# ANALYSIS OF MACROECONOMIC AND MICROECONOMIC FACTORS THAT AFFECT THE PRICE AND RENT OF APARTMENTS IN THE CITY OF TIRANA: AN ECONOMETRIC APPROACH

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### ABSTRACT

There are various points of views concerning determinants of apartment prices, some different factors are highlighted as the most important. None of the studies include all factors. The main purpose of the paper is to analyze determinant factors of apartment prices in the Tirana city. We estimate the relationship between various macro and micro factors and apartment prices and rent in this area. In the first part we investigate macroeconomic factors and in the second part macroeconomic factors. As it was expected deposit rate and lending rate negatively affect the price per square meters of apartments. The rate of growth of GDP negatively affects the price per squares meters. Based on the result of analysis is concluded that macroeconomic factors influence the price and rent of apartments. The year of purchase, number of rooms, presence of elevator, garage, age of the owner and monthly family income positively influence the price of apartment per square meters. Surface, zone from centre to periphery and number of members in the family negatively influence the price of apartments per square meters. We perform a principal components analysis. The purpose of the analysis is to obtain a small number of linear combinations of the 13 microeconomic variables which account for most of the variability in the data. In this case, 4 components: Bathrooms, Elevator, Floor and Garage have been extracted, since 4 components had eigen values greater than or equal to 1.0. Together they account for 52.6% of the variability in the original data. We conclude that monthly rent is inelastic in relation to the buying price per square meters and value of transaction.

Keywords: Apartment, price, factors, rent, transaction. JEL CLASIFICATION: C31, R31.

## ITRODUCTION

Albania's real estate market is still fairly new and untested, evolving in a country that has only seen a relatively short period of social and political stability and democracy. With the privatization of housing and liberalization of the economy after 1990, family saving went primary into improving the conditions of dwellings. Albania has the highest level of density and overcrowding indicators compared with other European and East European Countries: 7,5 square meters per person and 4,4 persons per dwelling (Census 2011). Current demand is also spurred by the Albanian living abroad; over recent years, Tirana has recorded a considerable number of Albanian 'foreigners' that have purchased residential buildings. However, several factors speak for investment in the country's real estate sector, such as continuously low inflation rates, increasing exports, low labor costs with a highly skilled and adaptable work force, a low cost of living and a rapidly growing tourist market. Furthermore,

as Albania is seemingly heading towards EU membership, international real estate investors are keeping a keen eye on developments in the country.

Real estate is a rather popular field of research. Many studies are conduct in the field of modeling of real estate prices, analyzing the relationship between real estate markets and other economic sectors. There are various points of views concerning determinants of apartment prices, different factors are highlighted as the most important. None of the studies include all factors. Each paper is concentrated on some main factors chosen for analysis. Many different approaches' are made for analyses of real estate market development. All of them have advantages and some disadvantages. The real estate analysis is complicated because of the distinguish features of the market. The property is not a portable good so has specific features that should be taken into account. Characteristics of the property are very different that make comparison very problematic. The supply of real estate is rather rigid. Papers that present investigation micro determinants provide different techniques for analyzing apartments market. Each method has certain advantages and drawbacks. But all of them use data for specific purchase and information for housing characteristics and certain information about buyer.

Table nr.1:	Buildings	for	residential	purposes	by	prefecture,	number	of	floors	and
presence of 1	lift									

	Number of Floors Presen							
Prefectures	Total	1	2	3-5	6-10	11+	Yes	No
Total	598,267	510,528	60,862	20,804	5,575	498	7,303	590,964
BERAT	36,488	32,638	2,884	825	137	4	165	36,323
DIBËR	29,524	26,034	2,874	544	70	2	51	29,473
DURRËS	56,052	45,800	6,844	2,593	737	78	981	55,071
ELBASAN	64,129	54,652	7,353	1,800	300	24	367	63,762
FIER	75,444	66,586	6,572	1,871	370	45	587	74,857
GJIROKASTËR	26,037	23,263	1,897	706	168	3	188	25,849
KORÇË	52,572	47,019	3,825	1,342	376	10	306	52,266
KUKËS	16,465	13,829	2,189	374	72	1	42	16,423
LEZHË	30,153	27,511	1,658	756	223	5	285	29,868
SHKODËR	48,633	43,127	4,195	1,050	256	5	304	48,329
TIRANË	110,283	86,411	14,847	6,565	2,203	257	3.039	107,244
VLORË	52,487	43,658	5,724	2,378	663	64	988	51,499

Source Census 2011

## LITERATURE REVIEW

Glascock et al (2002) examines the relationship between Real Estate Investment Trust returns and inflation rate. There was no evidence of causality between inflation rate and Real Estate Investment Trust returns. Hilbers et al (2001) focuses on the relationship between real estate market and financial sector. Analysis concluded that unbalanced real estate price developments often cause financial sector distress and that trend in the real estate market should be monitored closely in the context of financial sector analysis. The other finding was that the price change in real estate markets may be used as an indicator for the financial system. Case et al (2000) discusses the correlation of cross country real estate cycle return movements. The conclusion of the research was that cross country correlation of real estate markets was influenced by global GDP movement. GDP is also indicated as an important determinant of the real estate cycle Renaud (1997). Huang and Wang (2004) in their paper single out the following factors effecting real estate market : CPI,GDP, fixed assets investment, savings, population, total constructing area of commodity houses, total sold area of residential houses ,related taxes and fees of developers, profit of developers, total amount of development of loans and individual mortgage loans etc. Bardhan, Edeltein and Leung (2004) analyze the influence of globalization and open of the country on real estate rent. The paper consider 46 major world cities and concludes that higher openness increase rents and hence it can be assumed that real estate prices rise as well .Grison and De Lisle (1999) based on the analysis concluded that real estate cycle is not completely consistent with business cycle. Real estate cycle can lead the business cycle and can lag it. Hilbers et al (2001). The major problem that appears at this market is heterogeneity of properties. Most of the studies consider housing commodity in hedonic or characteristic form. The analyses of prices of houses is definite as bundle of individual attributes. Different functional forms of hedonic price models are analyzed.

Cropper et al (1988) examines linear, semi-log, double  $-\log$ , linear and quadratic function of Box and Cox (1969) transformation. Analysis includes following housing attributes: number of bathrooms, air conditioned, fireplace, garage and neighborhood characteristics. He concluded that when all housing attributes are included in the function, are observed linear and quadratic function of Box - Cox. Transformed variables provide the most precise estimates of marginal attribute prices. When some variables are not observed a simple linear hedonic price outperforms the Box - Cox function. Noland (1979) provide a estimation of house attribute prices. The analysis contain housing quality characteristics (number of rooms, age, lot size, presence of various items, location number of bathrooms, building characteristics and some occupant characteristics etc.).Papers that present investigation of micro-determinants provide different techniques for analyzing housing market.

Marsela Thanasi (Boce), (2016) in her study, has proved empirically that the characteristics of the apartments as square meters of living, number of rooms, access to parking, furniture, view and surface of living affect their price. Results showed that the marginal effect that the number of rooms has on the apartment value depends on the square meters of living of the apartment. In the same line, the effect of the square meters of living on value depends on the square meters, as the relationship between these variables is nonlinear and depends more on the number of rooms.

Each method has certain advantage and drawbacks, but all of them use data for specific purchase and information for housing characteristics and certain information about buyer. Such data we have used in our study.

## **OBJECTIVES AND HYPOTHESESS OF THE STUDY**

H1: How macroeconomic factors as rate of change, lending rate, inflation rate, GDP growth rate, unemployment rate, government deficit, remittances, affect the price of apartments

H2:How macroeconomic factors as rate of change, lending rate, inflation rate, GDP growth rate, unemployment rate, government deficit, remittances, affect the rent of apartments

H3: How microeconomic factors as year of purchase, surface of apartment in square meters, number of rooms, number of bathrooms, floor, has or not elevator, has or not garage, has or not parking square, finance cash or loan, age, education, zone from center to periphery 0-3, numbers of family member in emigration, number of workers in family, monthly family income, affect on the price of apartment per square meters.

H4: What are the principal components of microeconomic factors the influence the value of transactions and price per square meters of apartments.

H5: How microeconomic factors as year of purchase, surface of apartment in square meters, number of rooms, number of bathrooms, floor, has or not elevator, has or not garage, has or not parking square, finance cash or loan, age, education, zone from center to periphery 0-3, numbers of family member in emigration, number of workers in family, monthly family income, affect on the rent of apartment per square meters.

H6: To evaluate and interpret elasticity of rent of apartment per square meters in relation to price of apartment per square meters and in relation to value of transaction.

## METHODOLOGY AND DATA DESCRIPTION

The main purpose of the paper is to analyze determinant factors of apartment prices and rent in the Tirana city. We estimate the relationship between various macro and micro factors and apartment prices and rent in this area using hedonic regression method. This method consists in using a standard statistical technique, the so-called hedonic regression model, widely used for estimating the demand or value and specially used as a pricing method. It decomposes the apartment prices into its constituent characteristics obtaining an estimate of the contributory value of each characteristic. The contribution of each of them in the total price can be measured using the hedonic regression model. Along with this advantage, the method requires many data and property features which make it difficult to implement it properly in practice.

The analysis is done by using other linear models heteroscedasticity corrected. We used gretl 2015d Eview 9 and Stat graphics XV. In the first part we investigate macroeconomic factors. The value of each apartment transaction made, the price for each square meters of apartment bought, the rent for each apartment transaction made and the rent for each square meters of apartment are used as depended variables. We used log of price for each square meters of apartment bought, the log of rent for each apartment transaction made, and the log of rent for each square meters of apartment, as depended variables. Explanatory variables are: deposit rate, lending rate, inflation rate, exchange rate, GDP growth rate, unemployment rate, and government deficit and remittances. It is expected a positive relationship between prices and rents and GDP, inflation rate, and a inverse relationship with deposit rate. Deposit rate level increases result on a decreasing in the purchasing capacity. Interest rate level affects the ability of credit and purchasing capacity.

Data for macro variables are taken from INSTAT (National Institute of Statistics Albania) for period 1993 – 2015. The main problem in macro level data is the high level of aggregation. Among macro factors there are: building materials market, property taxation and political situation and others, missing in the model. The micro data were taken by a face to face interview organized by Finance Students of Economic and Agribusiness Faculty, Agricultural University of Tirana. The city was divided in four homogeny zones from center to periphery. The information was taken from 750 randomly selected apartment owners from all four homogeny zones. Number of responds for each zone was taken by a quota related to the density of the population of each zone. Variables in study were the price of the apartment transaction between seller and buyer in ALL, the year of purchase of the apartment, the size apartment in square meters , the number of rooms, the number of bathrooms, the floor, whether there is a lift or not, 0 if not, 1 if yes, there is parking space or not,0 if not, 1 if yes , the financing method with own resources or borrowed 0 cash 1 loan, the wanted value of the rent in ALL, the real value of the rent in ALL, the degree of satisfaction for the purchase price from 1 to 10 and the degree of satisfaction for the quality and conditions from 1 to 10, age of owner , average monthly income of the family, zone, family members , education, number of family members at work, number of members in emigration.

## **RESULTS AND DISCUSSION**

The average price for square meters of apartments in Tirana area is 75598ALL, with coefficient of variation 37.9%. The average value for one transaction of apartments is 6806150 ALL with coefficient of variation 46.6%. The average monthly rent is 28341ALL with coefficient of variation 45%. The coefficients for deposit rate, loan rate and GDP growth rate are significant. The depended variable we used is log of price of apartment per square meters. As it was expected deposit rate and lending rate negatively affect the price per square meters apartment. The rate of growth of GDP negatively affects the price per squares meters. When the interest rate growths by 1 percent price per square meters get down by -1,2%, when lending rate grows by 1 percent, the price per square meters get down by -0,9% and when GDP rate of growths grows by 1 percent, the price per square meters get down by -1,7%. Based on the results of our analysis, is concluded that macroeconomic factors influence the price of apartment. The price of apartment is sensitive to changes in deposit rate, lending rate and growths rate of GDP. The coefficient GDP growth rate is significant. As depended variable, we used log of rent of apartment per square meters. Meanwhile GDP rate of growths grows by 1 percent, the results down by -2%.

From the analysis of microeconomic factors mentioned above: the coefficients for year, surface, rooms, elevator, garage, age, zone, family members, and family monthly income are significant. As depended variable we used log of price of apartment per square meters and log of rent of apartment per squares meters.

The year of purchase, number of rooms, presence of elevator, garage, age of owner and monthly family income positively influence the price of apartment per square meters. The surface, zone from center to periphery and number of members in the family negatively influence the price of apartments per square meters. From one year to the other, price goes up by +2,4%. For every room added, the price of apartment per square meters goes up by 6,7%. Presence of elevator positively influences increasing the price by +11,4%, presence of garage positively influences increasing the price by +10,6%. Increasing of the age of the buyer by ten year positively influences getting up the price by +2,7%. Passing from center to the periphery gets the price of apartments down -3,3% from center to the next zone. Number of family members negatively influences the price of apartment bought. The increasing number of family members gets the price of apartments down by -3,9%. Manthly family incomes are significant positive factor that affect the price per square meters. Rising family

monthly income by 100000ALL gets the price of apartments up by +14.3%. It confirms that the increase in monthly family incomes leads to an increase in price level.

The year of purchase, number of rooms and monthly family income positively influence the rent of apartment per square meters. Surface and zone from centre to periphery negatively influence the rent of apartments per square meters. The rent from one year to the other goes up by +0,3%. The rent for every room added to the apartment goes up by 13,3%.Passing from center to the periphery gets the rent of apartments for square meters down by-14% from center to the next zone. The surface of apartments negatively affects the rent for square meters. As the surface increases by one square meter the rent for square meters gets down by -1%.The rent gets down by -13.5% if money of apartment bought are borrowed compared to their own money used. Monthly family incomes are a significant factor which influences rent of apartments per square meters. Rising monthly family incomes by 100000ALL the rent of apartments gets up by +17.3%. It confirms that an increase in monthly family incomes leads to an increase in rent levels.

We perform a principal components analysis. The purpose of the analysis is to obtain a small number of linear combinations of the 13 microeconomic variables which account for most of the variability in the data. In this case, 4 components: Bathrooms, Elevator, Floor and Garage have been extracted, since 4 components had eigen values greater than or equal to 1.0. Together they account for 52.6% of the variability in the original data.

As it can be seen monthly rent is inelastic in relation to the buying price per square meters. Rising the buying price by 1% the monthly rent per square meters is increased by 0, 46%. Monthly rent is inelastic in relation to the transaction value. Rising the transaction value by 1% the monthly potential rent (monthly rent that enjoyed the owner of apartment) related increased by 0.38%.

Table nr.2 Model 6: Heterosk	edasticity-correcte Missing or inco	d, using o mplete c	observation observation	ons 1-727 (n = 72 ons dropped: 2	25)	
	Dependent vari	able: ln j	price per	square meters		
	Coefficient	Std. H	Error	t-ratio	p-value	
const	10.7391	0.965	5696	11.1206	< 0.0001	***
Rate of change	0.00198665	0.0012	28834	1.5420	0.1235	
Deposits rate	-0.0204578	0.01	1023	-1.8559	0.0639	*
Lending rate	-0.00882596	0.0051	12012	-1.7238	0.0852	*
Inflation rate	0.000689881	0.0057	76798	0.1196	0.9048	
GDP Growth rate	-0.0194392	0.0066	57356	-2.9129	0.0037	***
Unemployment rate	-0.017707	0.012	7249	-1.3915	0.1645	
Government deficit	0.00795396	0.010	6661	0.7457	0.4561	
Ln Remittances	0.114196	0.107	7747	1.0599	0.2896	
	Statistics b	ased on	the weigh	nted data:		
Sum squared resid	271	4.906	S.E. of	f regression		1.947246
R-squared	0.16	51470	Adjust	ed R-squared		0.152101
F(8, 716)	17.2	23435	P-valu	e(F)		1.42e-23
Log-likelihood	-150	7.354	Akaike	e criterion		3032.708
Schwarz criterion	307	3.984	Hanna	n-Quinn		3048.638
	Statistics	based on	the origi	nal data:		
Mean dependent var	11.1	5561	S.D. d	ependent var		0.400014



Sum squared resid	91.3
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5351 S.E. of regression

0.357196

Test for omission of variables -Null hypothesis: parameters are zero for the variables Rate of change Inflation rate Unemployment rate Government deficit Ln Remittances Test statistic: F(5, 716) = 0.998557with p-value = P(F(5, 716) > 0.998557) = 0.417607

#### Table nr.3 :Model 7: Heteroskedasticity-corrected, using observations 1-727 (n = 725) Missing or incomplete observations dropped: 2 Dependent variable: In price per square meters

	Coefficient	Std. E	rror	t-ratio	p-value	
const	11.532	0.0368	3453	312.9843	< 0.0001	***
Deposits rate	-0.0164896	0.0065	8275	-2.5050	0.0125	**
Lending rate	-0.0120292	0.0043	8791	-2.7414	0.0063	***
GDP Growth rate	-0.0166053	0.0055	6211	-2.9854	0.0029	***
	Statistics 1	ased on t	ha waint	ted data:		
Sum squared resid	261	3.229	S.E. of	f regression		1.903799
R-squared	0.14	43088	Adjust	ed R-squared	(	0.139522
F(3, 721)	40.1	13105	P-valu	e(F)		5.45e-24
Log-likelihood	-149	3.517	Akaike	e criterion		2995.034
Schwarz criterion	301	3.379	Hanna	n-Quinn		3002.114
	Statistics	based on	the origin	nal data:		
Mean dependent var	11.	15561	S.D. de	ependent var	(	0.400014
Sum squared resid	92.4	14279	S.E. of	regression	(	0.358071

#### Table nr.4: Model 9: Heteroskedasticity-corrected, using observations 1-727 (n = 606) Missing or incomplete observations dropped: 121 Dependent variable: In price per square meters

	Coefficient	Std. Error	t-ratio	p-value	
const	-29.9433	5.49528	-5.4489	< 0.0001	***
year	0.0204427	0.0027355	7.4731	< 0.0001	***
surface	-0.00382198	0.000612349	-6.2415	< 0.0001	***
Rooms	0.061416	0.0189474	3.2414	0.0013	***
Bathrooms	0.00505052	0.0301623	0.1674	0.8671	
Floor	0.000294473	0.00652338	0.0451	0.9640	
Elevator	0.0930057	0.0337185	2.7583	0.0060	***
Garage	0.0947419	0.0364382	2.6001	0.0096	***
Parking	-0.0215711	0.0282578	-0.7634	0.4455	
Finance	0.020369	0.025513	0.7984	0.4250	
Age	0.0200767	0.0132136	1.5194	0.1292	
Education	0.0374165	0.0193143	1.9372	0.0532	*
Zone	-0.0218639	0.0132305	-1.6525	0.0990	*
Family	-0.0275634	0.0130494	-2.1122	0.0351	**
Emigration	-0.0113552	0.0147353	-0.7706	0.4412	
Working	0.00196913	0.0202175	0.0974	0.9224	
Monthly Income	1.3257e-06	2.55445e-07	5.1898	< 0.0001	***

Sum squared resid	1804.575	S.E. of regression	1.750370
R-squared	0.305694	Adjusted R-squared	0.286834
F(16, 589)	16.20808	P-value(F)	2.40e-37
Log-likelihood	-1190.511	Akaike criterion	2415.021
Schwarz criterion	2489.938	Hannan-Quinn	2444.172
	Statistics based on	the original data:	
Mean dependent var	11.16393	S.D. dependent var	0.395852
Sum squared resid	64.35298	S.E. of regression	0.330542

Table nr.5:Model 6: Heteroskedasticity-corrected, using observations 1-727 (n = 155) Missing or incomplete observations dropped: 572 Dependent variable: In The rent per square meters last year

	Coefficient	Std. Error	t-ratio	p-value	
year	0.00294410	0.000106239	27.71	< 0.0001	***
surface	-0.0107989	0.00153439	-7.038	< 0.0001	***
Rooms	0.129399	0.0369712	3.500	0.0006	***
Bathrooms	0.0695528	0.0656885	1.059	0.2915	
Floor	-0.00318482	0.0125115	-0.2546	0.7994	
Elevator	0.00888719	0.0620820	0.1432	0.8864	
Garage	-0.0489394	0.0924877	-0.5291	0.5975	
Parking	-0.0899555	0.0669345	-1.344	0.1812	
Finance	-0.0841578	0.0511649	-1.645	0.1023	
Age	0.0120933	0.0253021	0.4780	0.6334	
Education	0.0625012	0.0443602	1.409	0.1611	
Zone	-0.118243	0.0266391	-4.439	< 0.0001	***
Family	0.0182432	0.0290661	0.6276	0.5313	
Emigration	-0.00623134	0.0245983	-0.2533	0.8004	
Working	0.0244505	0.0388225	0.6298	0.5299	
Monthly Income	1.48224e-06	4.69609e-07	3.156	0.0020	***

Sum squared resid	440.8715	S.E. of regression	1.780937
Uncentered R-squared	0.461912	Centered R-squared	0.982230
F(16, 139)	7.457614	P-value(F)	2.29e-12
Log-likelihood	-300.9484	Akaike criterion	633.8968
Schwarz criterion	682.5916	Hannan-Quinn	653.6756
	Statistics based on	the original data:	
Mean dependent var	5.644069	S.D. dependent var	0.405246
Sum squared resid	15.42795	S.E. of regression	0.333155

Test for normality of residual -Null hypothesis: error is normally distributed Test statistic: Chi-square(2) = 1.62803with p-value = 0.443076

#### Table nr.6:Model 7: Heteroskedasticity-corrected, using observations 1-727 (n = 155) Missing or incomplete observations dropped: 572 Dependent variable: In The rent per square meters last year

	Coefficient	Std. 1	Error	t-ratio	p-value	
year	0.00304105	5.1979	99e-05	58.50	< 0.0001	***
surface	-0.00923085	0.0014	44459	-6.390	< 0.0001	***
Rooms	0.125115	0.034	8147	3.594	0.0004	***
Zone	-0.131479	0.027	4598	-4.788	< 0.0001	***
Monthly Income	1 59727e-06	3 908	51e-07	4 087	<0.0001	***
intenting income	1.571210 00	517002	10 07	1.007	(0.0001	
	Statistics I	based on	the weigh	nted data:		
Sum squared resid	509	.0250	S.E. of	f regression		1.842145
Uncentered R-squared	0.30	65012	Center	ed R-squared		0.911489
F(5, 150)	17.2	24497	P-valu	e(F)		1.84e-13
Log-likelihood	-312	.0885	Akaike	e criterion		634.1771
Schwarz criterion	649	.3942	Hanna	n-Quinn		640.3580
	Statistics	based on	the origi	nal data:		
Mean dependent var	5.64	44069	S.D. d	ependent var		0.405246
Sum squared resid	16.2	26808	S.E. of	f regression		0.329323
Table nr.7:Mode	l 1: Heteroskedas Missing or inco Dependent variable	ticity-cor mplete o e: n poter	rected, us bservation ntial rent	sing observations ns dropped: 28 per square meters	1-725 (n = 69	97)
	Coefficient	Std. 1	Error	t-ratio	p-value	
const	0.542904	0.47	6937	1.1383	0.2554	
Ln price per square meters	0.461062	0.042	26563	10.8088	<0.0001	***
	Statistics 1	ased on	the weigh	nted data.		
Sum squared resid	244	0 487	S E of	f regression		1 873898
R-squared	0.14	43909	Adjust	red R-squared		0 142677
F(1, 695)	116	8293	P-valu	e(F)		2.81e-25
Log-likelihood	-142	5 729	Akaika	e criterion		2855 458
Schwarz criterion	286	4 552	Hanna	n-Quinn		2858.974
Sonwarz ontonion	200	1.552	Tunna			2030.771
	Statistics	based on	the origi	nal data:		
Mean dependent var	5.69	97838	S.D. d	ependent var		0.405285
Sum squared resid	96.	31633	S.E. of	f regression		0.372270
Table nr.8:Mode Dep	1 2: Heteroskedast Missing or incor pendent variable:	ticity-cor nplete ot In The re	rrected, us oservation ont per squ	sing observations as dropped: 532 aare meters last ye	1-725 (n = 19 ear	93)
	Coefficient	Std. 1	Error	t-ratio	p-value	
const	1.39567	0.70	8674	1.9694	0.0504	*
Ln price per square meters	0.380594	0.064	1789	5.9302	< 0.0001	***
	Statistics 1	nasad on	the waie	ted data:		
Sum squared resid	5tausues t 788	2491	S F of	f regression		2 031492
R-squared	700 0.1/	55493	Adjust	red R-squared		0.151071
F(1 191)	35	16738	P-valu	e(F)		1 396-08
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Log-likelihood	-409.6426	Akaike criterion	823.2852
Schwarz criterion	829.8106	Hannan-Quinn	825.9278
	Statistics based on	the original data:	
Mean dependent var	5.633525	S.D. dependent var	0.401220
Sum squared resid	25 55288	S E of regression	0 365766

Graph nr.1: SnapStat. One Sample Analysis: prices square meters



### **Principal Components Analysis**

Data variables:

- \_Bathrooms
- \_ Elevator
- \_ Floor
- \_ Garage
- \_ Rooms
- \_ surface
- \_1Finance
- \_2 Education
- \_3 Zone
- \_4 Family
- \_5 Emigration
- \_6 Working
- \_7 Monthly Income

Data input: observations Number of complete cases: 647 Missing value treatment: listwise Standardized: yes Number of components extracted: 4 **Table Nr.9 Principal Components Analysis** 

#### **Principal Components Analisis**

Component		Percent of	Cumulative
Number	Eigenvalue	Variance	Percentage
1	2.72433	20.956	20.956
2	1.83452	14.112	35.068
3	1.2158	9.352	44.420
4	1.06608	8.201	52.621
5	0.980569	7.543	60.164
6	0.862217	6.632	66.796

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7	0.808425	6.219	73.015
8	0.724139	5.570	78.585
9	0.661298	5.087	83.672
10	0.607292	4.671	88.344
11	0.573933	4.415	92.759
12	0.492388	3.788	96.546
13	0.449002	3.454	100.000



Graph nr.2:SnapStat.One Sample Analysis Value of Transaction

600

400 Row

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<u>95% confidence intervals</u> Mean: 6.80615E6 +/- 231021 [6.57513E6, 7.03717E6] Sigma: [3.01837E6, 3.34612E6] <u>Diagnostics</u> Shapiro-Wilks P-value = 0.0000 Lag 1 autocorrelation = 0.14878 +/- 0.0727914



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15.63094

15.65606

17.03439

13.81551

0.472880

-0.389707

3.924329

45.62260 0.000000

Graph nr.3 :SnapStat. One Sample Analysis distribution of the Value of Transaction in ALL 2 Vlera



Graph nr. 4: Snap Statistics Log Value of transaction





Graph nr.5:SnapStat. One Sample Analysis Potential Rent

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### CONCLUSIONS

We estimate the relationship between various macro and micro factors and apartment prices and rent in this area using hedonic regression method. The price of apartment is sensitive to changes in deposit rate, lending rate and growths rate of GDP. The year of purchase, number of rooms, presence of elevator, garage, age of owner and monthly family income positively influence the price of apartment per square meters. It confirms that an increase in monthly family incomes leads to an increase in rent levels. The surface, zone from center to periphery and number of members in the family negatively influence the price of apartments per square meters. Bathrooms, Elevator, Floor and Garage have been extracted, together they account for 52.6% of the variability in the original data. Monthly rent is inelastic in relation to the buying price per square meters. Rising the buying price by 1% the monthly rent per square meters is increased by 0, 46%. Monthly rent is inelastic in relation to the transaction value. Raising the transaction value by 1% the monthly potential rent rises by 0.38%. The accuracy, collection and reporting of data for the real estate transaction constitutes a challenge in the future for Albania. It remains open for discussion and for the future studies the reason of the low rent elasticity in relation to the purchase price per square meter and the transaction value.

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