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VECM Analysis to House Price Index. Case of Tirana

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Abstract

This paper analyzes long-run equilibrium of "house price index" in Tirana (the capital city of Albania) achieved by the long-run performance of macroeconomic factors.We have used the techniques and analysis of linear multiple regression by VECM (vector error correction model), to identify endogenous factors, that effect the stability of "house price index". The analyze is based on data series 2010-2018 (with 3-month frequency), with independent variables: mortgage loan, interest rate on long-term loans, construction cost index, EUR/ALL exchange rate, house price index with lag(1).We conclude that all these independent variable (expect EUR/ALL exchange rate) are statistically significant, in long-run equilibrium and in the elasticity assessment of "house price index".

Keywords*:* Real Estate, VECM model, house price index

Introduction

Real estate is nowadays in the focus of several academic studies all over the world. Although, it is commonly known that real estate markets are rather illiquid, the majority of academics assume that these markets are efficient; it is assumed that participants act in accordance with rationality.

The dynamics of house prices is closely related to the performance of macroeconomic variables, housing market conditions and financing characteristics for home purchase. The factors are so many that we can group them into: economic factors; government factors; geo - climate factors; and socio-demographic factors. The following are extensively explained in the literature of this paper.

Due to the role housing plays in modern societies, the focus of this paper is on housing prices. Transactions in the housing market constitute an important part of a country's GDP and household spending. The performance of house prices affects the well-being of families and their ability to borrow mortgages, which can have significant macroeconomic consequences. Housing market analysis today faces several challenges:

- the housing market is regarded as a market of highly heterogeneous and illiquid products, where the cost of obtaining information is high;
- the specific nature of the real estate market product itself is contingent on a rigid supply and periodic blossoming, creating opportunities for wrong decision making.
- the housing market is one of the markets with high government intervention, mainly in terms of territory management or social policies. Consequently, developments in this market, and especially the supply of this product, are significantly influenced by the institutional and legal framework of a country.

Based on the official publications of a house price index in Tirana (capital of Albania), as well as a review of the literature on the main factors affecting the performance of house prices, in this paper we have applied the econometric technique VECM to identify exogenous factors in determining the price of housing. The housing market in Albania has followed the trend of the construction sector, which has been associated with a major development phase a decade ago, while the last decade we have seen a marked deterioration. This trend is also observed in the market price of housing with a progressive growth phase (before 2010) and a very volatile price phase (after 2010).

The housing market in the last decade has been in frequent imbalance (as well as having the effects of the 2008 financial crisis). This is one of the main reasons why we have decided to study this market after 2010. Our study aims to assess the long-term equilibrium and resilience of the key economic factors that determine this equilibrium. Official data on the housing market in Albania are missing, they are recorded in the form of time series (with 3-month frequency) for the housing market index, only for the city of Tirana. The study therefore analyze this city. However, seeing the degree of concentration of the economy, population, level of housing construction, etc Tirana Housing Price Index is a very good representative of this

market nationally. It is difficult to study "house price index" in Albania, due to the following reasons:

- The buying of a house is mainly the highest expenditure of a family, so the transactions of this type are timely rare.
- It is very difficult to find two identical houses in a time difference.
- If a "group" of houses will be fixed in a certain time, further changes in a house, such changes as the building of another public or private facility near the house or any qualitative change, will direct to a variability of the price.

Literature Review: Determination factors REGARDING real estate market

Theoretical and empirical studies have resulted that a high increased level of credit portfolio, accompanied with a sensitive increase of dwelling prices is one of the most consistent and warning indicator of future financial crisis (Borio and Lowe, 2002). Some comparative studies among countries with different economical and financial development (Tsatsaronis and Zhu, 2004;Annt2005; Egert and Mihaljek, 2007), concludes that the elasticity coefficients of changes in dwelling prices toward main factors sensitively varies according to country's measure, its financial markets development and the period of the study as well. Egert and Mihaljek (2007), while comparing Central East European Countries and OECD ones, analyzed that besides the abovementioned factors, the dynamic of the dwelling' prices is affected by some specific ones such as: the lack of the institutionalization of the dwelling markets; the limited supply of the new dwellings in the moment of the market liberalization; the improvement of the qualitative of the dwellings; the increased demand of nonresidents etc. Some other studies in the field of real market estates, such as Hilbert et.al. (2008); FTI Consulting (2012) mention 4 main group factors that affect the demand and supply of the market:

a) Economic Factors
b) Governmental factors
c) Geo – Climate factors
d) Socio-demographic factors

Economic Factors: Main economic factors are (Minsk, 1982; Kindlerberger, 1978; Valverde and Fernandez 2010; Suljoti, 2014; Ibrahimaj and Mattarocci, 2014):

The Unemployment level or the employment one, (in a local of national context) indicates the potential of a country to generate the individual income, affecting this way the demand for real estate.

The personal income level shows the ability of the individuals to invest in real estates, measured mainly by the average level of wage, and is considered as a key element of the real estate demand.

Construction costs are considered as the main factor of determining the real estate supply. This factor is considered in determining the initial price of these real estates and in Albania this is measured by the "Construction cost index" published by INSTAT. This index is focused on the direct costs of the construction (material costs, wages expenditures, machinery costs, transport costs, electricity costs etc.) and indirect ones.

Credits, is another supply factor (when credits is demanded by the construction companies) and demand factor (when credits is asked by individuals, as a financial tool to buy his/her real estate). Kindlerberger (1978) and Minsky (1982) have analyzed the role that credits have in the price of dwellings history. So, if the credits are in terms of cheap conditions, this will affect the behavior of real estate markets in these countries. In Albania, this can be measured either due to the value of the credits dedicated to buying dwelling estates or business estate , or due to the multiplication of the real estate credits published by the Bank of Albania or Statistical Reports. Measured as well by analyzing the facilitated or limited conditions published by the second level banks in the country.

Interest rate: the same as the credits is the factor of demand as well as the factor of the supply. Interest rates are an important factor of residential' investments decision, sensitively influencing the demand for real estate. The measurement of the effects that interest rate have, can be analyzed through crediting rates of the economy. In Albanian case, the financing of the real estate for dwelling or services intentions has the lowest credit rates, compared with other credit rates for other intentions. (Bank of Albania, Statistical report, 2005-2015).

Treasure bonds rates. In Albania the interest rates of treasure bonds, 12months' maturity terms, represent the essential quota, from which it is indexed each credits rates or other deposits in second level banks. This means that this rate is considered as the initiation phase of every change in interest rates even for the long term individual credits, which in 90% of the cases is destined for buying dwelling estate. Since in the beginning 2012 and ongoing, this rate has been considerably deduced, while the interest rate of credits in banking sector has not reflected this kind of deduction, this one has remained in the almost sustainable situation (Bank of Albania, Statistical Reports 2005-2015).

Remittances: In Albania, the remittances are a key factor as far as domestic demand is concerning. Since 2013 and ongoing, the remittances level has decreased compared to its level in GDP (Bank of Albania, Statistical Reports 2005-2015). Even though, it doesn't exist any statistical indicator to show us which part of remittances that enters Albania is destined to the real estate market and which portion of it goes to consumption. Considering this explanation, it is not clear enough to judge for the correlation of this variable with real estate market trend, for all the post-communist period in Albania.

Exchange rate is another important demand factor (domestic currency is ALL) and supply factor; due to the fact that the majority of construction materials are imported in Albania. (General Custom Directorate, Albania 2002-2015). Referring to the internal reports of second level banks in Albania, such as: Raiffeisen Bank, National Commercial Bank, Credins Bank etc, the currency of the credits issued for real estate issues is not in national currency ALL, but manly it is in Euro (Manjani, 2014). As Euro, is the main currency used for exchange in real market estate in Albania, the exchange rate Euro/ALL, is considered to have an important impact in the real income level for all those buyers, whose monthly income are in ALL. During 2006-2010, the exchange rate Euro/ALL, has been considerably increased, but ongoing it has remained in a sustainable level within the interval 138-140, which means that the Albanian currency is constantly devaluated comparing with Euro, which means that Euro has become more expensive for Albanian buyers, whose income are in ALL (Bank of Albania, 2015).

Inflation: as an indicator of decreasing buying power, it affects the disposable income of individuals, so far the demand for real estate. Although, the investments in real estate, are considered as investments which deduct the effects of inflation either in the estate of individuals or businesses. In Albania, the inflation rate is kept stable with the parameters of 2-4% (Bank of Albania, Statistical Reports 2005-2015).

Financial services: are those services linked with: initial credit commissions for real estates, other commissions and tariffs, which refers to the payment for notary services due to buying –selling process.

Governmental factors: The governmental factors are very complex, but still affective, such as:

Fiscal Policies: Fiscal policies are treated as factors, in the contexts of their evaluation process, the legalization etc. In Albanian contexts, these have been accompanied with so many changes and high level of informality (General Taxation Directorate in Albania, 2015).

The literate impact of Government in real estate market. This has to do with the governmental policies toward the decrease of costs of credits for buying dwelling estate.

Educational development, the quality of education is directly linked with the buying of real estate for living purposes.

Development of unions: this is an indicator which reduces the risk of undo for the employment contracts by the employee's side, so it affects the employment markets and as a result, the stability of the disposable income of the employers.

The quality of public services: there are included here many different public services, but those which counts more are: Health public service, security issues, firefighter

services, public transport etc. Many studies have classified these services as very influential toward the real estate demand, especially for living purposes.

Geo – Climate factors: These factors have a convincing importance in real estate market, such as:

Locality: local position of real estate markets, such as different geographic or regional areas. Capital cities, main trade centers (customs), port cities, airport cities, big industrial cities, touristic areas etc. has a higher demand regarding real estate, comparing with other city types.

Transport: This factor impacts the demand for real estate and has to do with many types of transport such as: the nearby location with the highways, trade centers, working centers etc.(Smersh, Smith and Schwarts, 2003).

Topography: This factor has to do with the topographic position of the area where the real estate is located and is a factor that impacts the demand. Such areas may be: seaside areas, or under the sea level, lake –side areas, river-side areas, mountain areas etc.

Climate conditions: even this factor is a demand one. Climate conditions are linked with the cost for a normal life, transport problems, energy. Internet etc. So, these issues will affect the living costs or costs of doing business.

Socio-Demographic factors: Lastly, within the factors that affect the price of real estates are the ones of socio-demographic nature (Miles et al, 2000), such as:

Population: This refers to the population number in a certain area, the density per square kilometers, average age etc. This factor impacts the demand in a real estate market, mainly for the estates used for living purposes. Albania is a country with young age population and the average age is 35.5 years old (INSTAT, Census 2011), this shows for the high potential need for dwelling estates and services ones.

Family composition: is another incentive or inhibitor demand factor in real estate markets. In reality, families with one or two children may inherit estates from their parents or grandparents; in this case they were not obliged to buy other estates.

Conceptual changes of living and work conditions: As the post-communist period is going on in Albania, the concept of the dwelling space for household is changing, so far, the measures of a house has begun to extend its limits 2-3 time more than before, now we can talk for studio, or office space within the house etc. This influences the demand for real estate.

The holidays' culture. This is a new culture, especially for big cities, and has potential impacts to increase the demand and needs for more living space. While, in the context of business purpose, even the office's culture has begun to adopt the European standards, the companies have established their own campuses, many businesses,

even small ones, are adopting themselves with the conceptual changes of the spaces, evaluating the architectural aspects and so on.

The perception of life and property security: facilitated by the insurance companies, the level of security for private properties of individuals in Albania, is one of the most fragile in the Europe, as far as insurance culture is concerning. Although, the idea that an area is percept as one with high level of risks and criminality, holds back the buying of estates for living or business purposes as well as the development of business, especially the small and medium business.

Being friendly with the environment: This is a recent time phenomenon and is expected to be part of the Albanian culture, even though in some cities it is already settled. We are speaking here for the friendly constructions, using sunny energy etc., often, these kind of buildings are accompanied with additional costs compared with traditional constructions, so that, they impact the supply and demand of real estate.

Methodology of study

In this study are used the techniques and analysis of linear multiple regression by VECM (vector error correction model), with some macroeconomic independent variables and one specify dependent variable "house price index". The data are taken from official statistics published in statistical reports and institutional studies. These data represent a 3-month time series, for 2010 - 2018. The analysis will begin with finding significant statistical relationships of the unit root, co integration, and VECM estimate.

ADF Test of Unit Root: ADF Test of Unit Root. This test is the fundamental of testing the series and return to a stationary series. To realize this, we have used the Augmented Dickey-Fuller test (ADF). According to this test, we test whether a time series of data is influenced by its initial value, by the trend of time or by both simultaneously. The basic equation of ADF test linked with the constant and the trend is:

$$\Delta X_t = \lambda_0 + \lambda_{1t} + \lambda_{2t} X_{t-1} + \sum_{i=1}^{n-1} \lambda_i \, \Delta X_{t-1} + \varepsilon_t$$

This equation shows a time series (variable in the study) in the form of the first difference $\Delta X_t = X_t - X_{t-1}$ in the period t, where $\lambda_0$is the constant and t is the trend, with the null hypothesis, H_0: $\lambda_2 = 0$ (time series data is non stationary).

Johansen Test for Co-integration: After addressing the issue of unit root, the co-integration test can be applied in order to establish the long run relationship among the variables. To identify these long-run relationship we will use the trace test for co integration and its maximum eigenvalue statistic(Johansen, 1991). Theoretically, the Johansen test is based on matrix theory and the theory of its eigenvalue. Let k> 2 be the number of non-stationary and integral first order series I(1) included in the

model, and r the number of vectors that co integrate with each-other, where r ∈ [0; k - 1], then the co integration hypothesis is:r ≥ 1 (there is at least one cointegrating pair).Trace test and Max-Eigen values are lower than the critical values and p-values for them are also insignificant which asserts that Vector Error Correction Model (VECM) is not applicable in this specific case.

*Vector Error Correction Model (VECM):*VECM limits the long-run behavior of endogenous variables to converge towards their co integration relations. If there is a single relation for two time series X_t and Y_t such that: $u_t = Y_t - a_0 - a_1*X_t$ and the series are stationary with first difference I(1) and these series I(1) cointegrate with each-other. The dependent variable is Y_t series and the endogenous independent variable X_t, create a VECM model with lag = p and k dimensions:

$$\Delta Y_t = \underbrace{c + \sum_{i=0}^{p} \beta_i \Delta X_{t-i} + \sum_{j=1}^{k} \delta_j \Delta Y_{t-j}}_{short-run} + \underbrace{\{(-1) * \lambda\}[Y_{t-1} - \alpha_0 - \alpha_1 X_{t-1}]}_{long-run} + \varepsilon_t$$

The most important coefficient of the equation is λ which we can define as the coefficient of adjustment and explanatory of the long-run relationships between variables only under conditions where this coefficient is statistically significant.

Empirical analysis and results

The analysis of this study are based on quarterly frequency of time series from 2010 to 2018.

Based on the literature review we have selected the following variables in table 1. We think that these variables rapresent the specifict of Albanian real estate market.

The meaning of the variables in the model and their description and the source of information is shown, as well in table 1:

Table 1. Meaning and description of variables of the VECM model.

The variable code	Description of the variable	Source of information
Dependent variable:		
CMIM	Housing Price Index in Tirana (Capital of Albania), measured in base index, year 2002 = 100.	Bank of Albania
Independent variables:		

IKN	Construction Cost Index (measured in % change, includes all types of direct and additional costs for construction).	INSTAT
KURS	Currency exchange rate EUR/ALL (the housing market has the price in Euros and the Albanian income in ALL).	Bank of Albania
INT	Interest rate on long-run loans (measured in %, loans with maturities greater than 5 years).	Bank of Albania
HUA	National Mortgage Loan (measured in million Euros, measures the source of funding for individuals, where 90% of mortgage loan).	Bank of Albania

Source: Author's summary

To create a VECM model, some steps need to be followed correctly. These steps will be detailed below, and we will have an effective VECM model at the end. The table 2 below shows the unit root test results for each variable of the model. The Dickey-Fuller approach is used to apply the unit root tests.

Table 2. ADF unit root test results.

Time series	Levels (prob.)			First differences (prob.)		
	with constant	with trend constant	without constant and trend	with constant	with trend constant	without constant and trend
CMIM	0.5903	0.1280	0.5205	0.0118	0.0058	0.0007
HUA	0.9662	0.0252	0.0044	0.0000	0.0000	0.0024
KURS	0.9882	0.9914	0.4192	0.0003	0.0000	0.0000
IKN	0.9742	0.1150	1.0000	0.0000	0.0000	0.0000
INT	0.8932	0.0178	0.2326	0.0000	0.0000	0.0000

Source: authors' calculation in Eviews 9. If probability is less than 0.05 (percent significance level), the time series is stationary.

According to ADF test all of the variables are found out to be non-stationary for level form, however their first difference turns these series into stationary ones.

The second step of VECM model is the Johansen and Juselius (1990) approach. Using this test we have only two possibilities: co integrating relationship or no co integration. This approach suggests two kind of statistical tests: trace test and maximum eigenvalue test. Firstly, we have to determine the optimum lag (time retrospective of the variable). The results of optimum lag are in table 3 below:

Table 3. Lag Order Selection Criteria

Endogenous variables: CMIM, INT, KURS, IKN, HUA

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-439.6802	NA	5158147.	29.64535	29.87888	29.72006
1	-308.5202	209.8561*	4473.623	22.56801	23.96921*	23.01627
2	-283.5320	31.65171	5210.412	22.56880	25.13766	23.39060
3	-243.7460	37.13362	3005.706	21.58307	25.31959	22.77841
4	-189.9255	32.29231	1268.155*	19.66170*	24.56589	21.23059*

* indicates lag order selected by the criterion

Source: authors' calculation in Eviews 9.

We have decided to choose the "lag" equal 4 because the most of criterions suggest it. This lag is the best according to economics meaning (the data are quarter of year). Now we need to identify co integration pairs, and the results are shown in the table 4 below:

Table 4. Cointegration test

Hypothesized/ No. of CE(s)	Trace		Maximum Eigenvalue	
	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
None *	203.4329	0.0000	93.97013	0.0000
At most 1 *	109.4628	0.0000	52.00393	0.0000
At most 2 *	57.45887	0.0000	34.80985	0.0004

At most 3 *	22.64902	0.0035	22.04342	0.0024
At most 4	0.605602	0.4364	0.605602	0.4364

Source: authors' calculation in Eviews 9.

Based on the above results, we can find four co integrating relationship between variables. This fact shows us that we can build the VECM model for the long-run variables relationships between them. Using estimation method "Least Squares" in Eviews, we can find the coefficients of VECM model. The model has 4 co integration pairs, four coefficients of long-term links will be found. After processing the data in Eviews 9, (the time series was transformed into stationary by the first differences) using the VECM technique in identifying endogenous factors in explaining the dynamics of the housing price index in the city of Tirana (the capital of Albania) in long-run, the results are as in the table 5, below:

Table 5. VECM model.

System: VECM

Estimation Method: Least Squares

Sample: 2010Q2 2018Q4

Included observations: 35

Total system (balanced) observations 35

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.655673	0.244567	-2.680950	0.0231
C(2)	-10803.28	4228.527	-2.554856	0.0286
C(3)	3.912146	7.644301	0.511773	0.6199
C(4)	-196.4402	74.35231	-2.642019	0.0246
C(5)	0.523694	0.270716	1.934476	0.0818
C(6)	8121.495	4718.743	1.721114	0.1160
C(7)	-5.079796	15.62860	-0.325032	0.7519
C(8)	98.10432	80.44481	1.219523	0.2506
C(9)	-0.023651	0.016485	-1.434755	0.1819
C(10)	-0.240361	0.212503	-1.131090	0.2844
C(11)	3286.754	4015.241	0.818569	0.4321
C(12)	-26.96906	17.43568	-1.546774	0.1530
C(13)	66.61706	78.25166	0.851318	0.4145

C(14)	-0.006031	0.017605	-0.342571	0.7390
C(15)	0.037457	0.207247	0.180736	0.8602
C(16)	3733.466	3087.112	1.209372	0.2543
C(17)	-3.270062	14.21971	-0.229967	0.8228
C(18)	63.92001	61.81467	1.034059	0.3255
C(19)	0.006731	0.016745	0.401953	0.6962
C(20)	-0.400024	0.174920	-2.286900	0.0453
C(21)	428.6888	1825.886	0.234784	0.8191
C(22)	-15.81584	15.20398	-1.040244	0.3227
C(23)	22.39680	45.29795	0.494433	0.6317
C(24)	-0.008454	0.016387	-0.515902	0.6171
C(25)	-52.20464	33.01013	-1.581473	0.1449

Determinant residual covariance	377.3274

R-squared	0.873547	Mean dependent var	-15.02052
Adjusted R-squared	0.570061	S.D. dependent var	55.42294
S.E. of regression	36.34069	Sum squared resid	13206.46
Durbin-Watson stat	2.315663		

Source: authors' calculation in Eviews 9.

The general equation of the VECM model is:

$$\Delta CMIM_t = -52.2 + \overbrace{\begin{Bmatrix} \lambda_1 \cdot (1; 0.5808) \cdot \begin{pmatrix} CMIM_{t-1} \\ HUA_{t-1} \end{pmatrix} \\ \lambda_2 \cdot (1; -2.72E-06) \cdot \begin{pmatrix} INT_{t-1} \\ HUA_{t-1} \end{pmatrix} \\ \lambda_3 \cdot (1; -0.000667) \cdot \begin{pmatrix} KURS_{t-1} \\ HUA_{t-1} \end{pmatrix} \\ \lambda_4 \cdot (1; -0.0018) \cdot \begin{pmatrix} IKN_{t-1} \\ HUA_{t-1} \end{pmatrix} \end{Bmatrix}}^{\boldsymbol{long-run}} +$$

$$\boldsymbol{short-run}$$

$$+\begin{pmatrix} 0.5237 & 8121.5 & -5.0798 & 98.1043 & -0.0237 \\ -0.2404 & 3286.7 & -26.9691 & 66.61706 & -0.0060 \\ 0.0375 & 3733.5 & -3.2701 & 63.9200 & 0.0067 \\ -0.4000 & 428.69 & -15.8158 & 22.3968 & -0.0085 \end{pmatrix} \cdot \begin{pmatrix} \Delta CMIM_{t-1} & \Delta CMIM_{t-2} & \Delta CMIM_{t-3} & \Delta CMIM_{t-4} \\ \Delta INT_{t-1} & \Delta INT_{t-2} & \Delta INT_{t-3} & \Delta INT_{t-4} \\ \Delta KURS_{t-1} & \Delta KURS_{t-2} & \Delta KURS_{t-3} & \Delta KURS_{t-3} \\ \Delta IKN_{t-1} & \Delta IKN_{t-2} & \Delta IKN_{t-3} & \Delta IKN_{t-4} \\ \Delta HUA_{t-1} & \Delta HUA_{t-2} & \Delta HUA_{t-3} & \Delta HUA_{t-4} \end{pmatrix}$$

The model co integration terms are λ1, λ2, λ3 and λ4. Only λ3 is not statistically significant (with p <5%), while the other three terms (λ1, λ2 and λ4) are statistically significant (with p <5%), and explain the long-run relationships of our model. In the general equation of the VECM model are specified variables with long-term and short-term relationships (according to time delays). This equation of the VECM model confirms the basic working hypothesis:

Working hypothesis: Long-term equilibrium price index of Tirana housing is achieved by the long-term performance of macroeconomic factors (mortgage loan, interest rate on long-term loans, construction cost index, EUR / ALL exchange rate, and prior house price index): Hypothesis "at least one λi ≠ 0 for i = 1, 2, 3, 4".

Our VECM model shows us the following statistically significant long-term relationships:

CMIM: In equilibrium conditions, the change in CMIM in the short run will contribute to the achievement of long term equilibrium index of 65%. If the previous 3-month period has had an increase of 1% in the CMIM, it is expected that this increase will be followed by a long-term CMIM growth average of 0.65%. Short-term fluctuations (market imbalances) in the short run of housing prices have a major impact on maintaining long-term equilibrium. The change in the market price of housing that has taken place in Tirana over the last decade has been accompanied by a continuing decline in this market. The reasons for this economic situation are many, such as: many building permits at one time and construction suspension at another; numerous fiscal and bureaucratic changes in obtaining building permits; high level of corruption in the country; significant fluctuations of the business climate in the country; financial difficulties of construction companies; investing informal money in real estate; etc.

Construction Cost Index (IKN): If IKN rises by 1% in the long run it will result in an average increase of about 2% of the equilibrium CMIM in the long run. The increase in the construction cost index indicates an increase in the cost of production factors, which will consequently be accompanied by a decrease in the market supply, which under conditions of unchanged demand will be reflected in the increase of housing prices. This phenomenon is based on market expectations and economic principles. It is the task of policymakers to ratify more international free trade agreements and with concrete effect on domestic production, by applying construction industry's mitigating fiscal policies for production factors. Protectionist fiscal policies for the

production of raw materials in the construction sector are detrimental to the housing market and should not be applied to the Albanian economy.

Long-Term Interest Rate (INT): If INT increases by 1% over the long-term, this will result in an average increase of about 108 points of the equilibrium CMIM index in the long-term, or an average increase of 13%. Housing price has the highest elasticity against the variable INT. The absolute value of resilience was expected to be higher than all other variables taken into account, but the direction of the link leaves us in doubt. There are two explanations for this phenomenon: firstly, an increase in the market interest rate on loans would discourage individuals to borrow, bringing about a decrease in demand for housing (hence lowering the quantity and price in equilibrium bidding conditions ceteris paribus). Secondly, an increase in the market interest rate on loans will lead to an increase in the cost for construction companies, leading to a decrease in the supply of residential real estate (consequently lower quantity and lower price, in terms of demand paribus). The net effect of these two phenomena at the same time has resulted in a stagnant economic situation of the Tirana housing market (a trend of decreasing residential built areas and rising housing prices). By the economic nature of the market, the interest rate will reflect a faster impact on demand than supply, so supply is less flexible than demand in the short run.

In the long run the opposite happens, supply is more flexible than demand. Construction companies in Tirana are big business company with domestic capital and have an optimal capital structure with over 60% debt (Ll. Lleshaj, 2016), therefore they finance a construction project on loan at least 60% on average (of construction cost). Whereas individuals under the banking system conditions in Albania can borrow up to 70-75% of the market value of the house (Bank of Albania, 2018). Referring to official publications for Tirana (for the three-month period 2016-2018) the level of lending for housing purchase is as much as 1.8 times the amount of loans granted for construction (Bank of Albania, 2016-2018 statistics). This coefficient also indicates the change in the elasticity of supply with demand coming from the lending factor. On the other hand, coefficient 1.8 indicates the large change in the cost of construction and sale price for apartments in Tirana. If Euro/m^2, 0.7*P is the value borrowed from the individuals and (0.7 / 1.8) * P = 0.39 * P is the value borrowed from the construction company, where 0.39 * P = 0.6 * K hence the "K" cost of construction is K = 0.65 * P and the gain is 0.35 * P (such a conclusion is also supported by real estate market valuation experts). So, the elasticity of supply is minimum 1 / 0.39 = 2.56 while the elasticity of demand is maximum 1 / 0.7 = 1.43, which means that a change of one m2 of residential building surface will bring a greater response to supply than demand. Under these conditions the net effect indicates an increase in price. Looking at the market interest rates, according to the official publications in Albania for the years 2010 - 2015, the interest rate was about 4-5% higher for loans to construction companies than for mortgage loans to households, while for 2015 - 2018 this difference has dropped to about 2%. This fact

indicates an additional net increase in the house price as a result of the increase in the lending rates in the banking market. Under these conditions, the multiplier effect of interest rate hikes is very large on the price of housing, so credit risk supervision authorities should use an expansive monetary policy (by lowering the key interest rate). Monetary policy in Albania has not provided the required efficiency in lending as expected, two issues arise here: first, there is a need to increase the monitoring of expansive policy implementation through rigorous bank auditing; and second, there is a liquidity trap in the Albanian economy (lower interest rates and lower investment levels), this indicates excess liquidity in the economy, i.e. money outside the financial system (informal money in circulation at levels that have made expansive monetary policy ineffective for at least the last half-decade).

Euro Housing Loan (HUA): If the HUA increases by 1% in the long run, this will result in an average decrease of about 0.7% of the equilibrium CMIM index in the long run. Under normal conditions an increase in these loans would affect the increase in demand and therefore in the short run would be accompanied by an increase in the price of housing only, while in the long run the increase in the price should be lower as the housing area would increase. According to our model, in the long run there is a negative relationship, so the loan for home purchase in Tirana does not serve as the only financial instrument of repay. As long as this market exists and is present in every area of Tirana, why does the loan not serve as the main instrument of payment? The average standard of living in the city of Tirana (INSTAT, average salary and family budget 2010-2018) does not provide income for the purchase of housing as a secondary loan source. Here is the suspicion that there is a lot of informal or illegal money in this market. This argument is further supported by the INT variable. Albania, for years, has had a high level of informal money in the country. The trend has been increasing in recent years, expressed by the Basel AML Index, 2015-2018, which ranks Albania as a high risk country. Compared to the Western Balkan countries, Albania is the country with the highest level of money laundering.

Exchange rate EUR / ALL (exchange rate): The exchange rate variable has no long-term relationship with the house price index. According to the statistical technique of the least squares the reason for the discrepancy is: the COURSES variable had a steady performance during the period under study (with the exception of a significant decrease in the last year), whereas housing prices were accompanied by a volatility and increasing in recent times, the performance of these variables turns out to be independent.

Conclusions

The analysis of the VECM model identifies statistically significant relationships for the endogenous variable's relationship over the long run. The housing price index in the Albanian capital, Tirana, reaches the long-run equilibrium affected by some key variables of this paper. Macroeconomic variables in the form of time series for 2010 -

2018 (with 3-month frequency) are included in the analysis. The number of data fulfills the criteria of econometric implementation of VECM evaluation.

From the analysis we found that the short-term dynamics of this index itself contributes to the achievement of long-term equilibrium by 65%. This is the basic quantitative reason that the values of this index are volatile in the long run and often disequilibrium.

In addition to the economic reasons of market agents, there are other factors: political, legal, and other extra economic or illegal that have brought about this last decade's imbalance. Tirana Housing Price Index has a direct and statistically significant relationship with the Construction Cost Index. A facilitating fiscal policy of the construction industry for production factors would therefore be suggested. In order for the prices to be in equilibrium and acceptable for the average living standard of the inhabitants of this city.

Also, the Housing Price Index has a straight and statistically significant relationship with the interest rates on long-term loans, with the highest degree of resilience from all the variables included in the analysis.

The long-term effect of interest rates on both supply and demand (in the long run, supply is more flexible than demand), the construction sector in this city is stagnant and the multiplier of interest rates on housing prices is very high. The fact that Albania's monetary policies have been expansive in recent years, the country is heading for a liquidity trap, means that there is a high informality in this market. The house price index has a statistically significant negative relationship with the level of mortgage lending at the national level, i.e. home buying loans in the city of Tirana do not serve as the only financial instrument of payment.

As long as citizens' livelihoods are low enough to meet housing prices, there is a stream of informality and illegal money invested in this market. In our analysis, in the long run, the exchange rate is not statistically significant in relation to the equilibrium price of housing.

After considering all the Albanian specific variables and the conclusion we have meet, we also think that there are some opening issues, as housing specific evaluation, the comparison of market value between the real estate in Tirana and Wester Balcans capital cities, etc.

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