, none of which affect the level of current market prices. An example of a free competition market is the international markets for forest, non-ferrous metals, wheat, and securities [16].

The monopolistic competition market is characterised by a considerable number of buyers and sellers who make deals with prices negotiated within a wide range. The price of each product is determined by demand and its consumer characteristics.

The oligopolistic market consists of a limited number of sellers, whose goods can be characterised by homogeneity and interchangeability, as well as their being different.

The market of pure monopoly is the market where one seller is the owner. When setting prices for products, the seller-monopolist usually possesses a significant level of freedom. Meanwhile, the price level is determined by the demand for its products.

On the whole, in the economic system of developed countries, the various market levers of state regulation, economic self-regulation and corporate planning merge, but it should be noted that their economies tend to experience crisis phenomena. An important factor of the imperfect operation of the mechanism of combining the above-mentioned levers is the presence of various kinds of monopolies in various economic spheres. P. E. Samuelson characterises the real economy as a combination of elements of competition with imperfections generated by monopolies [16]. The study of the competition essence and its acting mechanism allows to more effectively influence the development of modern economic mechanism.

The degree of market concentration can be analysed when examining the size of the market share belonging to a certain firm. However, economic theory provides a number of more advanced instruments of concentration levels measuring, which include: the market concentration ratio; the Herfindahl-Hirschman Index; the dispersion of market shares; the entropy of market shares; the Gini index [13, 15].

In the process of the market structure analysis, quantitative approaches and methods are frequently used to evaluate the levels of concentration [22]. The concentration of sellers reflects the relative magnitude and number of enterprises operating in the industry. The smaller the firms, the higher the level of concentration. With the equal number of firms in the markets, the more firms differ from each other in size, the higher the concentration level. However, what serves as an indicator of the size of the firm and the market boundaries is essential to determine.

Table 1

Types and basic characteristics of the markets

Market Type	Market Subjects Number		Products Homogeneity	Goods Variability	Interchangeability of Market Subjects	Market Entrance-Exit	Subjects Shares on the Market
	Sellers	Buyers					
Pure Free Competition	Multiple	Multiple	Homogeneous	Full	None	Open	Equal and Small
The monopolistic competition	Limited	Multiple	Differentiated	High Level	Insignificant	Limited	Dominant enterprise and outsider enterprises with a small share in the market
The oligopolistic market	Several	Multiple	Homogeneous or Differentiated	High Level	Significant	Limited	Large, quasi-equal
Monopoly	Single	Multiple	Homogeneous	None	None	Closed	100 %
Monopsony	Multiple	Single	Slightly differentiated or homogeneous	Insignificant	None	Closed	100 %

* *Compiled by the author, Pavlov K., according to the sources*: [2, 3].

With the purpose of determining the size (scale) of an enterprise the indicator is generated by the indicators of an enterprise's sales in the total volume of sales, the indicator of the level of employment at the enterprise within the limits of the total staff number involved in the production, or the amount of the asset value of enterprise share in the total asset value of all enterprises. Due to the limited statistical data for the residential real estate market, the share of a construction firm is most often estimated by the ratio of the number of residential buildings built by the firm to the total number of objects on the residential construction market.

The magnitude indicator of the largest enterprises can serve a means of concentration indicators characterisation in the market, also called the threshold market share [22].

For example, according to the Russian law of 1991 "On competition and limitation of monopolistic activity in commodity markets", provided that the share of the company exceeds the threshold of 35 % in this market, the enterprise is included in the State register of monopolist enterprises. According to the newer version of the law of 1995, an enterprise exercising control over more than 65 % of the market is considered an absolute monopoly. An enterprise the market share of which varies between 35–65 % can also be considered a monopolist, provided that the antitrust enforcement authorities can prove that it dominates the market and is thus consequently abusing the market situation [22].

Meanwhile, studying the threshold indicator as the market structure characterisation indicator, it should be noted that this indicator applies to a particular enterprise and does not actually characterise the overall market structure of a particular product. To determine this goal other indicators are used [22].

Market concentration index. To analyse the state of the competitive environment, we calculate the market concentration factor CR_n. This coefficient is defined as the sum of market shares of the largest firms operating on the market. It

characterises the share of several largest enterprises in percentages in the total market volume.

Thus, the market concentration index is an indicator with widespread implementation and worldwide popularity to determine and evaluate the structure of the market [15]. Its disadvantage is not taking into account information on the influence of firms remaining beyond the largest ones, and also does not showing the distribution of sales among the largest market participants. This indicator can distinguish oligopoly from monopolistic and pure competition in the industry. It is defined as a percentage of the total sales in the industry, which falls on several large-scale firms, ranked relative to market share [15]. This indicator is calculated as:

$$CR_n = \sum_{i=1}^{n} S_i, i = 1,2,\mathbf{K},n \qquad (1)$$

in which n is the number of largest firms in the market for which the indicator is calculated; S_i is the share of the i=1 firm in the market (in the industry).

If the concentration index develops approximation to a value of 100 %, the market can be characterised by a high degree of monopolisation. Provided that its value is "slightly zero deviant", it can be regarded as a competitive one [22].

It should also be noted that the concentration index does not take into account the market structural features of the industry as a whole. For instance, an identical concentration index can be obtained by means of the analysis of two industries, in either of which there are four largest enterprises yielding about 60 % of all industrial products. Nevertheless, the situation on the market may vary, say, in one industry there can be 10 enterprises and 100 in the other. In addition, in the very "core" of the market, a completely different share distribution is possible. Similarly, predominance of one enterprise over others can be demonstrated by four firms with 15 % (equivalent distribution) or with 35 %, 10 %, 10 %, and 5 %, respectively [22].

The concentration index is exclusively acceptable as a "rough" factor demonstrating the dominant position in a small number of enterprises, which distinguishes oligopolistic from monopolistic and perfect competition, or as an additional indicator that is used concurrently with other indicators of concentration in the market [22].

V. G. Shepherd described all American markets in a four-ratio (CR_4) concentration factor, dividing them into four groups [5]: pure monopoly ($CR_4 \approx 100$ %); dominant firms (50 % $<CR_4<$ 90 %); limited oligopoly ($CR_4>$ 60 %); effective competition ($CR_4<$40 %).

One of the main objectives of competitive relations regulating in the process of creating an effective competitive environment in the housing markets is the strict control enforcement over compliance with legislation on the protection of economic competition. Therefore, in Ukraine, unlike other countries, the proportion of economic entities, recognised as monopolies, is more rigidly determined. In accordance with the provisions of the Law "On the Protection of Economic Competition", the market share of one business entity exceeding 35 %, three exceeding 50 %, and five exceeding 70 % is one of the conditions defining the position of a business entity in the market as dominant [7, 12].

The Linda Index. The insufficiency of the concentration index for the characterisation of the concentration of production and economic competition is presupposed due to the fact that it does not reflect either the distribution of shares within the group of largest firms, or between firms-outsiders. In order to solve this problem, in the countries of the European Union, the Linda Index (IL), which was initially proposed by Remo Linda, a member of the European Union Commission in Brussels, is used. This index, along with the concentration index, should be applicable only to several major enterprises, notwithstanding, in fact, the situation "near" the market. However, unlike the concentration index, the Linda Index is aimed to illustrate the differences in the "core (core)" market [22]. The Linda index allows to determine the number of firms and those of them occupying leading positions in the market. To realise this goal, the index is calculated in stages: first – for two largest enterprises, then for three, and continues so until the continuity of functions is violated (the trend of the index decrease will not replace the trend of its next

increase) [17]. This continuity violation illustrates that the enterprise to be added last owns a conspicuously smaller market share than any of the previous companies [22].

For two largest firms, it equals the percentage of their market shares:

$$IL_2 = \frac{S_1}{S_2} x100\ \%. \qquad (2)$$

If S_1 = 50 %, S_2 = 25 %, then IL_2 = 200 %.

For three largest firms the Linda Index is determined by the formula:

$$IL_3 = \frac{1}{2}\left[\frac{S_1}{(S_2+S_3)/2} + \frac{(S_1+S_2)/2}{S_3}\right] x100\ \%. \qquad (3)$$

For four firms the Linda Index is calculated as:

$$IL_4 = \frac{1}{3}\left[\frac{S_1}{(S_2+S_3+S_4)/3} + \frac{(S_1+S_2)/2}{(S_3+S_4)/2} + \frac{(S_1+S_2+S_3)/3}{S_4}\right] x100\ \%, \qquad (4)$$

The new firms being added, the Linda index reduction means that the core is not formed yet. If the core of the market is formed by one firm, the index will increase with the addition of the second and third firms. For example, if the Linda index for one firm is 250, for two firms it is 200, for three firms it is 150, and for the four companies 220, respectively, this means that the "core" of the market is comprised of the first three firms.

The Herfindahl-Hirschman Index. In the United States of America, since 1982, in the process of state antitrust policy implementation, the Census Bureau has been using the Herfindahl-Hirschman Index (HHI) as a complete alternative to the concentration index. This indicator can also be regarded as a unique concentration index. Although, it is the distribution of "market ownership" among all players in a particular market that is determined thereupon, not the market share taken over by several largest companies [22].

This indicator is calculated as a sum of the squares of market shares percentages of all entities in the market in total:

$$HHI = \sum_{i=1}^{n} S_i^2, \qquad (5)$$

where S_i is the share of the *i*-th firm in the industry, in %; n – the number of firms in the industry, which is usually n = 50. In this case, market shares of firms can be expressed in ratios or percentages. In the first case, the HHI will gain a value ranging from 0 to 1, and in the second case, from 0 to 10,000.

If the number of firms exceeds one, the HHI can vary from 0 to 10,000 (up to 1) depending on the distribution of market shares. In the case of perfect competition, provided that there are many sellers on the market, with a small share of the market each, the Herfindahl-Hirschman Index will approach zero. A unique monopoly enterprise operating in the market, the value of HHI will equal 1 (or 10.000). For a market with a high level of competition, with more than 100 enterprises, for instance, corresponding to a value of 1 % each, the HHI will be 100 (or 0.01). In the market, where there operate 10 companies, each with identical volume of market shares, the yielded value equals to 1000 (or 0.1). Indeed, the higher the value of the HHI index, the higher the level of concentration in the seller market, and vice versa, the lower the importance of the HHI index, the stronger the level of competition in the market and the less concentration and power of enterprises in the market [17].

The Herfindahl-Hirschman Index is used in the United States as a benchmark for determining the possibility of firms merger [4]. According to the US Merger Directive, amended on August 19, 2010, if the Herfindahl-Hirschman Index is less than 1500, the market is considered to be of low-concentration, any merger is unhindered and doesn't require notification. If the HHI index ranges from 1500 to 2500, the market is considered to be moderately concentrated [15]. If the HHI index exceeds the 2500 mark, the market is considered to be highly concentrated. In this case, a merger of firms is permitted only when the Herfindahl-Hirschman index will increase by less than 50 points as a result of the merger; if an index is increased from 50 to 100 points, additional control and verification are imposed; provided that the increase in the HHI is more than 100 points – the merger is prohibited [22]. In addition, the economists have proved the correlation between the HHI and the correlation indices, which allows to make certain marketing conclusions regarding the market structure, typology, competitive position and level of market monopolisation (Table 2) [1, 17].

Table 2

The relationship interpretation indicators between HHI and CR

HHI	The minimum possible number of market participants (type of market)	Maximum possible ratio of the largest sellers, %			
		CR_1	CR_2	CR_3	CR_4
500	20 – a perfect competition market	22	31	39	44
1000	10 – a perfect or monopolistic competition market	31	44	54	63
1800	6 – a market of monopolistic competition approaching oligopoly	42	60	72	85
3000	4 – an oligopoly approaching monopoly	54	75	95	100
5000	2 – a monopoly	70	100	100	100

Compiled by the author, K. Pavlov, based on: [17].

One of the main shortcomings of the HHI Index is that its calculation accuracy requires a complete analytical framework for all market participants, the collection of which tends to currently be complicated [17].

The recent research has enabled to determine the direct dependence of the concentration of production processes of the individually selected for the sake of research country upon the consolidation stage of both national corporations and corporations of other states.

The American scientists G. Dinz, F. Kroeger, S. Zeisel were the first to introduce in the science the concept of the consolidation curve, according to which the process of consolidation in various industries is carried out with variable intensity and with variable degrees, characterised by a different percentage of the concentration of the three largest companies within the industry [8].

According to this concept, the sectoral consolidation process takes place in four stages: initial; growth; specialisation; equilibrium; alliances (Table 3).

Table 3

The state of world industry concentration

Consolidation Stages	Initial	Growth	Specialisation	Equilibrium and alliances
Coefficient of concentration of the three largest commodity producers	Up to 30 %	Up to 35 %	35–75 %	75 %
Industries	textile industry, construction, services, insurance.	chemical industry, banking, breweries, auto parts, paper production, restaurant catering, pharmaceuticals.	coal production, dairy products, engines, retail trade, metallurgy, automobile industry, tire industry, aircraft engineering, shipbuilding.	production of aluminum, cement, iron ore extraction and processing, oil refining, footwear production, soft drinks production, tobacco industry
Stage Duration	up to 5 years	up to 7 years	up to 5 years	up to 5 years

Compiled by the author, K. Pavlov, based on: [18].

As shown in the Table 3 above, the international construction market is characterised by a low level of concentration and a high level of competition.

The HHI Index as an indicator of the concentration level is directly related to the Lerner Index of Monopoly Power . This feature is widely used in economic research [17, 22]. In the course of microeconomics, the index characterising monopoly power is considered as a certain value, the price of which exceeds the marginal cost:

$$L = P - \frac{MC}{P} = -\frac{1}{e_D}, \qquad (6)$$

where P is production unit price, MC is marginal costs associated with the production of an additional

production unit – the elasticity of demand for the price of the company. The larger the gap between P and MS, the greater the degree of monopolisation of the market. The value of L ranges from a low of 0 to a high of 1. In a perfect competition, the Lerner Index is 0.

The Lerner Index value can be directly related to the HHI for the oligopolistic market, assuming that it is described by means of the Cournot model [22]. In this case, for an individual enterprise, the Lerner Index will be calculated (index of monopoly power) as:

$$L_i = -s_i / e_D \,, \qquad (7)$$

where *Si* – the firm's market share; e_D – an indicator of the market demand elasticity [22]. In this case, the average index for the industry (with the shares of enterprises in the market serving as scales) is:

$$L = -HHI / e_D \qquad (8)$$

It should be noted that there is also a dependence of the Lerner Index on the level of concentration, taking into account the coherence of the pricing policy of enterprises [17, 22]:

$$\text{for the firm} - L_i = \\ = - b / e_D - (1\text{-b})\, k_i / e_D; \qquad (9)$$

$$\text{for the industry} - L = \\ = - b / e_D - (1\text{-b})\, HHI / e_D, \qquad (10)$$

where *b* is an indicator of the firm's pricing policy consistency (the degree of conspiracy), which assumes the value from the low of 0, which corresponds to the cooperation of the companies, according to Cournot, to the high of 1, which corresponds to the case of the cartel agreement. The higher the price coherence index, the less the dependence of the Lerner Index of the firm on its market share, and for the industry the less the dependence on the level of sellers concentration [17, 22].

For a more profound estimation of the uneven distribution of market shares, specific indicators are sometimes used – the entropy coefficient, the market share variance index. The Gini coefficient and the Lorentz curve are also used in world practice to determine the level of monopoly power of firms [17, 22]. Such a large number of indices and coefficients that characterise the level of market concentration, testifies to, on the one hand, the complexity of the object of research, and on the other hand, to the lack of universal methodology that would solve the problem. This circumstance is the reason why economists continue developing new indexes or modifying the old ones [17].

The market shares variance index evaluates the degree of deviation of the market share of each developer from the average market share. The dispersion of market shares is calculated as [15]:

$$s^2 = \frac{1}{n}\sum_{i=1}^{n}\left(S_i - \frac{1}{n}\right)^2, \qquad (11)$$

where S_i *is* the share of the *i*-th firm, *n* is the total number of firms in the market.

The smaller the dispersion of market shares s^2, the more homogeneous is the size of enterprises (firms) as well as the share of economic entities in the market, the lower the level of concentration. Conversely, the greater the size of the variance, the more unequal the market, the less is the competition and the stronger the power of large enterprises in it [9, 15]. The value of the index HHI is related to the dispersion of the firm's shares in the market as:

$$HHI = ns^2 + 1/n \,. \qquad (12)$$

To determine the degree of uneven distribution of market shares among market participants, the coefficient of variation is also used:

$$v = \frac{s}{\overline{S}} \cdot 100\,\% \,. \qquad (13)$$

Here $\overline{S} = \frac{1}{n}$ is the average market share. Table 4 presents the scale for determining the degree of homogeneity of the dataset, depending on the values of the coefficient of variation. The higher the uneven distribution of market shares, the more concentrated is the market under equal conditions. The magnitude of the coefficient of variation indicates the intensity of the variational feature and, accordingly, the homogeneity of the dataset under study. The increase in the coefficient of variation testifies that the feature oscillates around the mean, and that the more significant is the heterogeneity of the dataset.

Table 4

Scale for determining homogeneity of the dataset

V	Degree of homogeneity of the dataset
Up to 30 %	Homogenuous
30–70 %	Average
70 % and higher	Uneven

Compiled by the author, K. Pavlov, based on: [6].

Another indicator of the degree of uneven distribution of market shares is *the entropy index* showing the mean logarithm value of the share which is inverse to the market share, and is weighed by the market shares of firms:

$$E = \sum_{i=1}^{n} S_i \ln\left(\frac{1}{S_i}\right). \qquad (14)$$

The entropy coefficient is a converse indicator of concentration: the higher its value, the lower the concentration of sellers in the market, thus, their lower ability to influence the market price [7]. If the value of the entropy index ranges from 0 to 0.5, this means that the market is monopolised or close to single monopolisation. If the value of the entropy index ranges from 0.5 to 2.0, it is an oligopolistic market. If the index value exceeds 2.0, this indicates a high level of competition in this market.

The Lorentz curve is a traditional tool for measuring the degree of inequality in income or wealth distribution of a population. This tool has begun to be used of late to assess the degree of concentration of different markets. The Lorentz curve shows which part of the total output is accounted for by a certain proportion of enterprises, which are dispersed in different groups depending on the size of the income.

The Gini G coefficient is a quantitative interpretation of the Lorentz curve, which reflects the distribution of the total amount of income of the population (firms) between its individual groups. Its value can fluctuate within the range of 0-1. A Gini coefficient approaching to zero expresses even income distribution. The higher the level of the indicator value, that is, the more it approximates to 1, the more uneven is the distributed income in the market among the society.

The central idea to be the basis of the Gini coefficient presupposes that the calculation is made using the Lorentz curve; and that extreme positions in the distribution of wealth or income between individual groups of individuals are egalitarian. To put it differently, everyone who takes part in the distribution process receives equal shares, whereas in anti-egalitarian way, one participant in the distribution process gets all the benefits. In the first case, the complete equality is observed, and in the second case, there is the absolute inequality in the distribution process.

The calculation of the Gini coefficient is based on the data on the distribution of households (firms) depending on the average household income (firm). To depict the Lorentz curve on the coordinate axes with percentiles of 0 to 100, cumulative (accumulated) results of allocations are portioned: on the horizontal axis is the quantile of the persons receiving income, on the vertical, is quantile of the received income [14].

For an even distribution of incomes, each group of people (firm) would have the same share of income. In the graph, this is depicted by the diagonal of the square and is a line of even distribution, the perfect equality line (Fig. 1). For uneven distribution, the “concentration line” is a curve with a dip. The more significant is the deviation of the Lorentz curve from the straight diagonal of the square, the more evenly distributed is the income in the market among the society.

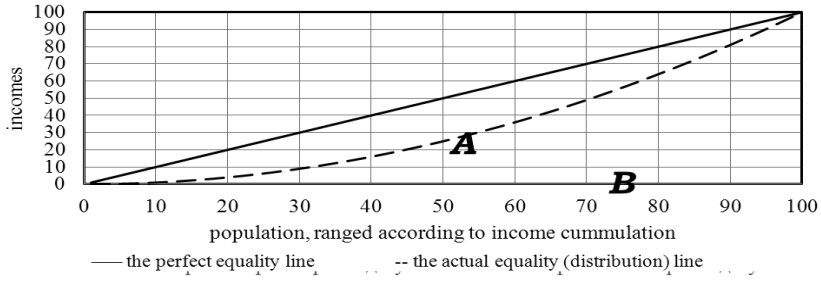

Fig. 1. The Lorentz curve (dashed line)

Built by the author K. Pavlov

The Gini coefficient helps to determine the average income difference between two recipients. Similarly, provided that the Gini coefficient is equal to 0.2, this would mean that the average difference in the income of recipients belonging to this population would be 40 % as regards the average income of the population. In developed countries the Gini coefficient is 0.25–0.35, in the underdeveloped ones it is 0.70–0.80.

The Gini coefficient is the ratio of the area of the segment A created by the Lorentz curve and the perfect equality line to the area of the below positioned triangle A + B: G = A / (A + B). For example, if the area of the curvilinear segment A is 12.000 units, the Gini coefficient is G = 12.000 / 50.000 = 0.24. Here A + B = 50.000 is the area of the lower triangle, which is half the square. The approximate trapezoidal method can be used to calculate the area of the lower segment B [491].

$$B = \\ = \frac{h}{3}\left(S_0 + 4S_1 + 2S_2 + 4S_3 + \mathbf{K} + 4S_{n-1} + S_n\right). \quad (15)$$

Where S_i - and i is the ordinate value of the Lorentz curve. The number of n values must be even. The area of the A segment is calculated by the ratio:

$$A = \frac{1}{2} - B. \quad (16)$$

Conclusions

Thus, in this article a number of methodological approaches to assessing the level of competition in the regional markets of residential real estate have been studied, systematised and suggested by the author, such as the methods of constructing integral indices of the construction market; as well as methodological approaches to determining the monopolisation level of residential real estate regional markets: the index of market concentration; the Linda Index; the Herfindahl-Hirschman Index; the Lerner indicator of monopoly power; the dispersion indicator; the entropy index; the Lorentz curve.

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