Innovative Approaches to Determining the Monopolitisation Level of Regional Primary Residential Real Estate Markets of Ukraine

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Abstract. In general terms, real estate market is a constituent of national economy, embodying a lion's share of the world's total wealth, and its stable functioning is one of the most complex market processes occurring in any state. Ukraine is currently experiencing the stage of forming a market system including the market of primary residential real estate. Due to constant demand for residential real estate, rather insufficient solvency of the population, and the disproportionality of certain regional primary residential real estate markets (RPRREM) development, the question of regional real estate markets' competitiveness and their monopolisation level are extremely significant today. For the purpose of this in-depth study, a large number of statistical, administrative, governmental, and scientific sources elaborated by leading scientists in Ukraine and abroad were processed in order to determine the state of primary real estate market in the regions of the country. A number of measuring instruments for

the monopolisation level (concentration) of regional primary residential real estate markets (RPRREM) were employed: the market concentration factor; the Herfindahl–Hirschman index; dispersion of market shares; entropy of market shares; the Gini index. The results of the study indicate that methodological approaches were generalised by the authors, as well as specific tools and methods of scientific knowledge, which, in turn, were introduced into a unified model of research with further definition of the monopolisation level of regional primary residential real estate markets (RPRREM) of Ukraine.

Introduction

Real estate markets conditioned by transformation processes in Ukraine are characterised by institutional asymmetry and structural incompleteness, and their crisis economic situation entailed by lower economy efficiency indicators, the financial and credit system's imperfection, general decline in production, shortage of real incomes, and population's social stratification reinforcement naturally slowing down their development.

When investigating regional primary residential real estate market, its integral functioning system, and the subordination of operating non-liquid commodity markets, as well as financial markets should be adhered to. Meanwhile, the inherent feature of residential real estate is the material form of existence, the space immobility and gradual transfer of market value over time. Besides, as a result of practical realisation of housing objects' purchase and sale operations, the market contributes to development of other types of economic activities creating a unique environment. Taking into account the mentioned conditions, it is possible to state that the primary market of residential real estate is one of the basic forming constituents of national economy.

The concept of competition and competitiveness has been researched by such scholars as Ohlin B. [1], Hekscher E. [2], Samuelson P. [3], Smith A. [4], Babenko V. [5], Melnyk M. [6], Suhina E. [7], Koshkalda I. [8], Vasyltsiv T. [9], Mikulikova, Z. [10]. The study focused on "compulsory nature" of products, industry and region as a production factor conditioned by competitive advantages. In fact, we believe that the competitive advantages of production factors insufficiently reflect the potential of an object. A certain region (regional market) with a high level of enormous potential as a research object can be classified as advantageous. However, Mann R. [11] believed that competitiveness of real estate is a cluster of different characteristics and distinguished them from similar objects according to the satisfaction level of an individual consumer, the cost of its purchase, operation and allocatedness by the consumer among options offered by sellers, due to significantly higher economic and technical peculiarities [11].

Consequently, the monopolisation level of regional residential real estate markets (RRREM) and competition within a certain RRREM is an important condition for

their functioning and development, as it promotes the implementation of the most efficient production methods, offers more flexible prices and new conceptual solutions [12].

Materials and Methods

The concentration of sellers reflects the relative scalability and number of construction developer companies working in the industry. Their smaller number testifies to a higher concentration level. If the number of construction developer organisations in the markets coincides and if these organisations diverge considerably, the level of concentration is higher. Although, it is of foremost importance to determine what serves as an indicator of the construction developer organisation's size and market boundaries. In order to characterise the concentration indicators of the largest construction developer organisations on a certain RRREM, a scalability indicator is used also called the threshold market share.

To analyse the state of the competitive environment, the coefficient of market concentration CR_n is calculated as the sum of market shares of the largest firms operating on the market. It characterises the percentage share of several largest enterprises in the total market volume. This indicator is calculated by the ratio:

$$CR_n = \sum_{i=1}^{n} S_i, i = 1,2, \dots, n, \tag{1}$$

where n is the number of largest firms in the market for which the indicator is calculated; Si is the share of the i-th firm in the market (in the industry).

If the concentration index approximates to a value of 100%, RRREM can be characterised by a high degree of monopolisation. The Linda index is used to determine the number of firms and those of them holding leading positions in RPRREM. With this aim, the index is calculated in several stages: first, for two largest CDOs, then for three, and etc. until the continuity of functions is disturbed:

$$IL_2 = \frac{S_1}{S_2} x 100\%, \tag{2}$$

$$\text{If, } S_1 = 50\%, S2 = 25\%, \text{ then } IL_2 = 200\%, \tag{3}$$

For three largest CDO the Linda Index is calculated by the formula:

$$IL_3 = \frac{1}{2} \left[\frac{S_1}{(S_2+S_3)/2} + \frac{(S_1+S_2)/2}{S_3} \right] x 100\%, \tag{4}$$

For four largest CDO the Linda Index is calculated by the formula:

$$IL_4 = \frac{1}{3} \left[\frac{S_1}{(S_2+S_3+S_4)/3} + \frac{(S_1+S_2)/2}{(S_3+S_4)/2} + \frac{(S_1+S_2+S_3)/3}{S_4} \right] x 100\%, \tag{5}$$

The Linda index reduction by addition of a CDO means that the core is not yet formed. Calculation of this indicator is carried out as a percentage sum of market shares squares of all entities in the market in its total volume:

$$HHI = \sum_{i=1}^{n} S_i^2, \tag{6}$$

where Si is the fraction of i-th input in the industry, in per cent; n - the number of CDO in the industry, n often taken as 50. Market shares can therefore be expressed in fractions or percentages. In the first case, the HHI will gain a value from 0 to 1, in the second case, from 0 to 10,000.

One of the main shortcomings of the HHI index is that the accuracy of its calculation requires a complete analytical basic framework for all market participants, setting which is currently complicated. The HHI index as a concentration level indicator is directly related to the Lerner's monopoly power indicator. This feature is widely used in economic research [13]. In course of microeconomics, the index characterising monopoly power is considered as a certain value, the price of which exceeds the marginal expenditure:

$$L = P - \frac{MC}{P} = -\frac{1}{e_D},$$ (7)

where P is price per item, MS marginal costs associated with the production of an additional production item, e_D is elasticity of demand for this company's price. The larger the gap between R and MS, the greater is the market monopolisation degree. The value of L ranges between 0 and 1. In perfect competition, the Lerner index is 0.

The value of the Lerner index can be directly related to HII index for the oligopolistic market, assuming that it is described through the Cournot model [13, 14, 15]. In this case, the Lerner index for an individual enterprise will be calculated according to the formula (monopoly power index):

$$L_i = \frac{s_i}{e_D}$$ (8)

in which s_i is a CDO's market share, e_D is market demand's elasticity index [12].

In this case, the average index for the industry (provided that the shares of enterprises in the market serve as scales) will be:

$$L = -\frac{HHI}{e_D},$$ (9)

There is also a dependence of the Lerner index on the concentration level to be mentioned, taking into account the consistency of enterprises' pricing policy:

for CDO - $$L_i = \frac{b}{e_D} - (1 - b)\frac{k_i}{e_D},$$ (10)

for a construction industry -, $$L = -\frac{b}{e_D} - \frac{(I-b)HHI}{e_D},$$ (11)

where b stands for an indicator of the of the CDO's pricing policy consistency (the degree of conspiracy), which acquires the value from 0, corresponding to the interaction of the CDO according to the Cournot curve, to 1, in consonance with the cartel agreement. The higher the pricing policy consistence indicator, the lower is the dependence of the Lerner index on the CDO by its market share, and for the construction industry - on the vendors concentration level. In international practice, the Gini coefficient and the Lorentz curve are used to determine the level of monopoly power

enterprises. The market shares dispersion index evaluates the degree of each CDO market share's deviation from the average market share. Market shares dispersion is calculated in concordance with the formula [16]:

$$\sigma^2 = \frac{1}{n}\sum_{i=1}^{n}\left(S_i - \frac{1}{n}\right)^2, \qquad (12)$$

where S_i is i-th CDO's share, n- total number of CDOs on the market.

The smaller the market shares dispersion index, the more homogeneous is the size of CDO and the economic entities share on the market; the lower is concentration level. Conversely, the greater the dispersion size, the more unequal is the market, the weaker is the competition and the stronger is the power of large CDO operating on this market [13]. The value of the HHI index is related to the dispersion of the CDO shares on the market by the equation as follows:

$$HHI = n\sigma^2 + \frac{1}{n}, \qquad (13)$$

In order to determine the disproportion level of market shares distribution among its participants, the variation coefficient was also used:

$$v = \frac{\sigma}{\bar{S}} \cdot 100\%, \qquad (14)$$

where $\bar{S} = \frac{1}{n}$ is the average market share.

Another indicator of the uneven distribution level of market shares is the entropy index. The entropy index shows the mean logarithm value of the number inverse to the market share, weighted by the market shares of firms:

$$E = \sum_{i=1}^{n} S_i \, In\left(\frac{1}{S_i}\right), \qquad (15)$$

The entropy coefficient is an indicator reciprocal of concentration. 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. A quantitative interpretation of the Lorentz curve is the Gini G coefficient, reflecting the distribution of the total amount of the citizens' income (firms) among their individual groups. Its value may fluctuate within the range of 0-1. If the income is evenly divided, there is an approximation of the coefficient in the direction of 0. The higher the level of the value of the indicator, that is, its approximation to 1, the more distorted are distributed incomes in the market within the society.

The Gini coefficient helps to determine the average income difference between two recipients. Similarly, provided that the Gini coefficient is equal to 0.2, it will mean that the average difference in the income of the recipients belonging to this figure will constitute 40% relative to the average income of the figure. The Gini coefficient is the ratio of the segment A area generated by the Lorentz curve and the line of even distribution to the triangle A area + B below the line of even distribution: G = A / (A + B).

$$B = \frac{h}{3}(S_0 + 4S_1 + 2S_2 + 4S_3 + \ldots + 4S_{n-1} + S_n), \qquad (16)$$

here S_i is i[th] value of the Lorentz curve ordinate.

The number of n values must be even. The area of segment A is calculated by the ratio.

$$A = \frac{1}{2} - B \qquad (17)$$

Results and Discussion

Assessment of the monopolisation level of regional primary residential real estate markets in Ukraine.

According to our proposed model of Ukraine's territory regionalisation with distinction between 6 regional markets of primary residential real estate, as reflected in Table 1: Western, Eastern, Northern, Southern, Central and Capital. Each of these markets possesses a certain degree of independence and has its own construction concentration peculiarities of primary housing stock and the intensity of CDO competition.

Table 1. Geographic and demographic features of regional primary residential real estate markets of Ukraine, as of January 1, 2019 (Indicators of the temporarily occupied territory of the Autonomous Republic of Crimea, the city of Sevastopol, Donetska and Luhanska oblasts as of January 1, 2014).

Area sq. m	per cent from the country's total area	Population, '000	per cent from the country's total
Western region: Volynska, Rivnenska, Lvivska, Ternopilska, Khmelnytska, Zakarpatska, Ivano-Frankivska, Chernivetska			
131277	21,7	10640	25,8
Cetral region: Kyivska, Zhytoyrska, Vinnytska, Cherkaska, Kirovogradska			
129964	21,6	6780,2	15,8
Northern region: Chernihivska, Sumska, Poltavska, Kharkivska			
115862	19,2	6290,9	14,7
Southern region: Odesska, Mykolayivska, Khersonska, AR Crimea			
112450	18,6	4601,6	10,8
Eastern region: Dnipropetrovska, Zaporizka, Donetska, Luhanska			
112295	18,6	11444	26,1
Capital region: KYIV			
839	0,1	2916,2	6,8
Total throughout Ukraine			
603766	100	42672,9	100

Sources: developed by the author based on data [17]

Analysis of the competitive situation that occurs between the CDOs as of January 1, 2019, within the framework of regional markets for primary housing construction, was carried out due to proposed methodological approaches to determine the monopolisation degree of regional primary residential real estate markets.

Thus, Western Regional Real Estate Market (RPRREM) must be considered first, characterised by the highest level of primary housing construction intensity. The statistics on developer companies and the number of construction sites for this region in

2018 are given in Table 2. Based on these data, degree of concentration and competition intensity in primary residential real estate market was assessed. The total number of operating construction companies in the region is 128, the total number of units under construction is 362.

This is how the market concentration ratio CRn is calculated for three, four, five, and seven largest developers. According to what we have:
$$CR_3 = 9.1\%; CR_4 = 11.9\%; CR_5 = 14.4\%; CR_7 = 19.3\%$$

The value of $CR_4 = 11.9\%$ means that the four largest companies, "RIEL", "BC Melnyk", "Dita and Ternopilbud", comprise 11.9% of the market. The five largest companies possess 14.4% of the market, seven companies 19.3% of the Western RPREM's. Since all calculated coefficients do not exceed 40%, according to V.G. Shepherd's classification. This proves the absence of monopoly and a high level of competition in primary residential real estate market of Western RPRREM.

Table 2. Calculation of primary housing market concentration for Western RPRREM.

№ п/п	Company	Number of objects	Si	HHI	Dispersion indicator	Entropy index	Sn	Fn
1	"Frankivskyi Dim"	1	0.0028	0.000008	0.0000	0.0163	0.003	0.008
2	LLC BC "Victoriya"	1	0.0028	0.000008	0.0000	0.0163	0.006	0.016
3	LLC "Rivnenskyi MZK"	1	0.0028	0.000008	0.0000	0.0163	0.008	0.023
4	JE "Lutsktekhnobud"	1	0.0028	0.000008	0.0000	0.0163	0.011	0.031
5	SB "Group"	1	0.0028	0.000008	0.0000	0.0163	0.014	0.039
6	"Fine City Development" Company	1	0.0028	0.000008	0.0000	0.0163	0.017	0.047
7	IDK "FD Group"	1	0.0028	0.000008	0.0000	0.0163	0.019	0.055
8	HCC "Ridnyi DIM"	1	0.0028	0.000008	0.0000	0.0163	0.022	0.063
9	GC "RANG"	1	0.0028	0.000008	0.0000	0.0163	0.025	0.070
…	…	…	…	…	…	…	…	…
109	"City of Dreams"	5	0.0138	0.000191	0.0000	0.0591	0.594	0.852
110	"Zelenyi Dvir"	5	0.0138	0.000191	0.0000	0.0591	0.608	0.859
111	"Halytska Budivelna Gildiia"	5	0.0138	0.000191	0.0000	0.0591	0.622	0.867
112	"Hazda"	5	0.0138	0.000191	0.0000	0.0591	0.635	0.875
113	"SK Group"	6	0.0166	0.000275	0.0001	0.0680	0.652	0.883
114	"Listyng"	6	0.0166	0.000275	0.0001	0.0680	0.669	0.891
115	"Creator Bud"	6	0.0166	0.000275	0.0001	0.0680	0.685	0.898
116	"Vambud"	6	0.0166	0.000275	0.0001	0.0680	0.702	0.906
117	"Blago"	6	0.0166	0.000275	0.0001	0.0680	0.718	0.914
118	"HalZhytlobud"	7	0.0193	0.000374	0.0001	0.0763	0.738	0.922
119	"Budivelnyi Alliance Group"	8	0.0221	0.000488	0.0002	0.0842	0.760	0.930
120	"Bever-Alliance"	8	0.0221	0.000488	0.0002	0.0842	0.782	0.938

121	BO "Lutsksatechmon-tazh" №536	9	0.0249	0.000618	0.0003	0.0919	0.807	0.945
122	"Yarovytsia"	9	0.0249	0.000618	0.0003	0.0919	0.831	0.953
123	"Integral-Bud"	9	0.0249	0.000618	0.0003	0.0919	0.856	0.961
124	"Halytskyy Dvir"	9	0.0249	0.000618	0.0003	0.0919	0.881	0.969
125	"Ternopilbud"	10	0.0276	0.000763	0.0004	0.0991	0.909	0.977
126	"Dita"	10	0.0276	0.000763	0.0004	0.0991	0.936	0.984
127	BC "Melnyk"	11	0.0304	0.000923	0.0005	0.1062	0.967	0.992
128	"RIEL"	12	0.0331	0.001099	0.0006	0.1129	1.000	1.000
	Total	362	1.0000	0.0137	0.0059	4.5488	37.547	64.500

Sources: developed by the author based on data [17]

The Linda index was calculated to assess the relationship between largest enterprises which constitute the "core" of primary real estate market. This index facilitates to determine which CDOs hold the dominant position on Western RPRREM. According to the obtained results, the meanings are as given below:

$$IL_2 = 109.1\%; IL_3 = 71.8\%; IL_4 = 79.3\%$$

The index growth on the third step means that the "core" of primary residential real estate market in Western region is formed by two largest companies: "RIEL" and "BC Melnyk". To assess the distribution of "market power" among all market actors, the Herfindahl-Hirschman index HHI was calculated, which resulted in:

$$HHI = 1.9$$

Followed by the calculations, we concluded that Western RPRREM, which is investigated, is a market for perfect competition. This is due to the large number of CDOs, most of which build one or two primary housing stock.

To estimate uneven distribution of market shares, the entropy coefficient and the dispersion index of market shares were calculated. Accordingly, the value of the dispersion index was obtained:

$$\sigma^2 = 0.00005$$

Hence, it is inferred that primary Western RPRREM is low-dispersed. In fact, a severe competition is observed and there is not a single dominating firm. The coefficient of variation for this market is:

$$V = 87\%$$

This explicates the heterogeneity of real estate market with both large CDO-leaders and small ones managing one or two housing projects. However, most CDOs carry provides services to one or two objects. The number of such CDOs is 78 (60.9%) from the total 128 CDOs on the market. Then the entropy of the CDO market shares was calculated, according to which:

$$E = 4.55$$

The high level of entropy indicates a high level of competition in Western RPRREM. The Gini coefficient was calculated with the use of previously applied methodological approaches:

$$G = 0.42$$

This value of Gini coefficient indicates a fairly significant differentiation of market shares possessed by different CDOs and, a correspondingly significant differentiation

in their revenues. In fact, we conclude that the average difference in market shares is 84% of this share's value.

Central RPRREM was studied next, which is, like Western RPRREM, characterised by a high degree of construction intensity. To the Central RPRREM we assigned: Kyivska, Zhytomyrska, Vinnitska, Cherkaska and Kirovogradska oblasts. The statistical data on the CDOs and the number of objects under construction for this RPRREM in 2018 are given in Table 3. Using the above indicators, the intensity of competition within Central RPRREM was calculated. The total number of operating CDOs in Central RPRREM is 92, the total number of objects under construction is 171. After that, the CRn market concentration ratio was calculated for three, four, five, and seven largest CDOs. According to this:

$$CR_3 = 11.7\%; \ CR_4 = 14.6\%; \ CR_5 = 17.5\%; \ CR_7 = 22.2\%.$$

Table 3. Calculation of primary housing market concentration for Central RPRREM.

№ п/п	Company	Number of objects	Si	HHI	Dispersion index	Entropy index	Sn	Fn
1	PE "RESPECT"	1	0.0058	0.000034	0.0000	0.0301	0.006	0.011
2	HC "Kyivskyi kvartal"	1	0.0058	0.000034	0.0000	0.0301	0.012	0.022
3	HC "Campa"	1	0.0058	0.000034	0.0000	0.0301	0.018	0.033
4	"Finansovyi budivelnyi holding"	1	0.0058	0.000034	0.0000	0.0301	0.023	0.043
5	"Ukrzhytloinvest	1	0.0058	0.000034	0.0000	0.0301	0.029	0.054
6	"TrestBoryspilsilbud"	1	0.0058	0.000034	0.0000	0.0301	0.035	0.065
7	"TEOS Developer Group"	1	0.0058	0.000034	0.0000	0.0301	0.041	0.076
8	"Sfera zhytlobud"	1	0.0058	0.000034	0.0000	0.0301	0.047	0.087
9	"Strakhovskyi Group"	1	0.0058	0.000034	0.0000	0.0301	0.053	0.098
10	"Serviszemproekt"	1	0.0058	0.000034	0.0000	0.0301	0.058	0.109
…	…	…	…	…	…	…	…	…
75	"R-Building"	3	0.0175	0.000308	0.0000	0.0709	0.585	0.804
76	"Novyi Dim"	3	0.0175	0.000308	0.0000	0.0709	0.602	0.815
77	"Druzi Development"	3	0.0175	0.000308	0.0000	0.0709	0.637	0.837
78	"Dovira Development"	3	0.0175	0.000308	0.0000	0.0709	0.655	0.848
79	"Global Development"	3	0.0175	0.000308	0.0000	0.0709	0.673	0.859
80	"Budregioninvest"	3	0.0175	0.000308	0.0000	0.0709	0.690	0.870
81	BC "Forum "	3	0.0175	0.000308	0.0000	0.0709	0.708	0.880
82	"BD Holding"	3	0.0175	0.000308	0.0000	0.0709	0.725	0.891
83	"Alliance Novobud"	3	0.0175	0.000308	0.0000	0.0709	0.743	0.902
84	"In-build"	3	0.0175	0.000308	0.0000	0.0709	0.760	0.913

85	"Evrodim.com"	3	0.0175	0.000308	0.0000	0.0709	0.778	0.924
86	"Atlant"	4	0.0234	0.000547	0.0002	0.0878	0.801	0.935
87	"AVM Development Group"	4	0.0234	0.000547	0.0002	0.0878	0.825	0.946
88	"NovaBudova"	5	0.0292	0.000855	0.0003	0.1033	0.854	0.957
89	"Vinnytsiabud"	5	0.0292	0.000855	0.0003	0.1033	0.883	0.967
90	"Building Company Nadiia"	6	0.0351	0.001231	0.0006	0.1175	0.918	0.978
91	"Arial Investment Development"	6	0.0351	0.001231	0.0006	0.1175	0.953	0.989
92	"ProfGroup"	8	0.0468	0.002189	0.0013	0.1433	1.000	1.000
	TOTAL	171	1.0000	0.016176	0.005306	4.33075	31.82	46.50

Sources: developed by the author based on data [17]

The value of $CR_3 = 11.7\%$ means that the market share of 11.7% is possessed by the three largest companies – "Profgroup", "Arial Investment Development" and "Nadiia Building Company". The five largest companies occupy 17.5% of the market, seven companies – 22.2% of Central RPRREM. Since all calculated coefficients do not exceed the value of 40%, according to the V.G. Shepherd's classification this is proves the absence of monopoly and a high level of competition in Central Regional Primary Real Estate Market.

The Linda index was calculated to estimate the relations between the largest CDOs comprising the "core" of primary residential real estate market. This index explicates which CDOs hold the dominant position in primary housing market. As a result:

$$IL_3 = 133.3\%; IL_3 = 75.0\%; IL_4 = 92.1\%.$$

The growth of index on the third step means that the "core" of the Central RPRREM is formed by two largest companies: "Profgroup" and "Arial Investment Development". For the estimation of "market power" distribution among all market participants, the Herfindahl-Hirschman index was calculated, which resulted in:

$$HHI = 162.$$

This value is much greater than the value of the HHI for Western RPRREM. On the other hand, according to the provided classification, Central RPRREM is characterised by perfect competition.

The entropy coefficient and the dispersion index of market shares is to be calculated. According to this the index of dispersion is obtained:

$$\sigma^2 = 0.00006$$

Consequently, Central RPRREM is marked by low-dispersion. In other words, there is a tough competition and the lack of dominance of one or two CDOs. The coefficient of variation for this market is:

$$V = 70\%$$

This testifies to the low level of heterogeneity of Central RPRREM. Although there are both small and large CDOs, the majority of the CDO manage one or two objects. There are 72 small CDO of this (78.3%) within 92 BOD on the market.

The next step was to determine the entropy value of CDO market shares. According to the calculations the following was retrieved:

$$E = 4.33$$

The high level of entropy indicates high competition on the market. The value of Gini coefficient was calculated accordingly:

$$G = 0.32$$

Such value of the Gini coefficient explicates a smaller differentiation of market shares, held by different CDOs than that of Western RPRREM. The market is fairly homogeneous, CDO market shares differ by 64% of this share.

Based on the methodological and practical approach described above, we conducted a study on the level of competition between the construction market for primary housing and for other regions of Ukraine: Northern RPRREM; Southern RPRREM; Eastern RPRREM; Capital RPRREM. The grouped and systematised results of our studies are given in Table 4.

Table 4. Monopolisation Level Characteristics of Regional Primary Residential Real Estate.

RPRREM	CR$_5$, %	Number of firms in the "core"	HHI	σ^2	V	E	G	Market Type
Western	14.4	2	2	0.00005	0.87	4.55	0.42	Perfect competition
Central	17.5	2	162	0.00006	0.70	4.33	0.32	Perfect competition
Capital	39.8	3	485	0.00056	1.23	3.47	0.50	Perfect competition
Southern	55.9	2	1142	0.00254	1.66	2.85	0.53	Compet. with Monopoly El.
Northern	58.3	2	890	0.00198	1.02	2.72	0.49	Compet. with Monopoly El.
Eastern	48.5	3	725	0.00094	0.55	2.75	0.29	Compet. with Monopoly El.

Conclusions

The analysis of the table indicates that there is a situation close to perfect competition for three RPRREMs (Western, Central and Capital). In each of these markets there is a large number of CDOs (50-100) and there is no apparent predominance of one or two separate CDOs. The CR$_5$ concentration index does not exceed 40%. The Herfindahl-Hirschman index does not exceed 500. The entropy index exceeds 3 which indicates a high level of competition in these markets.

On another three RPRREMs (Southern, Northern and Eastern regions), a market situation is observed as "competition with the elements of a monopoly". The number of builders is smaller (20-30), and, at the same time, there are several CDOs – outstanding leaders in terms of the number of objects under construction. The CR$_5$ concentration index ranges within 50% – 60%. The Herfindahl-Hirschman index is 700–1100. The entropy index exceeds – 2, which indicates a fairly high level of competition on the RPRREM. The value of Gini coefficient for Central and Eastern RPRREMs is the lowest indicating the high homogeneity of these markets. The value of Gini coefficient for the Capital, Northern and Southern RPRREM is significantly higher, indicating the presence of leading CDO building up a large number of residential properties in primary housing stock.

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