The relevance of the housing market for the banks' risk profile in Albania

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Abstract

The housing market is an important sector for Albanian banks. Housing market financing dominates retail loans, and at the same time, houses represent a high share of the pledged collateral. This study aims to evaluate the role that the housing market plays in the Albanian banks' risk-taking profile. The empirical work confirms the statistically significant difference in the risk profile between real estate and non-real estate banks. The dynamics of the housing market influences both types of banks, but the real estate banks are more sensitive to the housing market conditions. The negative relationship between the housing market developments with specialization of banks in real estate market reflects the high informality of the housing market and handicaps such as governmental interference, institutional shortcomings and flawed enforcement of property rights.

Keywords: housing market, mortgage, bank risk profile, z-score

1. Introduction

Housing is considered the largest lifetime private investment for an individual. The housing market is believed to be a market with heterogeneous products, few transactions and high information costs. Moreover, the unique nature of the real estate market, which is conditioned by a rigid supply and occasional booms, establishes the premise for creating unrealistic expectations and overly optimistic decision-making, which implies higher prices far from fundamentals. Another channel of high importance is the pivotal role that housing plays in banking. Given the fact that most banks' loans are collateralized with houses, housing prices greatly influence the decision making for lending and the overall banking activity. A rapid increase of house prices, followed by an immediate economic decline, can significantly affect the stability of the banking sector due to the effects on credit quality and collateral value. This role was

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emphasized by the global financial crisis of 2007-2008, which has shown that housing prices were an important factor in the scale of this crisis.

In the former communist countries, due to data limitation and institutional problems in the housing market, studies focusing on the inter-linkage of the banking sector and the housing market are still limited. Especially for Albania, studies on the housing market are scarce, due to the relatively new liberalized housing market and the lack of detailed official statistics of this market. This study aims to contribute to the existing literature by offering a new prospect of the housing market, highlighting the role it played in influencing the banking sector's risk-taking behaviour, thus demonstrating for the first time the important role that the housing market plays in relation to the banking system's performance. The main research question of this study is to examine: What is the importance of housing market development to the performance of the banking sector, in the case of banking- oriented economy? The first empirical investigation of the influence that housing prices dynamics have on the banking performance in Albania, ROA and ROE indicators and stability/ risk indicator measured by Z-score provide an added value to this study.

The paper begins by presenting the literature overview and a summary of the international experience on the influence of housing prices on the banking performance and stability. Next, the paper will present an overview of the situation of the housing market in Albania and of the banking sector. The third section will present the empirical analysis of the role of housing prices on the banking performance. It should be noted that this study will focus on the time period 2002-2014. The paper concludes with the main findings and some recommendations for further study.

2. Literature review

There is ample literature that has studied the housing market and its interrelation with macroeconomic variables, market-specific conditions, and housing finance characteristics. In addition to the majority of studies elaborating on the determinants of housing prices from both a supply and demand perspective, an increasing importance has been put on exploring the relationship between housing market developments and mortgage financing. The analysis of such relationships is of particular interest because of its implications in two important sectors of the economy: construction and banking sectors. In addition to this, the direct or indirect impact that these sectors have on the entire economy and financial stability in the country is of direct relevance. These relationships have gained more importance especially after the global financial crisis.

Gerlach and Peng (2005), Herring and Wachter (1999), Chen (2001) have highlighted the importance of the linkage between real estate prices and bank lending, due to the heavy reliance of the housing market on mortgage financing. Moreover, housing markets are local in nature. In this context, Garmaise and

Moskowitz (2004) find strong evidence that asymmetric information about local market conditions plays an important role in reshaping property transactions and determining the choice of financing.

Studies looking at the importance of real estate market developments on bank returns and their risk structure and profile are fairly recent and rare. The reason behind this is that before the global financial crisis of 2008, residential mortgage lending was not considered a particularly risky lending activity. As discussed by Deng et al. (2000), although it was evident that home mortgage markets would weaken as local conditions deteriorated, default rates on home mortgage loans were not particularly high. Moreover, in an environment where lenders can securitize loans, the relationship between local real estate conditions and bank performance will be affected by the extent to which banks diversify their geographic concentration of their mortgage-related investments by purchasing mortgage back securities, which, since government institution would guarantee the mortgage, would imply no credit risk to the bank (Basel Committee on Banking Supervision, 2011).

Martins et al. (2011) studied the sensitivity of EU-15 bank returns with regard to the real estate sector by looking at the individual sensitivity determinants of the EU-15-listed banks, for size and relative asset exposure to the real estate market in particular. They use a three-factor risk model. This study also tests the hypothesis of bank sensitivities to real estate returns being a function of the size and the degree of banks' credit exposure to the real estate market. The results indicate that small banks that have greater exposure to the real estate sector in their assets tend to be more responsive to the real estate market development. Furthermore, they find this reaction to be higher after the subprime crisis in countries like Spain, Ireland and UK.

Buch et al. (2013) provide evidence on the link between monetary policy, property prices, and bank risk taking, using a factor-augmented vector autoregressive model (FAVAR) for the US for the period 1997-2008. The authors find that in the short run, the supply for loans is influenced by the shocks in commercial property prices rather than the banks' characteristics. They find that, in case of collateral shock, small banks take an additional risk due to the higher monitoring cost and weaker market power. Another important finding of their work was that, following a monetary policy easing and consequentially higher property prices, the banks' risk exposure differs on size and ownership. They find that small domestic banks increase their exposure to risk, foreign banks lower risk, and large domestic banks do not change their risk exposure.

The theoretical work and empirical evidence reviewed by Dell'Ariccia (2012) suggest that banks alter their lending and risk-taking behaviour over real estate cycles with significant implications for macroeconomic fluctuations and financial stability. Mortgage loans represent a large share of the banks' loan portfolio so that changes in their collateral value, i.e. real estate risk, denote a

relevant risk for banks. For the last twenty years, Young et al. (2014) document that US banks' holdings of real estate loans have remarkably increased, while other loan categories have declined on a relative scale, thereby resulting in a higher real estate exposure on banks' balance sheets. The immanent exposure to real estate risk has been documented during the US real estate crisis in the late 1980s and early 1990s as well as in the recent subprime and financial crisis (Hendershott and Kane, 1992; Huizinga and Laeven, 2012). Therefore, real estate price fluctuations directly affect the profitability of mortgage-related bank lending. By contrast, commercial real estate risk generally has lower immediate relevance with respect to their principle business activities. Bessler et al., (2015) found that, while important for firms operating in the construction industry, this sector is generally considered to be highly cyclical and sensitive to the economy stage of development so that real estate risk only denotes one relevant risk factor amongst others. Therefore, the authors interpret real estate risk for industrials as a common business cycle indicator instead of a specific risk stemming from primary business activities. In fact, real estate prices are closely associated with common leading economic indicators such as housing starts and building permits.

Gibilaro and Mattarocci (2013) is another recent study that has looked at the influence that the real estate market dynamic has had on the West European banks. They have employed -bank- level data in a panel-fixed effect OLS (ordinary least square), to evaluate the influence of the real estate market dynamic in the overall risk taking of banks and the different behaviour between real estate banks and non-real estate banks. The authors have confirmed the high importance of real estate market in risk taking for banks. They also conclude that the real estate banks are less affected by the real estate dynamic due to the higher expertise in the market.

There are very few studies on the real estate market in Albania. The limited extension of economic studies on the housing market in Albania has been influenced by the relatively new housing market and the lack of detailed data on prices and other features. Bollano and Ziu (2009) investigated the relation between credit and housing prices in Albania, and the impact that credit and housing prices fluctuations have on the economy. Their empirical analysis suggests that the economic stability has been supportive to the credit activity and the housing market, while increased lending to the private sector has fuelled the prices of housing. These findings were later confirmed by Suljoti and Hashorva (2012), who used in their research DOLS, a co-integrated model and analyzed the developments for the period between 1998-2011. The empirical results of the study confirmed the positive correlation between housing prices and credit, total income and construction costs, meanwhile the coefficient before the euro interest rates, although with the expected sign, showed statistically non-significant results. Ibrahimaj and Mattarocci (2014) examined the factors that have affected the performance of the construction sector in Albania. The authors find real economy

indicators (gross domestic product, remittances, construction permits and construction cost index), monetary indicators (household loans, interest rate on deposits), and housing market indicators (housing prices and rents) to be determining factors in the construction activity. Their empirical analysis through the VAR model and "impulse response" shows that the construction output is positively influenced by the GDP growth of other non-construction sectors, such as household loans, remittances and the ratio of prices to construction costs. Furthermore, the positive correlation between housing prices and household loans and remittances, as the two main financing sources in the market, was another part of their findings.

The most recent article published on the determining factors for the housing prices in Albania, is from Suljoti (2015). The study aims to assess through the co-integration analysis of VECM, the role of the demand side factors in the housing prices performance in Albania. The empirical findings show that, in the long run, housing prices are determined by bank lending, treasury bills yield and exchange rate volatility. These findings are broadly in line with the empirical literature and complement the existing literature on the determinants of housing prices for Albania.

Although the importance of understanding banks' performance and risk taking background is clear, there have not been any studies on this matter for the Albanian banking sector. Unfortunately, nobody has, to the best of our knowledge, studied the real estate risk in the Albanian banking system. As mentioned in the BIS paper (2011), it is important, for the supervisory authority and for financial stability as a whole, to account for the real estate risk as much as it is important to account for the interest rate risk, liquidity risk or credit default risk. This paper will contribute to filling this gap by using Z-score indicator in a panel technique with individual banks' data.

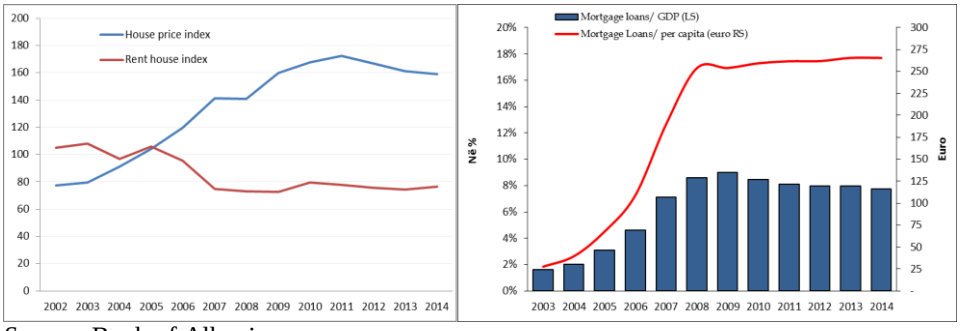
3. Some facts of the Albanian banking system and housing market

The housing market in Albania has undergone significant changes during the transition period, similarly to other countries of the CESEE region. Data shows that housing prices grew significantly during the 2004-2007 period, with an annual average price increase of 15%. Meanwhile, developments show that the real estate market has reached a bottleneck during the 2008-2014 period, with prices fluctuating and shrinking occasionally since 2009.

The housing market experienced a substantial increase in volume and in prices due to the high demand for houses before the onset of the global financial crisis. The factors that triggered the increase in demand for new construction in the early 1990s were the lack of sufficient housing space and the poor quality of existing housing, shifting of household behaviour towards living in smaller families; as well as the alteration of the demographic map driven by economic and social factors (UNECE, 2000). Then, during the transition period, an important

source of growing demand, until the end of 2007, for new houses originated from emigrants. Meanwhile, since the onset of the crisis, the housing demand from emigrants has declined, reflecting deteriorating conditions in labour markets abroad (Suljoti et al., 2012).

Figure 1.House prices, rent index and mortgage



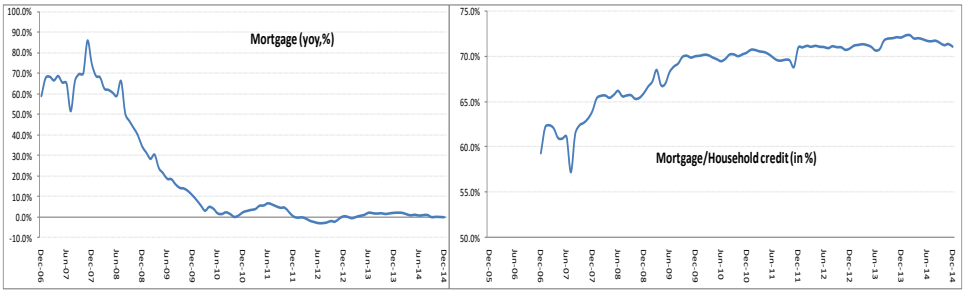
Source: Bank of Albania

The increase in disposable income, which appears to have supported demand and house price rise until early 2008 has been another important factor in the rise of housing prices over the years. With the deceleration of income, there was reluctance to both house purchasing and mortgage loans after that. In addition to this factor, the general uncertainty of future income, including increased unemployment and overall uncertainty about the labour market, was reflected in a contraction of households' demand for housing (Unicredit, 2011).

The consolidation of the banking system and its increased flexibility to finance households and construction companies make for additional important factors that have led to the increased demand and supply in the housing market. During the 2002-2007 period, financing through bank loans constituted an important source of funding for households. High property prices provided their owners with sufficient collateral to obtain new loans and to expand the demand for housing (Suljoti et al., 20012). The growth rate of the loan portfolio declined significantly after 2008, manifesting a negative growth during 2012-2013.

The lending portfolio of the Albanian banking system represented 41% of the total assets at the end of 2014, being dominated by business and foreign currency lending. Lending for mortgage purposes represents almost 25% of the lending portfolio. This portfolio has increased substantially during the lending boom period of 2004-2008. The acceleration of mortgage lending during that period was sustained by the introduction of attractive mortgage products with high maturity and low lending interest rates as foreign banks were highly specialized and had considerable know-how of this product.

Figure 2. Mortgage lending from banks



Source: Bank of Albania

Credit to households was one of the main segments during the lending boom period, where banks were oriented towards increasing their market share, due to this underleveraged market. Mortgage lending, in particular, represents the main product of household lending. The share of mortgage lending to retail lending was 71% at the end of 2014, an increase of 11 pp compared to the level at the end of 2007. Mortgage lending is dominated by euro lending, which represents 61% of the total mortgage portfolio, in comparison to the peak of 73% at the end of 2008. The decline of the euro mortgage share reflects the decrease of interest rate of lek mortgage lending, stimulated mostly by monetary policy easing and banks' policies toward domestic currency lending. The maturity of this portfolio varies, averaging 20 years, in terms of initial maturities, and the interest rates are the lowest in the market, ranging from 3.5%-5.0% per annum for both lek and euro mortgages.

The mortgage lending portfolio represents almost 8% of the GDP. It has been calculated that households borrow 260 euro per capita, on the average. These figures, compared regionally, indicate that mortgage lending in Albania is not as developed and that households use relatively low leverage in the housing market. However, mortgage represents the main share of household lending and furthermore, houses represent the main collateral obtained by banks. 73% of the total lending portfolio overall has collateral and more than half of that is real estate.

Besides mortgage lending, the Albanian banking system provides financing to construction companies or to businesses for real estate investment. Both these categories have experienced a considerable increase in the lending portfolio of the banking system. Lending to construction companies increased considerably until 2008, reaching the maximum share at the end of 2008 by 15% of the total lending portfolio. After 2008, it has been shrinking continuously, reaching down to 9.5% at the end of 2014. This behaviour is in line with the economic activity of the sector, which represented the main contributor to the economic growth before the crisis, but has had a broadly negative contribution ever since. Meanwhile, credit to businesses for real estate investment represents less than 20% of the total lending portfolio. Before 2008, the size of this portfolio was on the average 13%

of the total, and increased up to 21.4% of the portfolio in 2013. After 2013, its share has been declining. Even though the lending products related to the real estate market represent a notable share of the lending portfolio, this portfolio was not included in the empirical analysis due to missing data for the overall real estate market and our focus on a more homogenous market.

4. Empirical Analysis

4.1. Data

Data included in the empirical analysis refers to the banking sector statistics as reported quarterly on the balance sheet and income statements, provided by the Bank of Albania database. Data from all 16 banks of the banking system has been included. The housing market data is based on the quarterly index of the nominal house price compiled by the Bank of Albania. In the absence of housing price data at the national level, our analysis is based on Tirana's housing price index. The data included in the empirical analysis is quarterly and covers the 2002-2014 period, most of them being transformed in log.

The most prominent indicator, often mentioned in the literature, for representing the default risk of the banks is the z-score indicator, which accounts for the profitability and capitalization of a bank with regard to the historical fluctuation of profitability. As Beck et al. (2009) mention in their paper, the z-score is a measure of bank stability, which indicates the distance to insolvency, and is derived by combining profitability, leverage and volatility measure. Thus, the empirical research starts with the calculation of the default risk indicator of the Albanian banking system. As proposed by Beck et al., (2009) the following formula is calculated in time for each bank in the sample:

$$ZRisk_t = \frac{Average\ ROA_{t-2,t} + CAP_t}{\sigma ROA_{t-2,t}}$$

In the above formula, each of the variables in the equation represents:

Average ROA$_{(t-2,t)}$ - The mean of returns on assets (ROA) for a 2-year period. RoA, as defined by the Bank of Albania, is calculated as the ratio of net profit annualized (after taxes and extraordinary items deduction) to the average total assets of the banks. RoA indicates the effectiveness of the use of the banks' assets.

CAP$_t$ - Capitalization rate represents the ratio of the shareholders equity to total assets in a quarter. This indicator provides information on the extent to which the assets are financed by own funds, being a supplementary indicator for the capital adequacy of the banking sector. Also, this ratio measures the degree of financial leverage of the bank. As mentioned by Peek and Rosengren (1992), this ratio tends to evaluate the ability of banks to lend and to absorb losses.

σROA$_{(t-2,t)}$ - Standard deviation of ROA for the 2 year period. The sum of ROA and capital is divided by the standard deviation of ROA, indicating the extent to

which the current situation of banks deviates from the historical past. The higher the standard deviation value, the lower the z-score, the closer to default and the riskier the bank is. The lower the standard deviation, the higher the z-score and the more stable the bank.

$ZRisk_t$ - Z-score as a dependent variable represents the risk profile of the bank and is used to assess the different behaviour of the real estate banks to the non-real estate banks. The higher the value of the Z-score indicator, the more stable the bank is. This indicator represents the profitability of a bank and the ability of its own funds to support any negative shock. The higher this indicator, the less risk default for the bank, and the lower the index, the closer to default the bank is.

In the second step of our empirical work, we choose the indicator to distinguish between the two groups of banks, real estate and non-real estate banks. Similar to Gibilaro and Mattarocci (2013), two alternative indicators are used to create these two groups. The first selected indicator is the ratio of mortgage loan to the total loan portfolio of the bank. Real estate banks include each of the banks that have a mortgage share more than 20% of the total portfolio. A different threshold of 30% has also been tested, but the number of banks fulfilling this condition does not allow a comparison between the two groups. Furthermore, this study has been based on the level of mortgage portfolio as a percentage of the total, different from Gibilaro and Mattarocci (2013). This selection is conditioned by the lack of statistics in the real estate market. The use of the mortgage lending indicator for the involvement of the bank in the housing market helps to understand more precisely the influence of housing price on retail lending and the risk profile of the bank.

The second indicator, used to distinguish real estate banks from non-real estate ones, is a qualitative dummy variable. The first dummy variable is constructed by putting 1 for each individual bank that has the ratio of mortgage loans to total loans more than 20% in five consecutive years. This indicator is called DumRE. The other non-quantitative variable is the DumNRE, which is constructed by putting 1 every time the bank does not fulfill the criteria to be considered a real estate bank.

Following the approach of Gibilaro and Mattarocci (2013), the following are included in the empirical analysis: an indicator that accounts for the degree of bank capitalization- Tier1; a performance indicator return on equity - RoE; a variable to account for the interest rate risk-market risks (NIIR and NSARS), and finally, two indicators to account for banks' credit risk NPL and LLP. Each of these indicators is compiled in more detail, as follows:

Tier1- the ratio of Tier 1 capital to risk weighted assets in time *t* at bank *i*. This indicator measures the ratio of core capital to all weighted risk positions, in accordance with the regulation of the Bank of Albania, "On the Bank's Regulatory Capital", based on the provisions of the Basel II agreement.

RoE- the ratio of net profit to bank equity at the time t and bank i, annualized. The return on equity shows the rate of the shareholder capital remuneration within a year. The indicator is calculated as the ratio of the financial year's profit (after the taxes and the extraordinary items deduction) to the average value of the share capital during the same period. The average capital refers to the level of the share capital during the year, including: share capital, shares, revaluation differences, retained earnings, and profit or loss of the current year.
NIIr- the ratio of net interest income to the total gross income for bank i at time t, annualized. As defined by the Bank of Albania, this ratio is a profitability ratio, which measures the relative weight of net interest income - interest earned minus interest expenses – to the gross income. "Gross income" is calculated as the sum of net interest (net interest margin) and net income from other activities.
LLPr- loan loss provision for bank i at time t represents the total amount of provision held by banks to cover loan losses in accordance with the regulatory framework required by the Bank of Albania. The reserves are raised according to the loan classification for each category.
NPLr- the ratio of nonperforming loans to total loan for bank *i* in time *t*. This indicator represents the ratio of non-performing loans to the total gross lending portfolio (i-e including the non-performing loans and loan loss provision). This indicator aims to identify problems with asset quality in the loan portfolio. The NPLs included "substandard", "doubtful" and "loss" categories of the lending portfolio according to their number of days of arrears (more than 90 days). This is not exactly according to international standards, which also include the financial situation of the client for the loan classification. The NPL included in the model is transformed in log according to the formula provided by Espinoza and Prasad (2010).
NRSAR- net position (the difference between) of the interest rate sensitive assets ratio to total assets and interest rate sensitive liabilities to total assets, for each bank i at time t. Interest rate sensitive assets and liabilities are determined in the Bank of Albania regulation.
After creating the two groups, a preliminary analysis of the characteristic of the groups has been carried out. By employing the Kolmogorov test, we compared the distribution of risk indicator for the two types of banks. Table 2 shows the summary of Kolmogorov test results, not only for the Z-score, but also for other indicators considered in the empirical analysis. The results of the test show that the two groups of banks do not behave statistically different in any of the indicators taken into consideration.

4.2. Methodology

Following the approach of Gibilaro and Mattarocci (2013), the risk default indicator has been regressed in four different equations. In all equations (1-4), an OLS panel regression with a fixed effect on individual banks' statistics has been

employed to account for the heterogeneous behaviour of banks toward risk taking. The selection of the fixed effect model is also confirmed by the Hausman test. A robustness check has been undertaken in order to test the sensitivity of the results related to the indicator used for the selection of the real estate banks. In this regard, all four equations have been re-estimated (equations 5-8) by substituting the ratio of banks exposure to housing market for the dummy variable in the selection of real estate banks.

Equations 1- 4 change by adding the housing market indicator and the composite indicator of the banks' exposure to the housing market and house prices. In all equations, the bank's used characteristics remain the same and include: the NPL indicator, Tier 1, Loan loss provision, RoE, the net interest income and the net position of rate sensitive assets and liabilities[1].

The representative forms of the equations run are presented as it follows:

$$ZRisk_{it} = c_{it} + \sum_{k=1}^{n} \beta^k bankfeatures_{it}^k + \gamma_{it} \,\%\, realestate\ ratio_{it} + \varepsilon_{it} \quad (1)$$

$$ZRisk_{it} = c_{it} + \sum_{k=1}^{n} \beta^k bankfeatures_{it}^k + \gamma_{it} \,\%\, realestate\ ratio_{it} + \tau_{it} HPI(t) + \varepsilon_{it} \quad (2)$$

$$ZRisk_{it} = c_{it} + \sum_{k=1}^{n} \beta^k bankfeatures_{it}^k + \gamma_{it} \,\%\, realestate\ ratio_{it} + \theta_{it}(DumNRE_{it} * HPI_t) + \delta_{it}(DumRE_{it} * HPI_t) + \varepsilon_{it} \quad (3)$$

$$ZRisk_{it} = c_{it} + \sum_{k=1}^{n} \beta^k bankfeatures_{it}^k + \gamma_{it} \,\%\, realestate\ ratio_{it} + \theta_{it}\,(\%\, realestate\ ratio_{it} * HPI_t) + \varepsilon_{it} \quad (4)$$

In the first model (1), we included the selected variable as bank characteristics and the ratio that shows banks' exposure to real estate market. In the second equation (2), we have added the house price index to equation (1), aiming to capture the housing market dynamics in the bank's risk taking. In the third equation (3), in addition to the banks' characteristics and exposure to the housing market, two new variables have been introduced in order to capture the composite effect of the housing market dynamics and the bank profile related to the real estate sector. The coefficient before the composite indicator of the real estate and the non-real estate group tends to capture the influence of the housing market on risk taking, dependent on the bank's profile. Finally, the fourth model (4) is an augmented version of model 1, when the influence of the housing market on banks' risk taking is assessed through the composite indicator of banks' exposure size to the housing market and house prices dynamic.

The results for each of the models are summarized in Table 3 below.

[1] As this may be a better indicator, which accounts for the risk taken by the bank and its capitalization ratio.

Table 3: The estimated results of the model based on the exposure to the housing market

	(1)	(2)	(3)	(4)
C	0.92***	-0.43	-0.42229	1.33***
NPL ratio	-0.37***	-0.41***	-0.42***	-0.30***
RMORT (real estate ratio)	-0.06***	-0.06**	-0.06**	0.75***
LLPR (loan loss provision ratio)	0.02	0.03	0.03	0.00
TIER1	0.48***	0.53***	0.53***	0.36***
NRSA(net interest rate sensitive assets)	0.02	0.02	0.02	0.01
NIIR (net interest income ratio)	0.0006***	0.0005***	0.0005***	0.0005***
ROE	0.01***	0.01***	0.01***	0.01***
HPI (House price index)		0.24		
dummy Real estate *HPI			0.24	
dummy non Real estate *HPI			0.24	
real estate ratio* HPI				-0.16***
Adjusted R-squared	*0.49*	*0.49*	*0.49*	*0.49*
S.E. of regression	*0.56*	*0.57*	*0.56*	*0.57*
F-statistic	*27.30*	*25.81*	*25.00*	*26.39*
Prob(F-statistic)	*0.00*	*0.00*	*0.00*	*0.00*

Source: Author calculations; *** T-test significance at 99% level and ** t-test significance at 95% level.

The results in Table 3 show that the NPL ratio negatively influences the default risk of banks. The higher the NPL ratio, the lower the Z-score, the higher the default risk for the bank. The coefficient is statistically significant and is sustainable in the estimated value through different model. For a 1 pp increase of the NPL ratio, the Z-score deteriorates in the range of 0.37% to 0.42%. This finding is in line with the one of Gibilaro and Mattarocci (2013).

The results show that the size of a bank's exposure in mortgage lending is statistically significant in all three models, besides the second one. The negative coefficient confirms the negative relation between the banks' default risk and the share of mortgage loan. The higher the share, the lower the Z-score, the higher the default risk. This finding shows that real estate banks tend to be more risky than non-real estate banks. This result is the opposite of the one that Gibilaro and

Mattarocci (2013) concluded for the Western European countries. This may come out due to the differences in the housing market and the banking system structure. The high informality in the housing market combined with the evident market anomalies in Albania, such as governmental interference, institutional shortcomings and faulty enforcement of property rights, make the investment or the exposure to this market more risky for the banks' activity. At the same time, the delay of the collateral execution and problems with the bailiff office make the mortgage portfolio and the collateral exposure for the banks more problematic, therefore making the bank riskier.

The loan loss provisions resulted to be statistically insignificant in all models, confirming that the reserves accumulated by the banks do not play a special role in their risk profile. This finding may be influenced by the regulatory requirement binding for all the banks in the system and the fact that all the banks have created large reserves to account for higher credit default, which does not influence the stability of banks.

The level of bank capitalization, captured by the ratio of Tier1 to the total assets is a significant indicator for the risk default of the bank. The positive coefficient confirms the expectation that the higher the capital, the higher the Z-score, the lower the default risk. The increase of Tier1 ratio by 1% will increase the Z-score by nearly 0.5%. This level is stable within the different estimated model. This finding is in line with the findings in the literature (Gibilaro and Mattarocci (2013), etc.

The net position of interest rate sensitive assets and liabilities is another indicator which resulted statistically insignificant in all models. The reason for this may be related to the fact that the secondary market is underdeveloped and the overall bank's exposure to the gap interest rate sensitive assets is small and as such does not influence the bank's risk taking profiles.

The default risk of the bank is positively influenced by the net interest income ratio. The higher the ratio, the higher the Z-score, and the lower the risk default. The positive coefficient is in line with the literature and it is consistent through all the models. However, the very low coefficient before this indicator is noted. An increase of 1 pp of the ratio will influence the Z-score by less than 0.001%.

The level of ROE influenced positively the Z-score. The higher the return on equity, the more stable the bank is and further from the default. The coefficient before this indicator resulted positive and close to 0.1% in all models. A 1 pp increase in the ratio of return to equity will influence by 0.1% the increase of Z-score. This finding is in line with the one of Gibilaro and Mattarocci (2013).

The inclusion of the housing market indicator in model 2 resulted to be statistically non- significant, confirming that the housing market dynamic per se does not have any statistically significant influence on the risk profile of banks if it is not related to the banks' market exposure. This could be due to the average of

the relatively low exposure to real estate we have in the sample as shown in the sample description.

The model uses the bank's mortgage share combined variable and the characteristic of the housing market in the following step. In Table 3, the 4th column represents the results of equation 4. The coefficient before the composite indicators shows that the market dynamic negatively influences the Z-score indicator if the exposure of the bank in the housing market is taken into account. The negative sign of the coefficient shows that the higher the size of exposure, the lower the Z-score, and the higher the risk default of the bank. These results confirm the different behaviour of real-estate and non-real estate banks, emphasizing that real estate banks are riskier. This finding is confirmed by the literature on real estate risk (i.e. Allen et al., 1995).

4.3. Robustness analysis

The next step of our empirical work was to apply the same set of the model, by changing the variable of determining real estate banks from non-real estate banks. Instead of the ratio of the mortgage lending to total lending, we employed the two created dummy series. The four equations are represented as follows. The other variables representing the banks' characteristics and housing market remain the same.

$$ZRisk_{it} = c_{it} + \sum_{k=1}^{n} \beta^k bankfeatures_{it}^k + \gamma_{it}\, DumRE_{it} + \varepsilon_{it} \quad (5)$$

$$ZRisk_{it} = c_{it} + \sum_{k=1}^{n} \beta^k bankfeatures_{it}^k + \gamma_{it}\, DumRE_{it} + \tau_{it} HPI(t) + \varepsilon_{it} \quad (6)$$

$$ZRisk_{it} = c_{it} + \sum_{k=1}^{n} \beta^k bankfeatures_{it}^k + \gamma_{it}\, Dum\, RE_{it} + (DumNRE_{it} * \theta_{it} HPI_t) + (Dum\, RE_{it} * \delta_{it} HPI_t) + \varepsilon_{it} \quad (7)$$

$$ZRisk_{it} = c_{it} + \sum_{k=1}^{n} \beta^k bankfeatures_{it}^k + \gamma_{it}\, DumRE_{it} + \theta_{it}(\%\, realestate\, ratio_{it} * HPI_t) + \varepsilon_{it} \quad (8)$$

Table 4, which summarizes the results for the four alternative models, shows the coefficients before banks' characteristic variables have been broadly the same and statistically significant as in the first four models. The two variables, loan loss provision ratio and net interest sensitive assets, remain statistically insignificant in all the models, independent of the variable use for real estate and non-real estate banks.

The results of the alternative models with a dummy real estate variable show that this variable is insignificant in the first two models while in the other two, it becomes significant but with the opposite sign of the first scenario. This result confirms that the default risk is dependent on the size of exposure of the bank in the housing market and not to the qualitative variable of zero and one. This result changes seven and eight, which have also included the composite indicators of housing market with the banks' profile, in the equation. The results of equation seven confirm the finding in equation 3 that banks' default risk is

sensitive to the banks' profile in the real estate market dependent on the housing market development. The coefficient remains negative and statistically significant, meaning that real estate banks are negatively affected by the housing price market movement.

Table 4. The estimated results of the model based on the dummy variable for the housing market

	(5)	(6)	(7)	(8)
C	0.99	0.98	-1.64	0.06000
NPL ratio	-0.42***	-0.43***	-0.42***	-0.39***
Real estate dummy- DUMRE	-0.025	(0.02)	6.24***	0.34***
Loan loss provision ratio-LLPR	-0.014	-0.02	-0.01	-0.02
Capital - TIER1	0.41***	0.41***	0.40***	0.44***
Net interest rate sensitive assets-NRSAR	0.01	0.01	0.01	0.00
Net interest income ratio-NIIR	0.0004***	0.0004**	0.0005***	0.006***
Return on Equity- ROE	0.01***	0.01***	0.01***	0.01***
House price index-HPI		0.003095		
Dummy Real estate *HPI			-0.73***	
Dummy non Real estate *HPI			0.54***	
Real estate ratio * HPI				-0.01***
Adjusted R-squared	*0.52*	*0.52*	*0.53*	*0.49*
S.E. of regression	*0.58*	*0.58*	*0.58*	*0.57*
F-statistic	*31.33*	*29.95*	*30.87*	*24.73*
Prob(F-statistic)	*0.00*	*0.00*	*0.00*	*0.00*

Source: Author's calculation; *** t-test significance at 99% level and ** t-test significance at 95% level.

The results of equation seven confirm that the non-real estate banks are positively influenced by the housing market dynamic which has positive effects on banks' stability. The same conclusion holds for equation eight.

5. Conclusions and recommendations

Studies looking at the importance of the housing market on bank profitability and risk taking profile, have been gaining more importance recently, stimulated by the aftermath of the 2008 subprime crisis. According to Basel Committee on Banking Supervision (2011), it is important for banks to account for real estate risk as much as it is important to account for interest rate risk,

liquidity risk or credit risk. Real estate market influences the lending activity through two main channels- *directly,* through the real estate related loans and *indirectly,* through the collateral channel. In the first channel, house prices directly influence the credit risk and the client default risk. Especially at the time of housing prices decline, individuals may choose to default and not to pay the credit, thus increasing nonperforming loans and the default risk of the bank. In the second channel, the high share of housing collateralized loans make banks more vulnerable to the losses and increase the risk, especially in an economy with substantial problems in collateral execution and in the real estate market. There are a lot of studies in the literature that have found a statistically significant relationship of banks' risk taking with real estate market conditions.

The housing market and banks mortgage lending in Albania have undergone significant changes during the transition period, similarly to other countries of the CESEE region. Data shows that house prices and mortgage grew significantly during the 2004-2008 period. After the 2008 crisis, the housing market has particularly stagnated and the quality of banks' customer base has deteriorated substantially, while increasing nonperforming loans and influencing the banking system stability. Studies on the housing market in Albania are limited and there is none that looks at the influence of the real estate market on the banking sector's risk taking profile. Likewise, keeping in mind that the housing market is characterized by a high informality and its own unique challenges such as governmental interference, institutional inadequacies and inconsistent enforcement of property rights, it makes it more relevant to go deeper into the details of this relation.

This paper studies the influence of the housing market on the default risk indicator of banks, as measured by Z-score, in an OLS fixed effect in panel of individual banks' data. The main finding of this empirical work is that housing market dynamics represent an important risk factor for the Albanian banking system, not only because of the high share the mortgage lending has in retail lending portfolio, but also due to the high share of housing collateralized loans. The importance of the housing market dynamic is more evident with the size exposure of the bank to the housing market. The higher the exposure of banks' lending portfolio to the housing market, the riskier the bank becomes. The study shows that the real estate risk plays a role in the bank stability as well. Moreover, the risk profile of the bank is negatively influenced by the development of nonperforming loans. The capitalization and the profit were confirmed to positively influence the banks' stability.

The data limitation in the real estate market constitutes a lack of robustness of this study.

This study would have benefited from the use of an alternative indicator, which would have better captured the housing market developments and would have offered another robustness check of the results. The use of the house price

index for all the country would be a better indicator than the one used in this study. In addition, the use of data on the total real estate market would benefit from the better study of the exposure Albanian banks on the real estate market, thus better capturing the collateral channel that influences the risk profile of banks.

Having in mind the vast literature on banks' default risk, this study would have also benefited from calculating an alternative risk indicator of banks, which would be interesting to elaborate on the housing market role. Another important area to elaborate further to this analysis would be to assess the combination of the overall banks' size and the influence of the real estate market, or the combination of the banks' funding structure and the real estate market. These issues will remain the main challenges for the further development of this study.

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