

The Model for Determining the Market Value of Residential Properties in Tirana City

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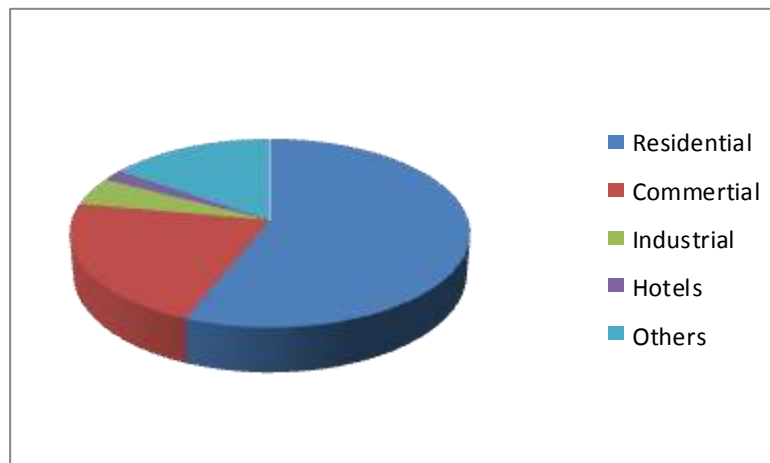
Abstract: Residential properties, even in Tirana City, represent the biggest group of real estate. As the most important part of real estate market there is a need for the evaluation of these properties for different purposes. The main basis of evaluation is the market value. Market value is a function of market conditions and the attributes of the property itself. Every residential property can be viewed as consisting of a bundle of attributes, some related to the physical features of the property, some related to the location and a third group related to the building design.

This paper attempts to show which model of hedonic price can be suitable for determining the market values of residential properties in Tirana City.

Keywords: residential property, hedonic price, regression analysis

1. Introduction

The real estate constitutes one of the most valuable assets for the state and individuals and therefore its valuation assumes a special importance. In Albania during these 20 years apart of birth, configuration and empowering the real estate market has increased and the range of purposes for which the assessments are carried out. In total stock of properties (even in Albania), residential properties make up the largest group (graph. 1). [1]



Graphic.1 **Distribution (%) of properties by types** (Source INSTAT, 2012)

Assessment of residential properties is mostly required for purpose of selling and buying, renting, mortgage purposes. The basis of evaluation for these purposes is the market value. Market value is the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's-length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently and without compulsion. [2] [3]

Are known and acceptable differences in values reported by different appraisers for the same property, at a given moment of time and for the same purpose of evaluation, precisely because the assessment is the art of analysis and interpretation of other transactions carried out in the recent past, under the optics of market characteristics and individual characteristics that each property has.

This paper attempts to give the answer to the question: Which is the most suitable price model that can be used in the process of determining the market value of the residential properties in the actual conditions of the property market in Albania, in order to narrow the differences.

2. Materials and Methods

2.1. Residential Properties and Methods Of Valuation

Residential property is any property that is used as, or is suitable for use as a residence. [4]

The Comparison Method of Valuation is the most common approach used for the appraisal of residential properties. This method entails making a valuation by directly comparing the property under consideration with similar properties which have been sold in the past, using the evidence of those transactions to assess the value of the property under consideration. [5] The method is based on a comparison of like with like. Properties may be similar, but each property is unique so that they can never be totally alike. [6] Even when properties appear to be similar, close inspection often reveals that they are in fact different.

The market value of a property (the capital value) is function of market conditions and terms of the property itself. The market value of a property is variable in time because it depends on the supply-demand ratio for that type of property in a given moment of time. Different properties have different values, because every property has its own qualities and characteristics. Which are the features of the residential properties that affect price and that can be used to make comparisons and allowances?

According to the literature the most common features that an appraiser use to make comparisons are: the address, type and style of property, the age of property, the size of accommodation, the number of bedrooms, the number of garages, or the facility for parking space, the general conditions, any additional features, etc. [4]

Attributes which are likely to affect house prices include: physical attributes such as the numbers of rooms, the type of property (detached house, terraced house, etc) and presence of amenities such as central heating, a garage or a garden; locational attributes such as the region of the country in which the property is located; and neighborhood attributes in the form of the type of area (eg owner occupied outer suburb, industrial town, or inner city council estate) in which the property lies. [6]

Based on the above and based also on the albanian appraiser's perceptions, the attributes that are important and have to be taken into consideration in comparisons and adjustments are appreciated as following: the surface, number of rooms, number of balconies, the age, property conditions, additional qualities, etc.

2.2. Hedonic Price Model

The heterogeneous nature of real estate properties justifies the use of the Hedonic Price Model for estimating their value. The Hedonic Price Model takes into account the properties of real estate separately and estimates prices based on the assumption that these properties could be separated into characteristics as attributes of spatial unit, location attributes, quality of design and architecture, etc. Regression analysis and related estimation approaches are common in Hedonic Price Models. [7]

The model of multiple linear regression is well known and widely used in the valuation of real estate. The regression model is presented as an equation, with the dependent variable on the left-hand-side of equal sign, and a sum of terms on the right-hand-side consisting of the explanatory variables each multiplied by a parameter whose value is estimated by hedonic regression and that relates each explanatory variable to the dependent variable. [8] This model identifies the degree of importance of each variable, indicates the relative importance of each variable in the order of entry into the equation and shows how well the model works. [9]

The model of multiple linear regression is:

$$y = b_0 + b_1 * x_1 + \dots + b_n * x_n$$

where: y is the dependent variable (rent);

$x_1 \dots x_n$ are n independent variables (property attributes);

b_0 is constant

$b_1 \dots b_n$ are the value rating for the independent variables.

The model has to be understandable and explainable and it should predict rent value as close as possible market prices. Accuracy of the model depends on both the variables included in the model replicating market value and the market data used for calibrating the model.

The Data Sample

The data includes 133 apartments sold recently in 4 different areas of the city of Tirana. The data was obtained by carrying out a market survey and are summarized in Table1.

Data Preparation

Some of features can't be evaluated quantitatively, but only qualitatively. Property conditions are valued based on physical inspections. They were assessed using the scoring system. Thus 5 = very good, 4 = good, 3 = fair, 2 = bad and 1 = very bad. Location is evaluated by its importance (1= very important, 2= important, 3= normal, 4= less important, 5= less more important).

TABLE I: Sales Prices Attributes Assessment

No	Sales price	Surface (sqm)	Flat	Location	Condition	No. of rooms	No. of balconies	No	Sales price	Surface (sqm)	Flat	Location	Condition	No. of rooms	No. of balconies
1	60000	68	10	3	4	1	1	68	35500	89	3	4	3	2	1
2	63000	70	3	3	4	1	1	69	50400	126	4	4	3	2	2
3	60000	65	2	3	4	1	1	70	41850	93	4	4	4	2	1
4	47120	76	2	3	3	1	1	71	34200	90	3	4	3	2	1
5	72000	90	2	3	4	1	1	72	52250	95	5	4	4	2	1
6	57000	63	7	3	4	1	1	73	47080	107	4	4	4	2	2
7	53900	77	2	3	3	1	1	74	43650	97	4	4	4	2	2
8	99000	104	8	3	4	2	2	75	40000	98	4	4	3	2	2
9	98000	110	3	3	4	2	2	76	42000	100	4	4	3	2	2
10	72000	90	2	3	4	2	1	77	44520	106	4	4	3	2	2
11	68000	85	6	3	4	2	1	78	40800	102	3	4	3	2	2
12	104880	114	2	3	4	2	2	79	45000	90	5	4	4	2	2
13	76000	85	2	3	3	2	1	80	37000	85	4	4	4	2	2
14	59000	100	4	3	2	2	2	81	45320	103	4	4	4	2	1
15	80000	103	1	3	4	2	2	82	55000	97	5	4	5	2	1
16	48000	80	2	3	3	2	1	83	43200	108	4	4	3	2	2
17	65000	90	4	3	4	2	1	84	44500	89	5	4	4	2	2
18	101700	113	5	3	4	2	2	85	32000	65	5	4	4	1	2
19	50000	68	1	3	4	2	1	86	43000	72	6	4	5	1	2
20	90000	112	6	3	4	2	2	87	31600	79	4	4	4	1	1
21	110000	120	2	3	4	2	2	88	23000	65	1	4	3	1	1
22	120000	122	4	3	4	2	2	89	25000	66	2	4	3	1	1
23	87750	135	1	3	3	2	2	90	30000	65	2	4	4	1	1
24	100440	108	2	3	4	2	2	91	26250	75	2	4	3	1	1
25	63000	90	4	3	4	2	1	92	36000	74	6	4	4	1	1
26	87360	112	4	3	4	2	2	93	31950	71	7	4	4	1	1
27	99900	111	4	3	4	2	2	94	24500	46	3	4	4	1	1
28	112500	125	3	3	4	2	2	95	26250	75	2	4	3	1	1
29	119000	140	3	3	4	3	2	96	39000	74	4	4	4	1	1
30	115000	152	4	3	4	3	2	97	35000	68	5	4	4	1	1
31	110000	144	5	3	4	3	2	98	27750	75	2	4	3	1	1
32	108750	145	7	3	4	3	2	99	57000	103	3	4	4	2	2
33	104000	160	4	3	3	3	2	100	61500	123	3	4	4	2	2
34	82500	110	4	3	4	3	2	101	34240	107	2	4	3	2	2
35	139400	164	8	3	4	3	2	102	30000	100	1	4	3	2	2
36	107950	127	3	3	4	3	2	103	44000	115	1	4	3	2	2

37	140000	155	6	3	4	3	2	104	55000	118	6	4	4	2	2
38	119000	140	5	3	4	3	2	105	45000	95	5	4	4	2	2
39	36000	73	8	4	3	1	1	106	45590	97	2	4	4	2	2
40	34310	73	4	4	3	1	1	107	40500	90	2	4	4	2	1
41	24500	52	6	4	3	1	1	108	44000	110	4	4	3	2	2
42	42500	85	8	4	4	1	1	109	55000	110	2	4	4	2	2
43	25290	56.2	6	4	3	1	1	110	61050	111	2	4	4	2	2
44	30600	68	6	4	3	1	1	111	41000	83	7	4	4	2	1
45	28350	63	3	4	3	1	1	112	61500	123	3	4	4	2	2
46	31000	80	3	4	3	1	1	113	51000	93	5	4	4	2	1
47	28000	74	2	4	3	1	1	114	38000	106	4	4	3	2	2
48	30000	60	2	4	4	1	1	115	75000	134	4	4	4	3	2
49	28000	60	3	4	3	1	1	116	59250	118.5	3	4	4	3	2
50	36850	67	4	4	4	1	1	117	40150	73	2	4	4	2	1
51	28120	74	2	4	3	1	1	118	54000	108	2	4	4	3	2
52	30000	60	4	4	4	1	1	119	50032	118	6	4	4	3	2
53	34000	64	4	4	4	1	1	120	45024	96	4	4	4	2	2
54	24750	55	3	4	3	1	1	121	46000	115	1	4	3	3	2
55	35750	65	4	4	4	1	1	122	23400	52	5	5	4	1	1
56	24000	60	3	4	4	1	1	123	27000	57	3	5	4	1	1
57	28980	63	5	4	4	1	1	124	30500	61	6	5	4	1	1
58	53360	116	4	4	4	2	2	125	30000	70	5	5	4	1	1
59	56000	112	4	4	4	2	2	126	45000	97	7	5	4	2	2
60	58300	106	4	4	4	2	2	127	50400	112	4	5	4	2	2
61	37674	81.9	4	4	4	2	1	128	43000	86	5	5	4	2	1
62	40700	110	3	4	3	2	2	129	37050	95	7	5	3	2	1
63	52000	100	5	4	4	2	2	130	43000	99	6	5	4	2	2
64	45220	119	2	4	3	2	2	131	45000	104	3	5	4	2	2
65	53000	99	5	4	4	2	2	132	39000	95	5	5	4	2	2
66	40000	100	4	4	3	2	2	133	37000	86	5	5	4	2	1
67	47000	97	4	4	4	2	2								

The equation is:

$$P = b_0 + b_1*SA + b_2*L + b_3*NR + b_4*F + b_5*NB + b_6*C$$

where:

P is Sales Price;

S is Size of accommodation;

L is location

NR is number of rooms

F is flat

NB is number of balconies

C is property conditions

Age and quality of building cannot go together as factors that explain differences in value [9], so the age is excluded from the above equations. [10]

The goodness of fit of the model should be evaluated by some statistical tests:

Coefficient of determination (R^2)

This is the proportion of variation of rent value explained by the regression model. The values of R^2 range from 0 to 1. Small values indicate that the model does not fit the data well. On the other side, when the R^2 equals 1, all variation in values are explained by the regression equation.

F-statistic

The F-statistic is used to test whether or not individual regression variables are significant in predicting the dependent variable, rent value. In general, an F-statistic of 4.0 or larger indicates that a variable is significant in predicting rent value at 95 % confidence level.

Critical probability (p-value)

It is the measure of the probability that the result is "worse" than actual outcome (renting with deviations larger than those observed)

If $P_{kr} < \alpha$, hypothesis is rejected and if $P_{kr} > \alpha$ hypothesis is accepted.

3. Results and Discussions

Results generated by the application of regression analysis based on the data (tab. 1) show the surface and no. of rooms are both dependent variables; therefore further analysis is done by treating them as two variables separately. So we can build two equations separately. Thus we have:

The equation that gives the relationship between market value, surface, location, flat, property conditions is:

$$P = 40567.1 - 24437.85*L + 622.6*SA + 1278.84*F + 11546.57*C \quad (1)$$

(5.233E-05) (6.393E-32) (3.582E-35) (0.0119852) (6.884E-10)

By examining the data resulting from the linear regression, the coefficient of determination $R^2 = 0.879$ indicates that the equation explains 88 % of the distribution of observations. The equation obtained is valid, statistical probability $F = 1.04969E-57 < 0.05$. In brackets are the p-values. An explanation of the factors affecting the price is sufficiently satisfactory. All the variables have the expected signs, and the linear form of the equation means that the individual coefficients can be interpreted as showing the contribution of a one-unit increase in the level of the to the overall price [6].

The equation that gives the relationship between market value, no of rooms, location, flat, property conditions, no. of balconies is:

$$P = 77188-28678.33*L + 12856.65*NR + 1777.88*F + 10320.39*C + 11777.72*NB \quad (2)$$

(2.589E-10) (2.339E-30) (7.138E-07) (0.0056409) (6.471E-06) (0.0001451)

By examining the data resulting from the linear regression, the coefficient of determination $R^2 = 0.81$ indicates that the equation explains 81 % of the distribution of observations. The equation obtained is valid, statistical probability $F = 3.54E-44 < 0.05$. In brackets are the p-values. An explanation of the factors affecting the price is sufficiently satisfactory.

The estimated equations (1) (2) are then used to derive property valuations for the 20 properties in our survey by means of information extracted from valuation reports. The hedonic and professional valuations are compared in Table 2.

TABLE II: Estimated Prices and Valuated Prices

Surface sqm	Flat	Location	Condition	No. of rooms	No. of Balconies	Estimated Price (1)	Evaluated Price (2)	Valuated price
84	1	4	4	2	1	42500	43000	40000
84.9	2	4	4	2	1	44400	44800	41000
62	2	4	4	1	1	30160	32000	30500
62.85	4	4	4	1	1	33200	35500	32000
62.1	1	4	4	1	1	29000	30170	29000
91	3	3	3	2	2	62400	76700	70000
99.3	5	4	3	2	2	45670	51600	48000
81.74	7	4	3	2	1	37300	43400	40000
85.6	1	4	3	2	1	32000	32700	33000
85.1	4	4	3	2	1	35500	38000	36500
65	1	4	4	1	1	30700	30200	29500
107.4	2	2	3	3	2	95700	116500	100000
78.15	5	4	3	2	1	32500	39800	36000
65	1	4	4	1	1	30700	30200	30000
97	2	3	2	2	1	53300	52800	53000
123	2	2	3	3	2	105500	116500	110000
63.19	1	2	2	2	0	55400	68000	58000
65.8	1	3	2	2	1	32600	51100	35000
112	5	4	3	3	2	53600	64500	58000
63	5	3	2	2	1	36000	58200	37000

As we can see from the table 2, excluding the case 17 (no balcony), case 18 and 20 (the surface area is not consistent with the number of rooms), case 19 (the surface too big for the location), almost in the entire other cases the value is an average of the two estimated prices calculated according to two models.

4. Conclusions

The hedonic method provides a promising and cost-effective way of valuing residential properties. The use of a model for determining the market value, based on the property attributes, is a good way to bridge differences in values reported by different evaluators for the same property, as it "limit" their freedom only in assessing attributes, while the participation of any of them is unified.

The models provide the user with an average, expected value for a residential property. The most suitable model for the apartments of old buildings is the one based on the surface area; whereas for the newly built apartments both models give almost same results. It would be better to use both models and to get the value as an average of estimated prices.

The proposed models for determining the price does not mean that everyone, in anytime and for every property can determine the price without the need for a professional preparation. They can be seen more as aid for the professional evaluators to enable assessments with least possible changes. The success of using the model depends on the accuracy in the assessment of attributes.

The value is the most likely price to be carried out in the market, while the price is the value for which the property changes owners. The price at which a property finally changes hands depends on the degree of interest potential buyer/buyers show in it.

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