

REAL ESTATE MARKET ANALYSIS

08

HEDONIC INDEX OF REAL ESTATES

In June 2023, the Central Bank conducted a regular survey on real estate price trends in Podgorica. The questions in the questionnaire related to the qualitative characteristics of the apartments (heating method, internet connection, number of rooms, number of balconies, etc.) aiming to assess relative effects of such characteristics on the value of the apartment. A subjective value of a housing unit was assessed with the following question: *Under what price would the apartment owners not sell the apartment at the time of asking the question?* 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 June 2023 was based on a sample of 58.296 apartments in the locations Podgorica 1, Podgorica 2 and Podgorica 3. The survey included a random sample of 2.000 owners of housing units, whereby 411 questionnaires were successfully completed. This means that the total response rate was 22.55%.

The results of the June 2023 survey showed that the average price of a square meter of real estate units in Podgorica amounted to 1,478.63 euros, which is 18.4% increase in relation to June 2022.

Table 8.1

Summary statistics of average values of apartments per square meter in Podgorica, on quarterly basis, in the period September 2007 - June 2023			
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	114.1	73.6
December 2022	1,298.5	104.0	76.5
June 2023	1,478.6	113.9	87.1

Source: CBCG calculations

Based on the sample, the average price of an apartment was the highest in the second zone and amounted to 1,769.96 euros. In the first and third zones, the prices per square meter were lower and amounted to 1,559.26 euros and 1,317.68 euros, respectively.

Table 8.2

Summary statistics of average values; standard deviation; minimum and maximum prices by housing category in Podgorica; June 2023 in euros					
Variable	Observation (valid)	Medium value	Standard deviation	Minimum price	Maximum price
Average housing price per square meter	395	1,478.6	358.9	666.7	3,571.4
Average housing price per square meter - apartment	315	1,519.9	343.3	882.4	3,571.4
Average housing price per square meter - house	80	1,316.2	374.7	666.7	2,666.7

Source: CBCG calculations

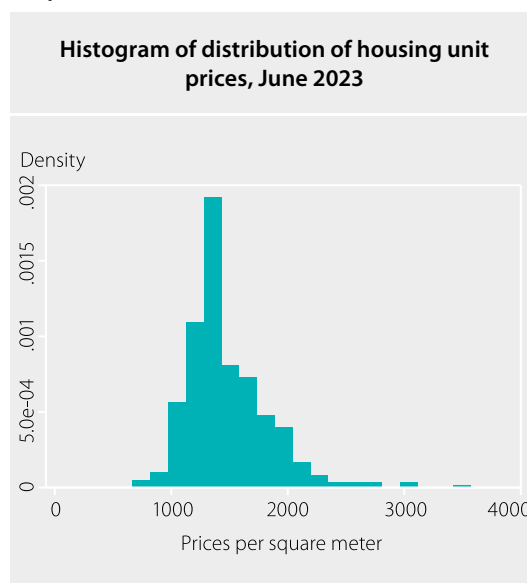
In the processed sample, the majority of residential buildings were apartments (79.7%), and a smaller part was houses (20.3%). The prices of residential buildings per square meter, on an individual level, range from about 3,571.4 euros in more exclusive locations to about 666.7 euros in neighbourhoods further 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 distribution of housing prices, and this price is also the dependent variable in the model.

In order to obtain a normal distribution of standard error values necessary when applying the econometric method of least squares (*ordinary least square - OLS*) and interpreting the results in the form of percentage changes, the prices per square meter are logarithmic. Qualitative characteristics related to the type of housing (apartment or house), square footage, age, location, as well as type of heating, number of balconies, number of rooms, possession of internet connection, telephone connection and garage space were used as independent variables. Also, in order to achieve a proper functional form, real estate of extremely high/low values, as well as low-quality data (for example, observed errors when entering the qualitative characteristics of a residential building) are excluded. This reduced the sample for modelling purposes to 395 observations.

Table 8.3 shows the empirical results of using the average housing price model, based on data for December 2022. Diagnostic tests of the model indicate that the model is well specified, that there are no problems with its multicollinearity (low VIF value, i.e. below 10), as nor with the functional form (*Ramsey Reset Test*).

Graph 8.1



Source: CBCG calculations

The empirical results of using the model of the average price of housing indicate that, measured by the level of statistical significance, the price of a residential building is affected by the location of the building, the type of building (apartment or house), the ownership of a garage and the number of rooms. On average, and after controlling for other factors, it is concluded that a square meter of an apartment is more expensive than a square meter of a house, and that buildings in the first and second zones of Podgorica are more expensive. Having a garage increases the value of the property. Residential buildings with more than two bedrooms have higher prices. In this iteration, characteristics such as age, number of balconies, having an elevator, 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, June 2023			
Variable	Ratio	Standard error	P>t
Dependent variable: Ln (msqr price)			
Ln (square meters)	-0.034	0.064	0.588
Podgorica 1	0.101***	0.033	0.003
Podgorica 2	0.272***	0.022	0.000
Apartment	0.177	0.040	0.000
up to 65 m ²	-0.029	0.039	0.458
up to 6 floors	0.019	0.038	0.624
Elevator	0.017	0.021	0.414
up to 5 years old	-0.006	0.046	0.888
from 5 to 10 years old	0.044	0.054	0.414
0 balconies	-0.035	0.089	0.695
1 balcony	0.046	0.067	0.493
2 balconies	0.054	0.057	0.349
0 rooms	-0.069	0.098	0.482
1 room	-0.055	0.056	0.330
2 rooms	-0.092**	0.037	0.012
Electricity	-0.061	0.037	0.104
Garage available	0.141**	0.065	0.030
Constant	7.232***	0.328	0.000
No. of observations	395	Diagnostics: VIF=3.08; Ramsey RESET test: Prob > F = 0.026	
R_squared	0.37		

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

Ln - natural logarithm

Source: CBCG calculations

Table 8.4 shows the real estate price trends in selected countries according to the report of the *Global Property Guide*. As can be seen, in the first quarter of 2023, divergent trends in real estate prices are present: the highest annual growth was recorded in Turkey (54.74%), and the highest annual decline in Argentina (-53.70%).

Table 8.4

Real estate prices in selected countries, ⁵⁷ (ranked according to annual growth in the first quarter of 2023)				
Country	Annual change Q1 2022, in %	Trend assessment	Annual change Q1 2023, in %	Quarterly change, Q1 2023, in %
Turkey	30.30	↑	54.74	8.53
North Macedonia	5.45	↑	12.65	4.82
Portugal	10.53	↓	8.49	3.62
UAE (Dubai)	9.43	↓	8.08	5.14
Vietnam (HCMC)	15.39	↓	6.74	1.94
Singapore	2.22	↑	5.59	1.99
Sri Lanka	-19.84	↑	5.07	0.74
Israel	2.23	↑	-3.95	-0.02
Mexico	0.41	↑	3.94	1.59
Spain	-7.61	↑	3.92	1.79
Japan (Tokyo)	9.49	↓	3.40	-0.44
Iceland	11.64	↓	3.23	-3.37
Malta	-2.76	↑	3.19	5.43
China (Beijing)	5.53	↓	3.05	2.42
Taiwan	10.49	↓	2.62	0.72
Thailand	1.48	↑	1.92	0.61
Switzerland	-0.65	↑	0.69	-0.26
Brazil (Sao Paulo)	-6.39	↑	0.14	-1.02
Puerto Rico	-7.02	↑	-0.29	-0.45
Lithuania	4.69	↓	-0.95	-1.81
Chile	4.49	↓	-1.17	-2.03
Malaysia	0.19	↓	-1.38	-0.58
USA (FHFA)	10.03	↓	-1.44	-0.55
Cambodia	-20.43	↑	1.48	-1.12
Russia	18.78	↓	-2.28	-1.08
France	3.55	↓	-3.12	-2.50
Indonesia	-0.51	↓	-3.28	-0.50
The Philippines	-6.53	↑	-3.44	-0.06
Ireland	7.79	↓	-3.46	-3.38
India (New Delhi)	-2.14	↓	-3.77	0.38
Ukraine (Kyiv)	-5.67	↑	-3.86	-0.50
Montenegro	-5.49	↑	-4.04	-4.37
USA (Case Shiller)	11.25	↓	-4.15	-1.27
Estonia	1.35	↓	-4.33	-4.39
South Africa	-1.83	↓	-4.81	-2.00
Macao	-1.50	↓	-4.98%	0.32
Italy	-4.70	←	-5.38	0.39
Norway	3.26	↓	-6.27	1.20
Qatar	-1.44	↓	-6.44	-2.51

⁵⁷ Inflation adjusted data.

The Netherlands	8.90	↓	-6.46	0.38
Morocco	-10.19	↑	-7.50	-2.54
Egypt	1.57	↓	-7.85	-6.74
Denmark	2.69	↓	-7.94	-2.16
Romania	2.50	↓	-7.95	-0.28
Pakistan	-6.30	↓	-8.66	-4.98%
Austria (Vienna)	5.68	↓	-8.70	-1.99
Canada	11.01	↓	-8.70	-3.66
South Korea	10.49	↓	-8.98	-3.85
Great Britain	6.73	↓	-9.19	-3.52
Hong Kong	-3.81	↓	-9.36	4.19
Slovakia	12.88	↓	-11.53	-7.77
Finland	-0.47	↓	-12.10	1.23
Australia (8 capitals)	12.18	↓	-12.59	-1.99
Germany	7.20	↓	-14.81	-3.01
Colombia (Bogota)	-9.42	↓	-17.50	-7.98
Sweden	7.81	↓	-18.19	-5.89
New Zealand	0.93	↓	-18.38	-3.09
Latvia (Riga)	4.64	↓	-18.66	-2.59
Argentina (Buenos Aries)	-40.05	↓	-53.70	-18.51

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, Q1 2023