

REAL ESTATE MARKET ANALYSIS

08

HEDONIC INDEX OF REAL ESTATES

In December 2022, the CBCG conducted its regular survey on the movement of real estate prices in Podgorica. The survey questions concerned the qualitative characteristics of housing units (manner of heating; internet connection; number of rooms; number of balconies; etc.), aiming to assess relative effects of such qualitative characteristics on the value of a housing unit. A subjective value of a housing unit was assessed with the following question: *Which is the price that a housing unit owner would not go below at this moment?* The collected data were used to calculate the Hedonic index of real estate prices which measures the effect of such qualitative characteristics on the value of a housing unit.

The calculation of an average price per square meter in December 2022 was based on a sample of 58,295 apartments in the locations Podgorica 1, Podgorica 2, and Podgorica 3. The survey included a random sample of 1,780 owners of housing units and 403 questionnaires were successfully completed. This means that the total response rate was 22,6%.

The results of the December 2022 survey showed that the average price of a square meter of real estate units in Podgorica amounted to 1,298.5 euros, which is an 18.7% increase year-over-year.

Table 8.1

Summary statistics of average values of apartments per square meter in Podgorica, on quarterly basis, in the period September 2007 - December 2022			
Period	Price in euros	Chain index	Base index
September 2007	1,697.6	100.0	100.0
March 2008	1,738.3	102.4	102.4
September 2008	1,525.5	87.8	89.9
March 2009	1,402.1	91.9	82.6
September 2009	1,223.1	87.2	72.0
March 2010	1,128.3	92.2	66.5
June 2010	1,191.5	105.6	70.2
September 2010	1,177.1	98.8	69.3
December 2010	1,185.2	100.7	69.8
March 2011	1,171.2	98.8	69.0
June 2011	1,163.0	99.3	68.5
September 2011	1,174.0	100.9	69.2
December 2011	1,151.2	98.1	67.8
January 2012	1,168.3	101.5	68.8
June 2012	1,179.6	101.0	69.5
September 2012	1,172.3	99.4	69.1
December 2012	1,171.6	99.9	69.0
March 2013	1,169.4	99.8	68.9
June 2013	1,069.8	91.5	63.0
March 2014	971.4	90.8	57.2
September 2014	950	97.8	56.0
March 2015	920.8	96.9	54.2
September 2015	939	102.0	55.3
March 2016	965	102.8	56.8
June 2016	1,019.9	105.7	60.1
September 2016	915.6	89.8	53.9
December 2016	919	100.4	54.1
March 2017	901	98.0	53.1
June 2017	950	105.4	56.0
September 2017	920	96.8	54.2
December 2017	939.7	102.1	55.4
June 2018	1,052.7	112	62.0
December 2018	988.1	93.9	58.2
June 2019	1,033.2	104.6	60.9
December 2019	1,045.2	101.2	61.6
July 2020	1,064.2	101.8	62.7
December 2020	1,004	94.3	59.1
June 2021	1,079.2	107.5	63.6
December 2021	1,094	101.4	64.4
July 2022	1,248.8	114.2	73.6
December 2022	1,298.5	104.2	76.5

Source: CBCG calculations

The average price of an apartment square meter was the highest in the first zone and it amounted to 1,578.4 euros. In the second and third zones, the prices per square meter were lower and amounted to 1,336.6 euros and 1,135.3 euros, respectively.

Table 8.2

Summary statistics of average values; standard deviation; minimum and maximum prices by housing category in Podgorica; December 2022 in euros					
Variable	Number of observations (valid)	Medium value	Standard deviation	Minimum price	Maximum price
Average housing price per square meter	403	1,298.5	254.1	583	2,192
Average housing price per square meter - apartment	277	1,390.7	216.5	746.3	2,192
Average housing price per square meter - house	126	1,095.7	209.3	583	2,000

Source: CBCG calculations

Most of the sampled residential facilities are apartments (68.7%) and the remaining are houses (31.3%). The price of individual housing units ranged between 2,192 euros/m² at high-end city locations to 583 euros/m² at locations further away from the city centre.

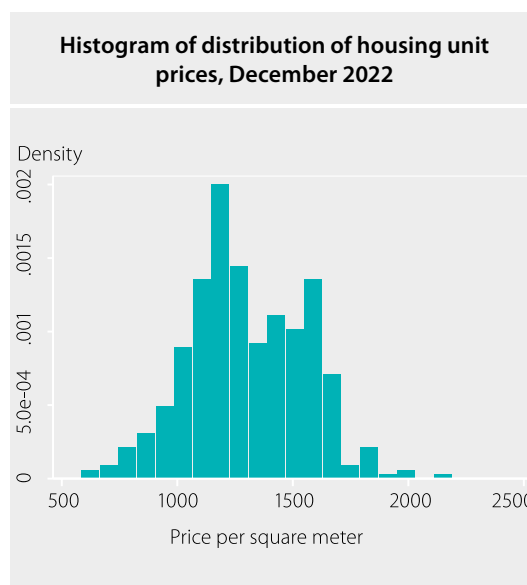
The available data provided for the preparation of an econometric hedonic real estate model which assesses the effect of qualitative characteristics of a housing unit on the price of that unit. Graph 8.1 shows the price range of housing units, and this price is also the dependant variable in the model.

In order to achieve a normal distribution, the value of standard errors necessary when applying the econometric method of the ordinary least square (OLS) and the interpretation of results in the form of percentage changes, prices per square meter are logarithmic. The independent variables used were qualitative characteristics related to the type of a residential unit (apartment or house), square metres, age, location, as well as the type of heating, the number of balconies, the number of rooms, available internet connection, telephone connection, and a parking space.

Table 8.3 shows the empirical results of using the average housing unit price model, based on data for December 2022. The diagnostic tests showed that the model was very well specified; there were no problems either with its multicollinearity (low values of the variance inflation factor - VIF, i.e. under 10) or with the functional form (*Ramsey Reset Test*).

The empirical results of the model of average housing unit price indicate that, measured by the level of statistical significance, the price of a housing unit is exclusively affected by the location and the type of building (an apartment or a house). By averaging the results and analysing other factors we come to

Graph 8.1



Source: CBCG calculations

the conclusion that a square meter of an apartment is more expensive than a square meter of a house and that housing units in the first and second zones in Podgorica are the most expensive. In this iteration, characteristics such as age, number of rooms and balconies, ownership of a garage, telephone and type of heating did not have a significant impact on the price per square meter.

Table 8.3

Empirical results of the average housing price model in Podgorica, December 2022			
Variable	Ratio	Standard error	P>t
Dependent variable: ln (msqr price)			
Ln (square meters)	-0.023	0.051	0.650
Podgorica 1	0.275***	0.023	0.000
Podgorica 2	0.153***	0.017	0.000
Apartment	0.168***	0.022	0.000
Over 65 square meters	0.026	0.022	0.227
Over 10 years old	0.008	0.029	0.782
Over 6 storeys	0.001	0.029	0.977
0 balconies	0.000	0.076	0.999
1 balcony	0.040	0.041	0.335
2 balconies	0.031	0.033	0.357
0 rooms	-0.047	0.135	0.727
1 room	-0.015	0.041	0.703
2 rooms	-0.041	0.026	0.120
Telephone	0.042	0.096	0.661
Electricity	-0.027	0.021	0.192
Internet connection available	0.077	0.057	0.182
Garage available	0.028	0.024	0.247
Constant	6.89***	0.260	0.000
No. of observations	403	Diagnostics: VIF= 3.13; Ramsey RESET test: Prob > F = 0.3952	
R_squared	0.60		

Note: *** significance at 1%, ** significance at 5%, * significance at 10%

ln - natural logarithm; msqr - square meters

Source: CBCG calculations

Table 8.4 shows the real estate price trends in selected countries according to the *Global Property Guide Report*. As it can be seen, divergent developments in real estate prices were present in Q4 2022: the highest annual growth was recorded in Turkey (63.02%), and the highest annual decline in Argentina (-51.76%).

Table 8.4

Real estate prices in selected countries ⁹¹ (ranked according to annual growth in Q1 2022)				
Country	Annual change Q4 2021, in %	Trend assessment	Annual change Q4 2022, in %	Quarterly change, Q4 2022, in %
Turkey	17.37	↑	63.02	6.89
Vietnam (HCMC)	8.42	↑	10.07	-8.37
Russia	6.13	↑	9.96	0.70
Iceland	10.22	←	9.78	-1.26
Portugal	8.93	↓	7.74	-0.16
Sri Lanka	-9.60	↑	6.05	31.75
Israel	5.79	←	5.52	0.79
Japan (Tokyo)	10.65	↓	4.80	0.24
Taiwan	11.71	↓	4.78	-2.02
Chile	4.79	←	4.31	-2.28
UAE (Dubai)	8.10	↓	4.14	1.69
Georgia	-11.21	↑	4.03	4.73
Egypt	-2.21	↑	3.37	13.92
Montenegro	10.14	↓	2.86	3.67
Puerto Rico	4.16	↓	2.41	4.86
Mexico	1.46	→	2.23	0.60
Singapore	6.40	↓	2.05	-0.34
China (Beijing)	6.74	↓	1.94	-0.31
North Macedonia	8.44	↓	1.66	-0.12
USA (FHFA)	10.49	↓	1.22	-0.03
Switzerland	-0.11	→	0.67	1.07
Slovakia	18.37	↓	-0.18	-4.63
Estonia	0.60	←	-0.20	4.71
Ireland	8.24	↓	-0.35	-0.37
Saudi Arabia	0.59	↓	-0.43	0.17
Spain	-3.51	↑	-0.64	1.11
Brazil	-5.39	↑	-0.68	-0.22
Qatar	-4.06	↑	-0.69	1.60
Thailand	0.23	↓	-1.13	2.14
Lithuania	10.70	↓	-2.17	-0.49
Indonesia	-0.28	↓	-3.36	-0.52
India (New Delhi)	2.59	↓	-3.43	-1.49
Norway	3.62	↓	-3.77	-5.00
The Philippines	-9.32	↑	-3.82	-0.62
Canada	10.17	↓	-3.82	-5.04
Great Britain	5.50	↓	-4.21	-5.24
Malta	4.73	↓	-4.26	3.56
South Africa	-2.06	↓	-4.28	-0.49
Ukraine (Kyiv)	-3.09	↓	-5.01	0.08

⁹¹ Inflation adjusted data.

Country	Annual change Q4 2021, in %	Trend assessment	Annual change Q4 2022, in %	Quarterly change, Q4 2022, in %
Austria (Vienna)	6.99	↓	-5.28	-4.65
The Netherlands	13.83	↓	-6.26	-2.23
Denmark	5.39	↓	-6.45	-2.21
France	0.55	↓	-6.56	-0.44
Romania	8.91	↓	-7.49	-3.98
Morocco	-10.54	↑	-7.54	-1.38
South Korea	15.89	↓	-7.74	-3.74
Macao	-1.55	↓	-8.33	-1.17
Pakistan	11.65	↓	-8.86	-3.95
Italy	-2.25	↓	-9.34	-2.18
Australia (8 capitals)	17.57	↓	-9.96	-5.30
Finland	1.36	↓	-10.20	-3.21
Germany	7.68	↓	-11.78	-5.89
Sweden	12.06	↓	-13.35	-8.53
Poland (Warsaw)	2.99	↓	-13.57	-2.52
Latvia (Riga)	3.57	↓	-15.95	-4.58
Hong Kong	1.25	↓	-16.81	-7.89
Colombia (Bogota)	-3.89	↓	-17.38	-3.93
New Zealand	14.02	↓	-18.13	-4.00
Argentina (Buenos Aries)	-36.88	↓	-51.76	-15.61

Note:

↑ = increase in property price of more than 1 percentage point

→ = increase in property price of less than 1 percentage point

↓ = decrease in property price of more than 1 percentage point

← = decrease in property price of less than 1 percentage point compared to the price in the same period last year

Source: Global property guide, Q4 2022