

# Mortgage lending and house prices in Albania - a co-integrated analysis based on VECM

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## Abstract

*The general view that the banks' lending plays a crucial role in the real estate market was again confirmed during the recent financial crisis. During the pre-crisis period, house prices in Albania increased rapidly, supported also by a fast expansion of mortgage lending. This study aims to empirically analyse the relation between housing prices and banks' financing in the long run, referring to a VECM model. The estimated results confirm the important role of mortgage to house prices. Meanwhile, the relation between house prices and interest rates resulted statistically insignificant. Unlike the previous literature, exchange rate has been included as an endogenous variable. Results show positive correlation and statistical significance between house prices and exchange rate. Finally, this paper is expected to contribute to the literature as there are very few studies that elaborate on the macroeconomic factors' influence on the housing prices in Albania.*

*Keywords:* housing price, bank financing, VECM, country experience Albania

## 1. Introduction

House purchasing is one of the most complex decisions people have to make because it associates with the need to have a good standard of living, the desire to consume, and furthermore, it may be seen as an investment in a durable product, that would provide profits in the future. Meanwhile, this market is closely related to the banking system and its main activity: lending. In addition, the housing market has specific institutional features whereas state intervention is crucial, interrelated with social and economic policy, which radically affects people's decision. Understanding economics in a dynamic market with a high and widespread influence in economy is a constant challenge for researchers and academics, although it has been extensively elaborated on. Moreover, in the former communist countries, due to data limitation and institutional problems in

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the housing market, studies focusing on the macroeconomic factors affecting the housing market are limited. In particular, for Albania, there are rather few studies in this regard. This paper aims to fill this gap in the literature and to offer a new prospect of the housing market, highlighting the role played by macroeconomic factors in the dynamics of house prices.

An added value of this paper is the empirical investigation of housing prices and macroeconomic factors such as financing from banks, exchange rates and mortgage interest rates. In contrast to the existing studies, this study shows for the first time an alternative indicator of housing market financing, as it is measured by the use of financial leverage in the market, represented by the ratio of mortgage loans to the GDP. Also, for the first time for Albania, the impact of exchange rates on the housing prices performance is observed given that this market is characterized by high use of foreign currency. Another contribution that this study brings to the existing literature is the use for the first time of a vector error correction model for Albania. The method chosen, which is widely used in the foreign literature, is thought to best fit the purpose of this study, because it takes into account the endogeneity between variables and analyses the short and long-term implication of the relationship between variables. The empirical analysis results show that the performance of housing prices is positively related to bank financing and exchange rates both on the long and short term. Meanwhile, this analysis could not confirm the existence of a statistically significant relationship between interest rate and housing prices.

This paper is organized in four sections. The following section brings an overview of the literature that analyses the importance of banks' lending for the housing market. The second section presents a detailed overview of the housing market and credit developments in Albania. The third section provides empirical findings, based on VECM model, about the factors affecting the performance of house prices in Albania, highlighting the role of the expansion of mortgage lending. Finally, the paper concludes with the main findings pinpointing some drawbacks that hinder the normal development of house prices in Albania.

## **2. Literature review**

The dynamics of housing prices are widely discussed in the academic literature for a variety of reasons. Housing is considered to be the largest private investment that people make in their lifetime. Moreover, the housing market is considered a market with very heterogeneous products, with few transactions and a quite high information cost. Also, the special nature of the real estate market, which is conditioned by a rigid supply and the occasional boom, establishes the premises for creating optimistic expectations and euphoric decision-making (Cappozza, 2002). These elements further complicate the role that housing has for individuals. Furthermore, houses play a very important role for the construction sector which, in many countries, and especially developing

ones, also represents the promoter of economic growth and employment (OECD 2011). The connection to this sector certainly reinforces the major role that housing plays in the economy. In addition to the importance it has for people's lives and the economy, the housing market is one with a high degree of interference of state policies and governmental institutions. Consequently, developments in this market are significantly influenced by the institutional and legal framework of the country. Another channel of high importance is the pivotal role that housing plays for the performance of banking activity (Doling *et al.* 2013). Given the fact that most bank loans are collateralized with houses or real estate, the price of housing essentially influences the decision making for lending and the overall banking activity. Precisely, this role was emphasized by the global financial crisis of 2007-2008, which has shown that housing prices were an important factor on the deepening and severe aftermath of this crisis. For this reason, the acknowledgment of housing determinants has become essential, even though many studies have been undertaken in recent decades in this regard.

Cycles of boom and busts of the housing prices are an inherent feature of the housing market. This is because housing prices reflect the supply delay in responding to demand shocks and, in turn, reflect the slow pace of defining the price, due to the lack of transparency and relatively rare trading of houses. At the same time, the price of housing reflects the high cost and illiquid nature of transactions and the impossibility of selling the house in a short period of time. In other words, real estate prices and economic activity in the construction sector are expected to show large fluctuations over long time periods. This is due to the institutional characteristics of real estate financing and the effects of regulatory measures taken by the authority of a country (Igan and Loungani, 2011).

Another macroeconomic factor affecting the performance of housing prices is the exchange rate. This factor takes a particularly important role in terms of global liberalization and opportunities for foreign investors, looking for profit. In particular, the exchange rate plays a special role for those countries that highly use foreign currency in their economies. Zhang *et al.* (2012), in their paper on the fundamental determinants of housing prices in China, find positive correlation between housing prices and the appreciation of the real exchange rate. The same findings were also confirmed by Yang and Zhiqiang (2012), who focused on the impact of housing prices on the exchange rate performance.

Many observers and scholars of the recent financial crisis have suggested that easy access to credit and low lending interest rates have been the main factors that have supported both the accelerated increase of the housing prices and the immediate change of the housing prices when credit dried up (Favilukis *et al.* (2010), Mayer (2011)). Proponents of a different perspective in this debate argue that the low cost of loans alone cannot explain the swelling or significant blast of house prices, and other factors are likely to have played an important

role (Glaeser, *et al.* (2010)). Greenspan (2010) states that, rather than lowering long-term interest rates, it was the introduction of new financial products and their lack of oversight, which resulted in the rapid increase of housing prices. On the other hand, Crowe *et al.* (2011), in their comparative material between countries, argue that the lack of empirical evidence supporting the role of interest rates in housing prices was due to the inflationary pressures contained in the economy.

One of the demand factors that has gained special attention in the literature is the impact of the credit, especially the relationship between mortgage loan and the price of housing. Mortgage loan affects housing prices through the so-called “financial accelerator” mechanism. According to Bernanke and Gertler (1989), loans given by banks stimulate the demand for housing purchase. In response to increased demand the housing prices will rise and meanwhile the pledged collateral for obtaining credit will be higher, allowing an additional mortgage loan and thus stimulating further demand for loans and speed up the whole process. However, the boom periods in lending and house prices would end up. A lower value of collateral and increased uncertainty would reduce banks’ initiative to lend. Furthermore, higher costs of mortgage credit service will bring some households to potential bankruptcy, especially in the case of the ‘not that good quality’ borrowers. Experiences from the past have shown that, in periods of boom, banks have a tendency to be more competitive and they incline to address more those segments of the households which take high risks. Under high uncertainty, households will aim to reduce consumption and increase savings and, as a result, they will shrink investments in real estate. Reduced demand for house purchases is reflected in their prices and furthermore, it will reduce the value of the collateral that serves to back up loans. Wealth effect would act in the opposite direction, resulting in lower consumption. Finally, economic activity in general will decrease by the same instruments that were activated during the economic boom and, as a result, an increase of non-inflationary pressures would be experienced. Many of these mechanisms were demonstrated by the developments during the latest financial crisis (in 2007/2008) in developed and developing economies.

Egert and Mihaljek (2007) make a comparative analysis between countries of Central East Europe (CEE) and OECD countries. They note that the price dynamics in the CEE countries, aside from disposable income and credit, is strongly influenced by specific factors, such as the lack of institutionalization of the housing market; the limited supply of new homes on the market immediately after the market liberalization; improvement in the quality of housing; and, increased demand from non-residents. In these countries, a factor of particular importance is the underestimated initial level of house prices in the transition period. Egert and Mihaljek have estimated that this factor has influenced the dynamics of housing prices during the economic convergence of these countries.

Studies on the housing market in Albania are scarce, due to the newness of this market and to the lack of official statistics data on housing prices and features. Some of the existing literature for Albania is focused on building the housing price index. Kristo and Bollano (2011) papers have explained the methodology of creating a housing price index, compiled and published by the Bank of Albania, while Agalliu (2013) offers another approach for calculating the house prices index. Furthermore, there are also some studies on the effects of the credit performance on house prices. Bollano and Ziu (2009) have attempted to explore the relationship between credit and house prices in Albania, as well as the impact that fluctuations in credit and housing prices have on the economy. Their empirical analysis has identified a strong impact of the economic activity and credit to the private sector in housing prices. These findings were later confirmed by Suljoti and Harshova (2012). Unlike Bollano and Ziu (2009), they have included the total income, interest rate, credit and construction cost index in the model, as explanatory factors of the house prices performance. The empirical results of their study confirmed the positive relationship between house prices and loans, total income and construction costs while the results on the link between house prices and interest rates, although with the expected sign, were not statistically significant. Kripa *et al.* (2013) conclude in their study that the housing market in Albania does not suffer from “bubbles”, and the reduction of prices observed in recent years highlights the development in the real supply and demand on the market, which have been widely affected by the worldwide developments.

### **3. Some stylized facts for house prices and mortgage lending in Albania**

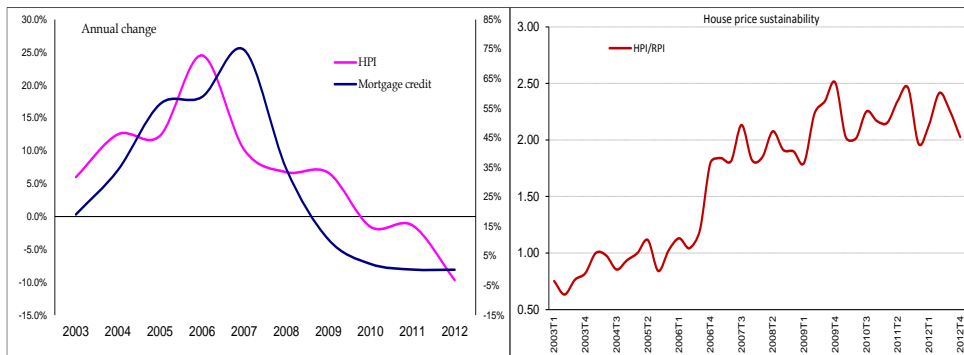
The housing market and lending for house purchases have experienced significant changes in the last 10 years in Albania. Developments in these two markets can be divided into two different periods. During the first period, 2004-2007, there is clear evidence on the rapid increase, both in the housing market and in mortgage lending. Meanwhile, during the period 2008-2012, there was a slowdown in growth rates and then a contraction of the two markets, affected by the sluggish economic activity, high uncertainty and low confidence, which reflected also the implication of the global financial crisis to the Albanian economy.

*During 2004-2007*, house prices in Albania show significant increase, especially in Tirana (the capital of the country). Available data on the housing market show that house prices in the city of Tirana have increased by an average of 13 percent per year. Since the early ‘90s demographic changes, economic and social factors have been some of the main factors that have increased demand for new construction. In this regard, an important role has been played by the migration from urban and rural areas toward Tirana. During the transition period, the attitude of living all together in a “big family” has been gradually

abandoned and the new couples choose to live apart from their parents, thus increasing the demand for houses. Another major source of demand for new apartments has been from emigrants leaving abroad. The improvement in living conditions and higher disposable income of Albanian emigrants in the countries of residence, have brought up a significant source of demand for dwelling in Tirana. This tendency is believed to have continued up to the end of 2007.

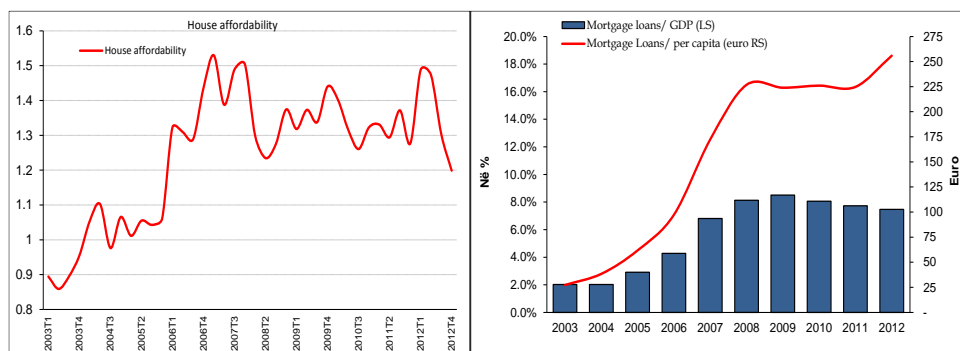
All the above mentioned factors have contributed to the rapid growth of house prices. As chart 1 shows, the ratio of indexed house prices to rent grew rapidly until the end of 2007. This development indicates the rapid increase in house prices which have left behind the moderate growth in the houses' rent. These parallel developments also reflect the very low level of this ratio at the beginning of transition. The annual growth rate of this ratio averaged to 30% for the 2003-2007 period. However, as evidenced by Mihaljek *et al.* (2007), house prices in post-communist countries are characterized by a low initial level, so a rapid growth in houses' price is also driven by the adjustment process of these prices toward a new equilibrium.

**Figure 1. House prices development in Albania**



Source: Bank of Albania

Another important factor, which influences the demand for houses, was banks' mortgage credit. The increased efficiency of the banking system helps to introduce mortgage loans to the household on very attractive terms. During 2004-2007, the annual growth rate of mortgage loans accelerated by an average of 65% (see figure 1). The positive performance during this period was supported by important changes within the banking system and the overall economic development in the country.

**Figure 2. Affordability indicator and the banks' mortgage lending**

Source: Bank of Albania, INSTAT

The willingness of banks to develop the mortgage market was accompanied by the desire of their clients to obtain loans. During this period, there was an increasing interest of households in banks' financing, driven by the rapid growth in house prices. House prices at the end of 2007 were almost 65% higher compared to the end of 2004. The affordability indicator of buying a house, measured by the ratio of house prices index with the salary index, shows that, in this period, buying a house has become increasingly difficult (see Figure 2). This situation picked up until the end of 2007. With house prices' further increase, the collateral value has expanded, making it easier for households to qualify and to obtain the desired amount of credit. At the same time, banks introduced attractive mortgage products by significantly easing lending standards, which has helped to further stimulate demand for mortgage loans. Meanwhile, the positive development in the economic activity seemed to create positive expectations for the future and for the further increase of house prices, thus encouraging households to purchase houses with credit, thus creating a feedback loop. Following this development, at the end of 2007, the mortgage loan portfolio was almost twice as high as at the end of 2004.

During the 2008-2012 period, there was stagnation in the real estate market. The supply for houses has not increased as the data of building permits and the activity of the construction sector show. Meanwhile, the demand for buying new houses has considerably dropped. Since the end of 2008, the construction sector has been contracted and has contributed negatively to the real economic growth. This phenomenon has been observed in many other countries after the global financial crisis and has also reflected in the household expectations for house price correction and high uncertainty about the future. Furthermore, emigrants' demand for houses purchasing has declined, in response to the deteriorating labour market conditions in the countries of residence. These developments have led to a marked slowdown in the annual growth of house

prices. Agents of real estate market indicate that in the last two years the volumes of transactions are low and the time needed for selling a house has increased (Bank of Albania Survey, 2013)

Therefore, after 2007, the annual expansion of the mortgage loan was significantly reduced; it even shrunk over the last 2 years. In early 2009, the strong slowdown of the annual increase in mortgage loans is impacted by the difficulties in the banking system liquidity. These difficulties forced banks to sharply the credit standard, in particular, foreign currency lending to households, which is closely related to the mortgage loan. A tight supply of mortgage credit resulted in the declining demand for these loans during this period. Subsequently, the demand for mortgage loans was reduced and further affected by the slowdown of disposable income, in response to the poor performance of the economy in the post-crisis period. This is thought to have contributed to the decline in demand for the post-crisis period. This phenomenon is also observed in other countries of Central and Eastern Europe (Hildebrandt, 2012).

## **4. Empirical findings**

### **4.1. Model**

Gimeno *et al.* (2006), Fitzpatrick (2004) and Gerlach (2005) have used a Johansen (1994) methodology to identify the co-integration relationship between house prices and mortgage credit. Based on these studies, this paper aims to evaluate a vector error correction model as proposed by Engle and Granger (1987) for the Albanian housing market. This section concludes with the presentation of statistic tests that confirm the stability of the model on the long as well as on the short term.

Johansen methodology for the co-integration relation proclaims that if between two or more non stationary variables of order one, at least one vector - which is a stationary variable- exists, then we can say that the variables are of the first rank cointegrated. According to Julius 2006, a vector error correction model (VECM) provides a suitable platform to evaluate the process between two/or more cointegrated variables of interest in time series framework. This model is also known as the unconditional VAR model, which may include different measurements without placing any conditionality on the parameters of the model, and maintaining the feature of the functional relation. Julius (2006) highlights among the main advantages of using this model the significant reduction of the *multicollinearity effect*, which is a widespread feature within the time series variables, providing summarized information for the long-term relation of the variables in a matrix form. Furthermore, it evaluates/assesses within the same framework the system of short-term equations, also providing



information on the short term development. A formal presentation of this model is:

Vector error correction model (VECM) of the first rank  $m=1$

$$\Delta X_t = \pi X_{t-1} + \sum_{j=1}^{q-1} \tau_j \Delta X_{t-j} + \delta D_t + \epsilon_t \quad \epsilon_t \sim N_P(0, \Lambda)$$

$t=1, \dots, T$

where:

$$\Delta X_t = \pi X_{t-p} + \theta D_t + \tau_1 \Delta X_{t-1} + \epsilon_t$$

$\Delta X_t$  = the vector with the first differences of endogenous variables included in the model. For Albania, this vector includes house price index, the ratio of mortgage loan to GDP, interest rate and exchange rate.

$\pi X_{t-p}$  = the cointegrated vector, which represents the endogenous variables (non stationary) with one time lag.  $\pi$  is a matrix of coefficients of the long-term relation. The coefficient before this matrix has to be negative and statistically significant. This coefficient indicates the speed of return to equilibrium level whenever there is a short-term deviation from the long term equilibrium between variables.

$\theta D_t$  = exogenous variables included in the model, which represent two dummy variables for the years 2004 and 2008 and a seasonal dummy for the first quarter.

$\tau_1 \Delta X_{t-1}$  = endogenous variables in the first difference with determined lag, that allows to identify short-term relationship.  $\tau$  is a matrix of short term parameters.

$\epsilon_t$  = a vector of random variables representing models' errors, which should be uncorrelated, and variance-covariant  $\lambda$ . It is generally expected to have white noise feature.

## 4.2. Data

The data included in the empirical analysis are of quarterly periodicity and cover the 1998-2012 time span. The sources of information are the Bank of Albania and INSTAT. All data are adjusted to consumer price inflation in the economy, reflecting real developments. More specifically, the data included in the model are: housing price index (Bank of Albania), mortgage loans provided by the banks (Bank of Albania), disposable income approximated by gross domestic product (INSTAT); interest rate (Bank of Albania) and the exchange rate of the ALL against the euro (Bank of Albania). These data are included in level after a natural logarithmic transformation.

The dynamics of the house prices in Albania is assessed through the house price index, which is compiled by the Bank of Albania. This indicator is calculated according to the hedonic method, which determines the price of a

house as a function of several characteristics of the dwelling, such as a flat position, location and level of furniture. The housing price index is calculated only for Tirana city, based on newspaper announcements on houses for sales and includes the following key features: location, age, size or number of rooms and furniture level (Kristo and Bollano, 2011). As mentioned in the European Commission's Manual methodology for compiling the housing price index (December 2011), the collection of information from newspapers can represent significant changes from the real prices of transaction, due to the tendency of retailers to decrease/increase and to provide a better/worse final price depending on the cyclical position of the real estate market. However, the use of this indicator is reliable for analyzing the long term dynamics in the housing market and serves as a good indicator for empirical analysis. In the case of Albania, this is the only available source of information, which covers a long period of time, almost 15 years.

For the assessment of the financing of housing market by banks outstanding mortgage lending data, published by the Bank of Albania, are used. The data represent credit to households, provided for house purchasing. These data have a monthly frequency, but have been adapted to quarterly frequency by taking the outstanding amount at the end of the quarter. Meanwhile, the included series in the model is expressed in Albanian LEK (ALL), even though the largest part of mortgage loans is denominated in foreign currency, mostly euro (68% in average). To address this issue, we have also included in the model the exchange rate of lek against the euro. Furthermore, the inclusion of this series aims to capture the wealth channel of owning a house. The exchange rate depreciation may increase demand for housing as property investment and protection against exchange rate fluctuations.

Following the example of Fitzpatrick, we have taken the series of the real gross domestic product published by INSTAT as representative for disposable income. This series is gross domestic product in a quarter. Based on the series published by INSTAT, a series of cumulative GDP is generated, calculated as the sum of the four quarters, to be compatible to the mortgage loan outstanding.

We have also included in the model an indicator which accounts for the cost of obtaining a mortgage loan, represented by the interest rates for loans in euro. This series represents the weighted average rate of annual interest on new loans. Given that, the dominant part of a mortgage loan is a variable interest rate, the interest rate of the new loan is a good proxy as the service cost of a mortgage. The data are compiled by the Bank of Albania and are based on monthly data reported by the banking system. The monthly data is adapted to a quarterly series by calculating the average interest rate of the quarter.

In addition to these endogenous variables, three exogenous variables as dummy are included in the final vector error correction model. These variables intend to

include in the model the impact of some important events specific to the Albanian economy and also the seasonal feature of the house prices series.

### 4.3. Model results

The VECM model for the case of Albania will be as it follows:

The co-integration vector for the long run relationship between endogenous variables is:

$$\pi X_{t-1} = -0.30*(LHPI(-1)) - 0.26*(LMCG(-1)) + 0.13*(LINTCE(-1)) - 0.37*(LER(-1)) - 3.76 \quad (1)$$

In the above equation the LHPI is the natural logarithm of the housing price index; LMCG is the logarithm of the ratio of credit to GDP; LINTCE is the logarithm of (1+average interest rate on new loans in euro) and LER is the logarithm of the exchange rate EUR/LEK.

**Table 1. Data features**

Variable	Transformation	Test of the unit root ADF (p-value)	Stationarity rank
HPI (House price Index)	log	7.8 (0.00)	I(1)
MC (Mortgage credit)	log	2.02 (0.04)	I(1)
GDPR (GDP cumulative real )	log	2.65 (0.00)	I(1)
INTCE (weighted average interest rate gor euro lending) <sup>7</sup>	Log (1+i)	8.1 (0.00)	I(1)
ER (exchange rate euro/ lek)	log	5.2 (0.00)	I(1)
LMCG (Ratio of mortgage to GDP)	log	2.56 (0.01)	I(1)

To test the existence of the unit root, the features of the selected series were observed, prior to the inclusion of each of the variables in the model. Unit root tests, as Augemented Dicky Fuller and Phillips-Peron test, confirm that all variables included in the model have unit root in the level, while they become stationary in the first difference. Table one presents a summary of these tests for the included variables. The results of these tests confirm that these variables satisfy the necessary condition of being of the first Integer and, as a result, they can be included in a VECM model.

Initially, the model was run with the inclusion of all variables mentioned above in their transformed log form. It was observed that, in these models, the

<sup>7</sup>The interest rate comes out to be I(0) if the constant and the trend are taken into account; however, we have chosen to be more conservative on the results of the test, and as such, we admitted that this variable certainly becomes stationary in the first differential.

coefficients before GDP and mortgage lending were statistically significant, but with the opposite sign of the one expected. Given this situation and the previous studies (Suljoti and Hashorva, 2011) the existence of a strong link, and as result of high *multicollinearity* between credit and GDP, the involvement of these two variables through a single indicator, the ratio of credit to GDP were tested. This indicator aims at measuring how the demand for buying a house is influenced by the use of financial leverage from households. It also shows how the increased possibility of access to finance from banks in relative terms to revenue/ GDP can influence house prices.

In order to select the right model of VECM, the determination of the lag is important within the time span that we expect the influence of the variables in the model. In the studies that analyze the relationship of credit to house prices, the selected lag is generally 4 quarters. But for Albania, because of the relatively short period (14 years only) covered by the data and in order to avoid a significant reduction of degrees of freedom in the sample, the selected Lag is two quarters. The use of 2 period lag in the model is confirmed by the lag selection tests (Lag length Criteria test). For more detailed results of the test refer to table 3 in the attached annex. However, the increase in length of the series in the future will enable the inclusion of a longer lag.

The co-integration tests, Trace and Maximum Eigenvalue test indicate that at least one co-integration relation, with high statistical confidence, larger than 95% exists between the selected variables. The results of these tests are presented in table no. 2, in the attached annex. Therefore, through the vector of error correction model, we are looking to identify the long-term relationship between credit and house prices. Within this model system, the equation of price change is the only equation which has a statistically significant negative co-integration coefficient.

After assessing the VECM model for Albania, the results are as follows:

**Table 2. Findings for the long run equation of VECM model<sup>8</sup>**

<i>Sample size 59</i>	House prices	Statistics (t)
<b>Endogenous Variables</b>		
MCG	0.26	7.3
INTCE	-0.13	0.11
ER	0.37	2.1
Cointgration coeff	-0.31	-2.1
<b>Exogenous Variables</b>		
DUM08	0.07	2.8
Dum04	0.07	2.8

<sup>8</sup>As data are included in logarithmic form, the coefficients before variables can be interpreted as elasticity coefficient of endogenous variables.

SEAS1	0.06	3.2
R2	40%	
DW	1.9	

Table 2 shows that, in the long run, the increase of financial leverage by 1 percentage point causes a house price increase by 0.29 percent. This coefficient has the expected sign and is statistically significant, with more than 99% confidence. Furthermore, it is stable around this level despite the different characteristics that can be selected to test the co-integrated relation (such as the change of Lag, adding special feature to the model, such as trend or shortening the analysed period). In all cases, this coefficient remains positive and statistically significant.

Meanwhile, the results of the table show a negative long-term relationship between interest rates and house prices, however, statistically insignificant. This conclusion is similar to that found by Suljoti and Hashorva (2011) for Albania, where none of the lending costs, that were tested in their model, results statistically significant and with an influence on house prices. Also, this finding is in line with the conclusions of Crowe *et. al.* (2010), who points out that the lack in empirical evidence for the correlation of house prices to interest rates in many of the countries may be due to the inflationary pressures in the economy. More specifically, global trade integration between countries (mainly developed to developing countries) has led to a rapid decline of import prices by counterbalancing the inflation of untradeable goods and, as result, may hide the relationship / impact of the interest rate on house prices (non-tradable goods).

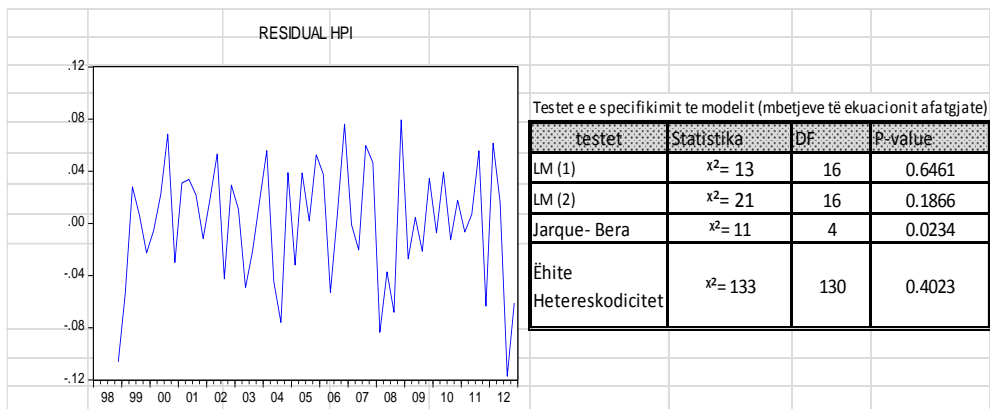
The relationship between house prices and the exchange rate is assessed to be positive and statistically significant. Given that house prices are determined in euro, the depreciation of the exchange rate (lek against the euro) in the series included in the model reflects increased variable, automatically leading to increased house prices expressed in domestic currency. This effect is estimated more as a methodological issue of the house price index calculation. Furthermore, the economic thinking suggests a positive impact of the exchange rate on house prices, because house purchasing is also considered a wealth investment for households. In this regard, LEK depreciation against the euro may be perceived by households as higher uncertainty for the future of their savings/wealth. For this reason, they will look to invest their savings in the real estate market, thus triggering increasing demand and then, prices for houses. The value of the coefficient shows that a 1 percent depreciation of the exchange rate (increase in the variable) will be reflected in 0.37 percent increase in house prices increase in the long run.

Another important finding of the model is the co-integration coefficient before the vector of the long-term relationship. The value of this coefficient of -

0.3 indicates that, as a result of a shock in the endogenous variables, house prices will need more than three quarter (3.5) to return to the equilibrium. This coefficient is negative and statistically significant confirming as such the existence of the long term relation between mortgage lending and house prices and the convergence toward equilibrium.

To determine the best VECM model, the feature of residuals has been evaluated. As it can be seen in table 3, residuals are stationary. The auto correlation and heteroscedasticity test show that the residuals do not suffer from correlation or heteroscedasticity. But as the normality test shows, they do not have a normal distribution<sup>9</sup>. Overall, the tests of residuals confirm the fulfillment of the necessary condition of the error of the model, and they support high confidence in the model. For more details refer to Table 3. Meanwhile, violation of the normality test does not affect the reliance of the model.

**Table 3. Residuals and the test for the long run equation**



Source: Authors calculation

Also, as in similar empirical papers (Belke and Cuzdaj, 2010) the coefficient stability under different periods within the sample has been estimated and, more specifically, for the periods 2004-2012 and 2008-2012, given that in 2004 and 2008, the financial system in particular and the economy in general have shown significant changes. We note that despite the change of the period of data coverage, the coefficient before the credit to GDP ratio always remains positive and statistically significant, fluctuating around the level. While the coefficient before the exchange rate remains consistent in sign and magnitude, the coefficient before interest rate remains low and statistically insignificant. These results confirm the overall stability of the estimated coefficients.

<sup>9</sup> The normality test is highly influenced by the length of the times series analyzed.

### 5. The short term equation

After generating the VECM model, the short term relationship between the variables within the same system was further analyzed. In the short term, relationship variables are entered in dlog form and are stationary. The short-term model is estimated with the ordinary least squares method within the evaluated VECM system and is reparametrized step by step. In other words, the model is initially estimated in total, then each of the variables that were not statistically significant (based on the p-value statistic) was removed and the rest of the model was reevaluated. Finally, the remaining variables in the model were all statistically significant (at 10%), setting out the final form of the short-term model for house prices. More specifically, the estimated coefficients in the short-term equation are shown in the table 4.

$$\Delta LHPI_t = -0.30 \text{ (LR equation)} - 0.31 * \Delta(LHPI)_{t-1} + 0.70 * \Delta(LER)_{t-1} + 0.24 * \Delta(Kredia) + 0.03 DUM04 - 0.04 SEAS(1) + \epsilon_t \quad (2)$$

$\Delta$ -represents the first difference of each variable. Exogenous variables,  $\theta D_t$  used for the years 2004 and 2008 are DUM08 and DUM04 while SEAS1 is the dummy set for the first quarter seasonality (as it is tested statistically).

**Table 4. Findings for the short term equation of the house prices**

Variable	$\Delta LHPI_t$ (p-value)
$ECT_{t-1}$	-0.29 (0.002)
$\Delta(LHPI)_{t-2}$	-0.30 (0.01)
$\Delta(LER)_{t-1}$	0.65 (0.04)
$\Delta(LMCG)_t$	0.23 (0.02)
DUM04	0.03 (0.02)
SEAS(1)	-0.04 (0.008)
Adjusted R2	41%
DW	1.8

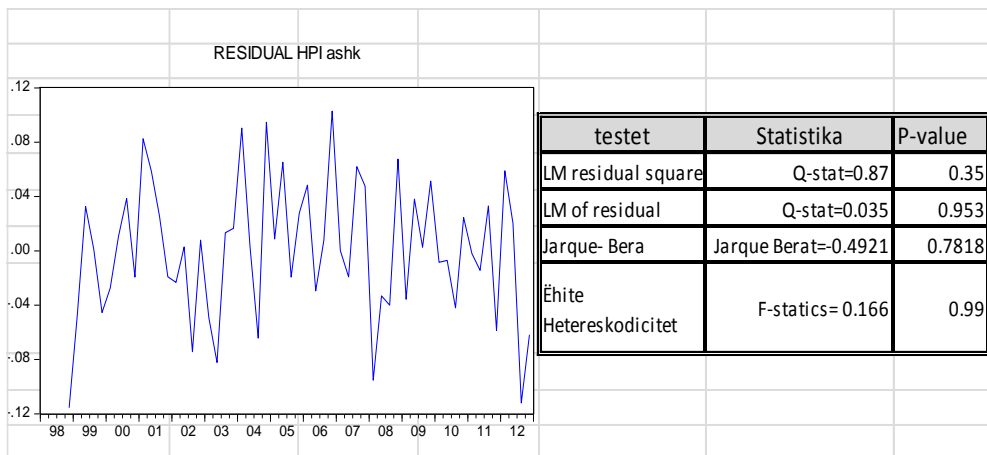
\* Figure in parentheses represents the p-value statistics (statistical significance) of the estimated coefficient

The findings of the short-term equation confirm the negative sign and the statistically significance of the error correction term coefficient. This result confirms that the increase in house prices will adjust in the following months as a response to any short term deviation from long-term equilibrium. As expected, an increase in financial leverage in the economy would lead to a hike in house prices. An increase in the exchange rate, meaning a depreciation of the domestic

currency against the European currency, will also have a positive effect on house prices. Meanwhile, the negative coefficient of the 2 period lag of house prices confirms that the house prices series has an autoregressive term. The explanatory power of this short term equation remains close to the one of the long term, to 40%. In the meantime, this level of R2 shows that the house price fluctuations in the short run are significantly affected by other factors, which are not included in the analysis, such as the real estate market frictional costs mentioned earlier. These costs are believed to inhibit the response of house prices to the level of availability and use of financial leverage in the near term. This conclusion is consistent with the conclusion derived from the DOLS estimation in the paper of Suljoti & Hashorva (2011).

The stability test for the short term equation is confirmed by the statistic feature of the residuals. The results of tests for residuals are summarized in the graph and in the table below. These test results show that the residual of our short term equation meets all three criteria. The unit root test of residual further confirms further the stationarity of the error term in the short term model. The residual tests confirm the stability and the high confidence of using the short term model.

**Table 5. Test for short term equation**



Source: Authors calculation

## 6. Conclusions

In the recent years, economists have paid special attention to the dynamics of real estate prices in the economy due to their interference with many vital sectors, such as construction sector, banking, etc. In particular, close attention is paid to the impact that house price performance has on the stability of the financial sector. During the last 15 years, real estate markets and mortgage loan portfolios have



experienced significant developments in Albania. This paper aims to assess the factors that influence the house prices dynamics, focusing on the effects of the mortgage loan portfolio on the housing prices performance during this period. The interaction between these two indicators is of high interest to elaborate on, not only because of the above mentioned reasons, but also because there are very few studies that investigate on the development of housing prices in Albania.

Our empirical analysis is based on the vector error correction estimation method (VECM) because it is widely used for assessing the long run (the relationship between A and B – B, in our case, is missing in the sentence; or is it the relationship between variables. Based on this methodology, a statistically significant relationship between the degree of financial leverage and the increase in house prices was found. The empirical estimation shows that the important factors in the formation of house prices in the long run are the degree of financial leverage used and the exchange rate. The interest rate, although part of the modeling, comes out to be statically insignificant even though it has the expected sign. This finding is in line with the findings of other authors, not only for the case of Albania but also for other emerging countries. Meanwhile, the high demand for houses during the transition period may be so high due to other social demographic factors, that interest levels were not as much as a concern for households.

Our finding of the high statistical significance of the long run relationship between these two indicators stresses the importance that housing price developments have for the financial stability and the entire economy. However, the normal development of housing prices remains conditional upon certain drawbacks. Legislative and institutional deficiencies such as in property rights, land and property registration, legalization etc., continue to be a serious handicap in the development and price formation of the real estate market. Addressing these problems will give a new impulse to the performance of the housing market.

Up to now, there are very few studies for the real estate market in Albania, due to the highly problematic character and to the dynamics of this market. Therefore, this paper, in addition to the elaboration of the factors that have affected the performance of house prices, tries to contribute to the existing body of literature. The research of housing market in Albania is a challenge, both in terms of available data as well as the structural and institutional problems associated with these developments.

## ANNEX

**Table 1. VEC Granger Causality/Block Exogeneity Wald Tests**

Excluded	Chi-sq	df	Prob.
D(LMCG)	5.024500	2	0.0811
D(LINTCE)	4.418331	2	0.1098
D(LER)	5.326366	2	0.0697
All	13.19594	6	0.0400

**Table 2. Unrestricted Cointegration Rank Test (Trace and Maximum eigenvalue)**

Hypothesized		Trace test			Max-Eigen		
No. of CE(s)	Eigenvalue	Statistic	Critical Value(0.05)	Prob.**	Statistic	Critical Value (0.05)	Prob.**
r=0	0.405555	71.66314	47.85613	0.0001	29.64727	27.58434	0.0268
r ≤ 1 *	0.372404	42.01586	29.79707	0.0012	26.55394	21.13162	0.0078
r ≤ 2	0.231991	15.46193	15.49471	0.0506	15.04535	14.2646	0.0376
r ≤ 3	0.007282	0.41658	3.841466	0.5186	0.41658	3.841466	0.5186

Trace test indicates 2 co-integrating equation(s) at the 0.05 level\* denotes rejection of the hypothesis at the 0.05 level \*\*MacKinnon-Haug-Michelis (1999) p-values

**Table 3. Lag order selection criteria**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	332.8978	NA	4.72e-11	-12.42736	-11.8213	-12.19577
1	494.8640	14.42036	2.99e-13	-17.52408	-15.7059	-16.82929
2	485.4353	257.2201*	2.25e-13*	-17.78178	-16.56965*	-17.31859*
3	511.8678	23.33859	3.02e-13	-17.56344	-15.1392	-16.63707
4	529.0436	20.88038	3.16e-13	-17.60955	-14.5792	-16.45158
5	543.1849	14.97313	3.92e-13	-17.53666	-13.9003	-16.1471
6	558.6203	13.92211	5.01e-13	-17.51452	-13.2721	-15.89336
7	585.7256	20.19608	4.53e-13	-17.95002	-13.1015	-16.09727
8	613.2325	16.18058	4.78e-13	-18.40128	-12.9467	-16.31693
9	656.7507	18.77255	3.59e-13	-19.48042*	-13.4198	-17.16448

\* indicates lag order selected by the criterion LR: sequential modified LR test statistic (each test at 5% level); FPE: Final prediction error; AIC: Akaike information criterion; SC: Schwarz information criterion; HQ: Hanna-Quinn information criterion.

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