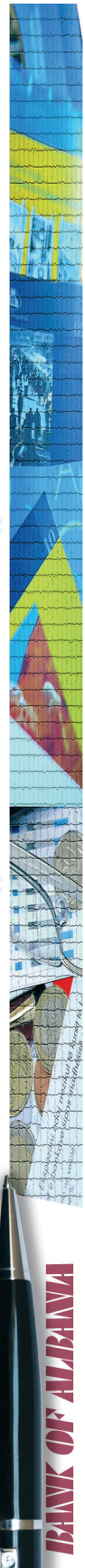

WORKING PAPER

39 (78) 2018

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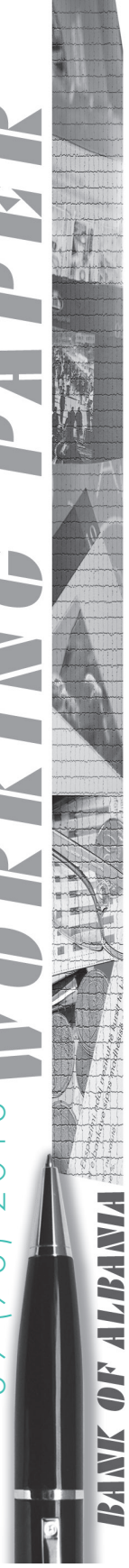

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Note: The views expressed in this paper do not necessarily reflect those of the Bank of Albania.

C O N T E N T

ABSTRACT

This paper analyses empirically the internal and external factors related to banking stability, especially if primary sovereignty risk affects banking stability. For this reason, we have followed a new method for calculating a risk index for the Albanian banking system, which is based on the balance sheet data reported by banks and reflects the banking situation in individual terms. The model is estimated based on a two-step General Method of Moments (GMM) approach with panel data for the period 2008 Q03 – 2015 Q03. Results support the view that the primary sovereignty risk does not affect the stability of the banks, although its effect is found negative. Despite this, it has been found that improving macroeconomic and financial conditions is among the most important external factors. At the same time, the financial leverage and operational efficiency are among the specific factors of banks that have a greater impact on stability.

JEL Codes: C26, E32, E43, G21, H63,

Keywords: Bank Fragility, Primary Sovereignty Risk, Panel Data, Dynamic GMM

1. INTRODUCTION

The global financial crisis (GFC) of 2007 highlighted yet again that the stability of the Albanian financial sector is largely dependent on the reliance on the banking system (Bank of Albania, 2015), mainly because the banking system constitutes the spinal cord of economic activity, which is seriously hampered, if the banks, the most prominent agents in financial markets, exhibit some turbulent moments and cannot properly execute their financial function. This became even more evident in the view of the possible Greek default crisis to which banking systems across the CESEE countries, and in particular in Albania, was faced with some important challenges. Firstly, banks had to finance a non-austerity Albanian fiscal policy, at a time when financial markets started questioning the solvency

of those countries with a high debt burden on the verge of the possibility of Greek defaults, while rising spreads became the main driver in the run-up to a possible systemic risk for all European banks, especially in late 2011 and in the summer of 2012 (Black, et al. 2016). Second, the spill-over effects and Albanian banks' balance sheets problems triggered a contraction of the flow of bank lending to other sectors of the domestic economy due to the need for de-leverage. Despite an accommodating monetary policy, rising spreads were associated with rising banking system instability (See Graph 1 in the Appendix) that shows tightening of financing conditions in some sectors and significant withdrawals on economy equity and debt funds making it more costly and difficult to support economic activity through lending.

Existing literature provides a fairly comprehensive review of the main internal and external determinants on bank stability, but one question of these cases still remains to be answered empirically, as there is no evidence on how primary sovereignty risk affects bank stability after GFC, particularly in the case of an EME, namely Albania. Therefore, this paper empirically analyses the effect of primary sovereignty risk on bank stability, which may ultimately lead to bank fragility. For this reason, we use a sample with quarterly data that includes 16 banks operating in the Albanian banking industry over the period 2008 – 2015. The empirical approach follows a five-step procedure.

First, we construct a new composite stability indicator by compiling the on-site bank balance sheet information for each of the 16 banks operating in the Albanian banking industry. Second, our stability indicator is expressed as a function of bank specific (internal) and macroeconomic (external) variables using panel estimation approach based on a dynamic two-step Generalised Method of Moments (henceforth GMM), and specifically, the first difference transformation approach. Finally, we perform a variety of robustness checks. On the one hand, we include a set of control variables to mitigate in turn potentially omitted-variable problems which ranged across bank-specific and market-specific indicators. On the other hand, we further augment the model to evaluate the extent to which off-balance-sheet activities, in which banks are

engaging in, may have an effect on bank stability.

The main findings provide strong empirical evidence supporting the view that primary sovereignty risk negatively affects bank stability. However, the pass-through effect of primary sovereignty risk is found to be relatively low. At the same time, we found that banks are more sensitive to economic activity and growth performance and macroeconomic risks linked with it. Other sovereignty risks linked to financial market conditions, fiscal stance and the price bubble are also found to significantly affect bank stability. Liquidity risk and monetary conditions are also important determinants of stability. The trade-offs with stability conditions are observed in relation to efficiency operations, while greater stability appears to be boosted in line with higher degree of market share and a higher extent of bank capitalisation. We also found that the scale at which banks anticipate off-balance sheet activities is negatively correlated to bank stability conditions, but this effect is relatively small and insignificant. The rest of the results imply that stability conditions are less sensitive to the degree of financial intermediation, excessive capital, as well as profitability. We did not find a significant effect with regards to credit risk.

This paper complements and expands existing literature in several aspects. First, our approach is a significant departure from the existing empirical literature, typically focusing on bank risk taking or stability indicators base on Z-score, binary approach or credit risk proxies. As such, to our best knowledge, our study is the first empirical assessment that neither focused on real episodes of banking crises nor did we use a binary approach as a proxy for instability moments. All these approaches may either provide insufficient data for estimation purposes or be based on a threshold level. Therefore, they may be easily criticised or produce false signals of instability moments. In addition, we neither used the Z-score nor did we use a credit risk indicator as an invariant measure of the bank's risk-taking behaviour and distance from solvency, to which Fu, et al. (2014) provide some arguments against, as means of bank stability proxies. By contrast, rather than focusing on only one aspect of bank risk exposure e.g., capital, profitability or credit risk, we proceeded by using a rather more

sophisticated proxy for bank stability. This proxy includes instead a wide range of information based on consolidated balance sheet data with regards to different aspects of bank risks, e.g. capital adequacy, asset quality, earnings, liquidity and sensitivity to market risk. Then, our proxy for bank stability was estimated through a set of statistical approaches that also includes the use of the principal component analysis approach. Therefore, we strongly believe that our indicator is qualitatively more capable of directly capturing the most common factor identifying any possibility of outright bank defaults or/and instability episodes without much information loss. This approach is advantageous even for the fact that it avoids any pitfalls (e.g., insufficient volume of data or false signals) of using the binary approach to crisis episodes. To our best knowledge, no previous study has employed such a bank stability indicator as the dependent variable to investigate how bank stability is affected by the primary sovereignty risk and we believe this is an important step forward towards better understanding the underlying mechanisms. Second, to the best of our knowledge, no previous paper has either analysed the effect of primary sovereignty risk on bank stability or addressed stability issues regarding EMEs, particularly in the case of Albanian banking system. Third, we focus only on the period after GFC and therefore provide new insights into the extent to which potential internal and external factors explain patterns of bank stability conditions, which may be relevant to both investors and regulators. Finally, it avoids any pitfalls, as described by Uhde and Heimeshoff (2009) related to data issues and ensure comparability across both dependent and independent variables since it focuses only on a single country. Similarly, we do not make use of data from the Bankscope database, but rather we use data taken from the Bank of Albania, which provides the most accurate and reliable dataset on banking data.

The remainder of the paper is structured as follows: The next section discusses the literature review. Section 3 presents the methodology with regards to model specifications and data. Results are presented in Section 4. The material concludes in section 5 with final remarks and policy implications.

2. LITERATURE REVIEW

In accordance with the theoretical views, many recent studies have tried to empirically analyse issues related to banking stability, can be summarized in two forms. On the one hand, stand those studies that are related relatively to the approach to transforming bankruptcy episodes or the measurement of this phenomenon through binary and / or qualitative indicators. On the other hand, there is another group of studies that are essential for understanding the form under which certain phenomena that are directly and / or indirectly related to banking stability are studied.

2.1. LITERATURE REVIEW ASSOCIATED WITH BANK STABILITY INDICATORS

A review of the literature shows that different proxies that come from balance sheet and profit and loss information of banks are used to measure bank risk. However, there is no consensus which measure fits best to gauge risk (Noth and Tonzer, 2015). For example, among many authors, Boudebbous and Chichti (2013) agree that bank stability is difficult to define and measure due to the constant changes of the financial and banking environment. Some authors view it in the absence of excessive volatility, stress or crisis and as a "steady state" in which the financial system efficiently performs its key economic functions", such as allocating resources and spreading risk as well as settling payments (Deutsche Bundesbank, 2003 and Jahn and Kick 2012).

In this aspect, the literature review can be distinguished among those that make use and those that focus on analysing the determinants of stability indicators. The former ranges among studies that use single or composite indexes variables or studies that identify leading indicators of bank fragility, as well as build models of early warning signals model to which they empirically evaluate the causes of instability periods in an ex post approach. Some studies use single or composite indexes variables or studies that identify leading indicators of bank fragility, as well as build

models of early warning signals model to which they empirically evaluate the causes of instability periods in an ex post approach. For example, some refer to the bank risk using the Z-Score, which indicates banks distance to default by calculating the difference between banks' profitability and the equity ratio of banks, scaled by the volatility of bank profitability. This approach includes studies by Demirgüç-Kunt, et al. (2008); Berger, et al. (2009); Kasman and Kasman (2015); Dushku (2016); and Noth and Tonzer, (2017). On the other hand, there exists also another group of studies, which make use of indicators, such as non-performing loan [Berger, et al. (2009), Jiménez, et al. (2013)] and / or loan loss provisions [Noth and Tonzer, (2017); Dushku (2016)].

In the macro-prudential regulatory frameworks, some have succeeded in developing one-stop indicators that combines macroeconomics and bank level data to which they use binary approach to signal instability periods[1]. However, Hagen and Ho (2007) argue that this methodology may be misleading for two main reasons. First, bank interventions may occur even in the absence of an acute crisis in the banking sector. Second, not every crisis leads to a visible policy intervention, as central banks and regulators may be able to fend off the crisis successfully with less spectacular means. For example, based on a non-binar approach, Fiordelisi, et al. (2011) approached the bank risk through the means of a cumulative Expected Default Frequency (EDF)[2] and Ötker and Podpiera (2010) create distress events using Credit Default Swaps (CDS). Other papers use the accounting risk-taking measurements such as Z-score used by Cleary and Hebb, 2016, to the belief that it allows the analysis of the entire variable profile of a firm simultaneously, rather than sequentially examine the individual characteristics. Black, et al. (2016) use a distress insurance premium risk indicator, which integrates the characteristics of bank size (total balance-sheet liabilities), the probability of failure based on CDS and the correlation (equity return correlations) and explore the source of systemic risk as well as the contribution from individual banks and countries.

[1] See also (Illing and Liu 2006); Jahn and Kick, (2012); Cevik, et al. (2013); Shijaku (2017a).

[2] This indicator is calculated for each bank by Mood's Kealbofer, McQuown and Vasicek, which is shortly known as the KMV model.

2.2. LITERATURE REVIEW ON EMPIRICAL APPORACH TO ANALYSE ISSUES RELATED TO BANK STABILITY

The effect of financial crisis of 2007 has once again brought the issue of bank risk to the heart of academic discussion. In the realm of the determinants of bank stability, as Hutchison (2002) states, theoretical literature falls under three groups of models: 'bank-run models', as in, e.g., Diamond and Dybving (1983); 'adverse shock/credit channel' models, as in, e.g., Bernanke et al. (1992); and 'moral hazard' models, as in, e.g., Demirgüç-Kunt and Detragiache (2002). The empirical framework identifies several variables consistent with one or more theoretical models that fall under two main categories, namely, internal and external determinants. The former consist of indicators influenced by the management policy objectives and their ability to monitor risks and, thereby, focuses on the characteristic bank balance sheet indicators, such as size and asset quality, state of capital structure and liquidity, operational efficiency and leverage. Among these studies, Caprio and Klingebiel (1997) mention as the main source of bank fragility their ability to monitor lending quality, while Dell' Ariccia, et al. (2008) show that standards may decline further during credit and house price crises in order to get into the game. Diamond and Rajan (2005) conclude that the reason bank failures are contagious is also the same reason that bank assets are illiquid and a systemic liquidity shortage in the interbank money market and increasing financial integration can make funding liquidity pressures readily turn into issues of systemic insolvency [Jutasompakorn et al. (2014)]. Berger and Bouwman, (2013) found that strong capital structure is essential to absorb any negative shocks during turbulent episodes.

The other category of indicators comprises macroeconomic and industry-specific variables. This group of indicators are exogenous with regards to decision-making process at bank level. Therefore, they are out of the control in relation to the decision-making and specific bank policies. Similar, as Demirguc-Kunt and Detragiache (2002) suggest, another set of indicators are related to banking supervision issues such as legal aspects of contract enforcement, bureaucracy

and accounting standards, deposit insurance instruments, etc. For example, Pill and Pradhan (1997) confirm a positive correlation between bank fragility and credit boom. Meanwhile, Eichengreen and Rose (1998) put more emphasis on the effect of rising spread and high interest rates, which are indicative of: banking problems; the need to curb high inflation rates; and the need to save the domestic currency price, which is likely to damage the bank's balance sheet, even if partially transferred to the borrower. Kaminsky and Reinhart (1998) also found that large and deteriorated fiscal deficits tend to increase the probability of banking crises, while the effect of monetary base growth is negligible. Among these studies, Honohan (2000) finds that the crisis often occurs in the second part of the economic boom cycles, while a number of studies report that the crisis is less likely to occur in countries with strong real or positive growth, low inflationary pressures and better management of foreign capital inflows [Demirguc-Kunt and Detragiache, (2005)]. Jahn and Kick (2012) note that banking stress is more related to the level of concentration of bank loan portfolios, and this is related to the fact that specialized banks tend to be more stable than diversified ones. At the same time, Boudebbous and Chicht (2013) report that high credit extension rates may finance an asset price bubble and consequently an increase in banking fragility, which is often preceded by deteriorating trade conditions, but also from exchange rate appreciation, although Domac and Martinez-Peria (2003) conclude that the duration of the crisis does not seem to be influenced by exchange rate developments. On the other hand, Cole and White (2012) use a multiple logarithmic regression model to analyze why commercial banks failed during the recent financial crisis. They find that the main indicators related to CAMELS criteria are potentially quite efficient to explain bank failures that were closed during 2009. Fahlenbrach, et al. (2012) also show that the performance during the 1998 crisis of return from investment in shares was a good tool to predict the probability of failure during the crisis. The authors also indicated that reliance on short-term financing, high leverage and high growth rates was related to the weak performance of banks in both crises.

Among other studies, Aubuchon and Wheelock (2010) examine bank thrift failures between 1 Janurary 2007 - 31 March 2010, mostly focusing on regional economic characteristics associated with bank failures, rather than on detail characteristics of the banks themselves. Other studies have shown that firms drew down their credit lines during the crisis in anticipation of shocks to their liquidity position (Ivashina and Scharfstein (2010), Campello et al. (2011)), and that riskier borrowers tended to utilise a larger portion of their credit lines, especially so during a crisis [Dwyer, et al. (2011)]. Beltratti and Stulz, (2012) confirm the findings of Laeven and Levine (2009) concerning the pre-crisis period, but challenge the view that poor bank governance was a major cause of the crisis, by showing that banks with more shareholder-friendly boards performed significantly worse during the crisis. On the other hand, in a more recent paper, DeYoung and Torna (2013) examine the degree to which the composition of a bank's income sources affected bank distress during the recent financial crisis. They show that for distressed banks the probability of bank failure increased with non-traditional, asset-based activities (venture capital, investment banking and asset securitisation), but declined with non-traditional, purely fee-based activities (securities brokerage and insurance sales). The authors also show that banks with a substantial amount of non-traditional, asset-based activities tended to take more risk in their traditional banking activities. Berger and Bouwman (2013) exploit an exogenous source of variation in the stock of capital buffers to study the effect of capital on two dimensions of bank performance, i.e., probability of survival and market share, and find the effect to vary across banking crises, market crises, and normal times. In particular, capital increases the probability of survival and market share of smaller banks for all three types of crises, but improves the performance of medium and large banks, primarily during banking crises. In return, Antoniades (2015) builds on the work of Cole and White (2012) and argues that commercial bank failures in the United States can be explained by the deterioration of conditions in the real estate sector, a process which started as early as 2006 and lasted well after the funding crisis ended. The author identifies three sources of bank exposure to the real estate sector, which operate through its (a) illiquid assets; (b) marketable securities; and (c) off-balance sheet credit line portfolios.

3. METHODOLOGY AND THE SAMPLE

3.1. BANK STABILITY INDICATOR

From the structure point of view, banking sector is the most important segment of the Albanian financial system and as such, it requires more attention when it comes to its financial analysis [Kalluci, (2011)], while the value added consists of analysing banks on individual basis. Therefore, different from other indicators used by the Bank of Albania[3], this paper follows the Uniform Financial Rating System approach, introduced by US regulation in 1979, referred to as CAELS rating (Capital adequacy, Asset quality, Earnings, Liquidity and Sensitivity to market risk)[4]. First, using statistical methods, all indicators included in each of these categorises are normalised into a common scale with a mean value of zero and a standard deviation of one[5]. The formula is as follows:

$$Z_t = \left(\frac{X_t - \bar{\mu}}{\bar{\sigma}}\right) \qquad (1)$$

Where, X_t represents the value of indicators X during period t; μ is the mean value and $\bar{\sigma}$ is the standard deviation. Second, all normalised values of the set of correlated indicators used within one category are then converted into a single uncorrelated index by means of a statistical procedure, namely the principal component analysis (PCA) approach, which is yet again standardised based on the procedure of Equation (1). Then, the sub-indices estimated are transformed between values [0, 1] using exponential transformation [1 / (1 + exp(-Z*)]. Finally, our bank stability index (CAELS) is derived as the sum of the estimated exponentially transformed sub-indices, as follows:

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[3] Shih Kalluci (2011); Kota and Saqe (2013); Shijaku (2014); Saqe, et al. (2015).

[4] This approach is also used by the International Monetary Fund Compilation Guide (See IMF (2006) on Financial Soundness Indicators and other authors, e.g., Wheelock and Wilson (2000), Sere-Ejembi, et al. (2014) and Cleary and Hebb (2016). In the case of Albania, the indicators we use are reported monthly by each bank in a special reporting format, under the CAELS criteria.

[5] Normalizing the values avoids introducing aggregation distortions arising from differences in the mean value of indicators.

$$CAELS_{t,w} = \omega_1 \sum_{i=1}^{n} Z^*_{t,C} + \omega_2 \sum_{i=1}^{n} Z^*_{t,A} + \omega_3 \sum_{i=1}^{n} Z^*_{t,E} + \omega_4 \sum_{i=1}^{n} Z^*_{t,L} + \omega_5 \sum_{i=1}^{n} Z^*_{t,S} \quad (2)$$

$$\sum_{*=a,b,c,d,e} \omega^* = 1 \quad (3)$$

Where, *n* is the number of indicators in each sub-index; 'C' relates to capital adequacy; 'A' represents a proxy to asset quality; 'E' represents a proxy to earnings; 'L' represents a proxy to liquidity efficiency categories; and 'S' is related to the sensitivity of market risk. All indicators used within each category are reported in Table 1 in the Appendix. Z* is the exponentially transformed simple average of the normalised values of each indicator included in the sub-index of the given bank stability index. Then, the estimated index is used as a relative measurement, where an increase in the value of the index for any particular dimension indicates a lower risk in this dimension for the period in question, compared with other periods.

The advantage of this approach is fourfold. First, as presented in Graph 2 in the Appendix, CAELS represents a useful "complement" to on-site examination, rather than a substitute for them [Betz et al. (2014)]. Thereby, it thereby, creates a comprehensive, monthly-based, internal supervisory 'thermometer-like' instrument that can be used to evaluate bank stability in real time and on an uniform basis. It can also be used to identify those institutions that require special supervisory attention and concern with regards to both present and future banking sector conditions. Second, it builds on the recommendation of ECB (2007). Therefore, we believe it more accurately reflects the Albanian financial structure, since it attaches more weight to the banking sector and includes the most prominent agents in the financial markets, while it takes advantage of a broad range of bank level data. Third, the PCA approach highlights the most common factor identifying data patterns without much loss of information[6]. Four, it does not assume the probability form of the binary approach, which may expose it either to limitations of an insufficient number of episodes or to the vulnerability of the methodology employed to calculate the threshold level. The

[6] See also Jolliffe, (2002); Ringenér, (2008); Abdi, et al., (2010) dhe James, et al., (2013).

latter may even provide false banking distress signals. Rather, the PCA comprises a simpler approach that is easier to explain and implement. Most importantly, it allows analysing the state of the bank as it develops and it is also applicable in cross-section comparisons.

3.2. THE SET OF INDEPENDENT VARIABLES

The empirical literature broadly reflects the factors that determine banking stability, which on the one hand, are distinguished as macroeconomic indicators and on the other hand as other indicators linked specifically with banks' characteristics and the banking sector developments[7]. Therefore, in our model we have included five independent indicators, which are widely used in the empirical studies and at the same time meet the conditions of the selected sample.

First, we included two macroeconomic indicators. One indicator is linked to economic activity. The other one is associated with primary sovereignty risk. Both of them would solve the problem of omitted variable bias in the regression and capture adverse macroeconomic shocks, which presumably affect bank stability conditions. The first indicator, linked to economic activity, captures the effect that economic developments has on bank activity. It is expected that a higher economic growth or upward movement in expectations of economic performance, which enhances the ability of economic agents to meet their commitments in the future, would make bank fragility less likely. Therefore, the indicator related to economic activity is expected to have a positive sign. On the other hand, the indicator related to primary sovereignty risk presents a collection of concentrated macroeconomic risks (e.g., political risk, exchange rate risk, economic risk, sovereignty risk and transfer risk) associated with investing in a foreign country. This risk can reduce the expected return on portfolio investments and must be taken into consideration whenever investing abroad. For example,

[7] The empirical analysis would have been relatively more difficult and less unbiased if a higher number of explanatory variables would have been included, given the size of our sample.

as Jutasompakorn, et al. (2014) suggest, an appropriate indicator to measure the primary sovereignty risk is the spread between the domestic interest rate and the rate of a country (economy) assumed to be risk-free to invest in. Theoretically, one would expect that a higher sovereignty risk inducing a higher domestic interest rates makes the solvency condition harder and bank stress more prominent, and vice versa [Domac and Martinez-Peria (2003)]. In other words, we expect that an increase in sovereignty spreads would negatively affect bank stability.

Second, an indicator linked to the size of the bank was included also in the specified model, which is also supposed to reflect aspects of banking sector developments. This indicator was included under the argument that banks analyse their performance by comparing with other counterparty developments [Berger and Bouwman (2013)]. This indicator is expected to have a positive coefficient, assuming that the probability of coping with fragility periods increases with the size of the bank, compared with smaller banks. So, the greater the bank, the greater its ability to cope with crisis periods. However, it may happen that beyond a certain level and/or under certain conditions the growth of the dominance of a bank against other banks may be counter-productive. If a higher market share comes through higher capital and / or more aggressive policies, this can lead to higher attractiveness of new, but risky products, which entails higher deposits and/or higher leverage and inversely increases bank risk taking, and, therefore, the probability of default [Besankoa and Kanatasb, (1996)].

Finally, the specified model includes also two other indicators, which are specifically related to banks chatracteristics. On the one hand, based on Hughes and Mester's (2009) suggestions, the model included an indicator of bank's operational efficiency, for which Fiordelisi, et al., (2015) believes that it is quite significant from the assumption that the supervisory authorities may allow more efficient banks, eg. those with relatively better management and quality, greater flexibility in terms of their overall stability condition, ceteris paribus, and vice versa. Moreover, Shawtari, et al., (2015) suggests that the indicator on operational efficiency is a better measure for the performance of banks when compared to

averaging methods, such as return on asset (RoA) and return on equity (RoE). To that end, any policy-decision by the bank authority to make the bank more attractive or/and more competitive and vice versa would be reflected on bank balance sheet income-cost indicators. This refutes our assumption that decreasing efficiency would deteriorate the bank's health status. On the other hand, the analysis takes into account also an indicator related to the degree of bank capitalization. For example, a sufficient amount of capital, which serves as a safety cushion, is also important for a bank's daily operational activity. This is due to the fact that capital acts as a buffer against financial loses, protecting the bank from solvency risks. Adequate capital enables banks to fulfil the minimum capital adequacy ratio under potential solvency risks [Betz, et al. (2014)]. Therefore, we assume that any policy-making reflects the strength of capital structure and, thereby, stability is a condition for a bank's financial leverage. It is expected that solvency risk diminishes with a higher ratio of capitalisation, allowing the bank to absorb any shock it may experience. Therefore, such a ratio is expected to be positively associated with bank stability.

3.3. SAMPLE AND THE DATA

Sample data for this study are quarterly and composed of bank-specific and industry-specific data, which are taken from balance sheet and income statement items of 16 banks operating in Albania, as well as of some macroeconomics variables. The strength of the dataset is its sample coverage and reliability of information. It covers all banks operating in Albania in the last two decades. The sample consists of 960 quarterly sets of data for 16 banks operating in Albania, since 2001 Q01.However, due to the focus of this paper, the empirical study focuses on the period 2008 Q03 – 2015 Q03, as the second half of 2008 marks the beginning of pass-through effects of GFC into the Albanian economy[8]. These include a total panel of balanced observations with 448 observations and 28

[8] The Albanian economy was not directly affected by the GFC, but the spill-over effects through financial and trade linkages were immediately transmitted from 2008 Q04, which, at the same time, provides justification as to why we chose the empirical estimation from this period.

periods.

Variables used for empirical analysis are as follows: The bank-specific and market-specific variables as well as the stability indicator are estimated individually for each bank. CAELS represents the bank stability condition estimated as explained in Section 3.2.1 (See also Table 2, in the Appendix). This is transformed into an index, taking the average performance during the year 2010 as the base year. EFFICIENCY is a proxy as a gross expenditure to gross income ratio. LEVERAGE presents the total equity to total asset ratio of individual banks. SIZE represents a market-specific variable. It is expressed as the ratio of an individual bank's assets to the total banking system assets. The bank-specific variables, the market-specific variable and the stability indicator are individually estimated for each bank. The macroeconomic variables are aggregated indicators that represent the state of the economy. GDP represents gross domestic production. It is transformed in real terms by deflating with the Consumer Price Index (CPI). PSRISK represents the spread between domestic 12 months' T-Bills and the German 12 months' T-Bills. They are transformed in real terms by subtracting the respective domestic and German annual inflation rates.

All data represent end-period values. They are log-transformed, besides PSRISK and CRISIS. Further, the dataset developed for this paper has several sources. Data on GDP are taken from the Albanian Institute of Statistics. Data on domestic T-Bills rates are taken from the Ministry of Finance. Data on German 12 months' T-Bills rate and German CPI are taken from Bloomberg. The rest of the data are taken from the Bank of Albania.

3.4. THE EMPIRCAL ESTIMATION APPROACH

The empirical model specifications draw on the extensive review on several studies that have sought to identify the characteristics that cause banks to fail or get distressed. Among them, use has been drawn on the assumption by Wheelock and Wilson (2000), Cole and White, (2012), Betz et al. (2014) and Black et al. (2016), but this paper departs differently from them in that it also analyses

how primary sovereignty risk affect bank stability conditions. Therefore, our empirical model is expressed as follows: *(4)*

$$CAELS_{i,t} = \alpha + \beta_i * X'_{i,t} + \varepsilon_{i,t}$$

Where, is a stability indicator of bank *i* at time *t*, while *i* = 1, …, N and *t* = 1, …, T. $X'_{i,t}$ is a vector of explanatory variables grouped in three main categories: (1) $Banking'_{i,t}$ is a set of bank-specific explanatory variables; $Market'_{i,t}$ is a set of explanatory industry variables; $Macroeconomics'_{i,t}$ is a set of control variables that account for the state of the economy, and consist of two variables, namely, the output and the primary sovereignty risk; α is a constant term; β_i is a vector of coefficients to be estimated; $\varepsilon_{i,t}$ is an error term assumed to be identically and independently distributed with a mean value of 0 and variance $\sigma_u^2 A = \pi r^2$.

One potential problem with Equation [4] is the fact that, as a partially specified model, it puts together a variety of variables and, so, it nests a conditional restriction with a variety of unconditional ones, thus leading to an over-identification of problems[9]. Under these circumstances Maximum Likelihood estimators' are needed to identify the moments whose squares are minimised in order to satisfy only the subset of correct restrictions. To correct for this, the estimation approach is based on the General Method of Moments (GMM) difference weights (AB-1-step), as proposed by Arellano and Bond (1991) and Arellano and Bover, (1995)[10]. Theoretically, GMM is also a virtuous approach to deal with potential endogeneity and dynamic panel data problems in model estimation [Anderson and Hsiao (1981)]. From a practical point of view, the instrument variable is based on past information of , and to limit the number of instruments, we limit the lag range used in generating the instruments to 4, as suggested by Roodman (2009). We also used 4 lags in the assumption that the process of decision-making at the bank level is annually revised. First, AR(1) and AR(2) are the Arellano-Bond tests for first and second order autocorrelation of residuals. One

[9] Technically it is known as Maximum Likelihood approach.

[10] Han and Phillips (2010) suggest GMM approach is constructed so as to achieve partial identification of the stochastic evolution and to be robust to the remaining un-modelled components.

should reject the null hypothesis of no first order serial correlation, but not the null hypothesis of no second order serial correlation of the residuals. Second, the Sargan and Hansen test of over-identifying restrictions indicates whether instruments are uncorrelated with the error term. It is expected that the approach on weighted difference would also resolve the un-ward (down-ward) bias in standard errors t-statistics due to its dependence on estimated values (since it uses the estimated residuals from an one-step estimator), which may lead to unrealistic asymptotic statistical inference[11]. This is especially true in the case of a data sample with a relatively small cross-section dimension (Arellano and Bond 1991).

4. EMPIRICAL RESULTS

4.1. THE BENCHMARK MODEL

This section reports the main results of empirical analysis. First, with regards to the unit root approach[12], results in Table 3 in Appendix, show that EFFICIENCY and LEVERAGE are integrated of order zero I(0). This means that they are stationary. Therefore, they enter the model at level. The other variables, namely CAELS, GDP, PSRISK and SIZE are found to be integrated in order one, I(1). This means they pose non-stationary properties. Therefore, they enter the model as first difference, since it will transform them into a stationary stance[13]. In addition, this section represent also the main results from the model as specified in Equation [4], which are reported in Column [1] of Table 4 in the Appendix. Results are based on the GMM approach, while diagnostic tests confirm that that our model is properly specified and that the empirical analyses are robust and

[11] See also Judson and Owen, (1999); Bond and Windmeijer (2002); Ansari and Goyal (2014).

[12] The unit root test approach includes the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) Fisher Chi-square tests, which are mostly used for unbalanced panel models, such as our sample.

[13] These results are robustness also to other unit root test approaches, including the Im, Pesaran and Shin W-stat test and Fisher test. Data can be provided upon request.

consistent with the GMM estimation criterion[14].

In addition, a glance at the results confirms that stability conditions of banks react relatively to the responses of other explanatory variables according to the predictions obtained from the theory. For example, PSRISK has the negative effect expected on bank stability[15]. It implies that decreasing sovereignty primary risk, as measured by the spread ratio of domestic and foreign risks, increases bank stability and therefore lower risks are expected to materialise through improving bank stability conditions. This result complements the findings of Jutasompakorn, et al. (2014), but by contrast, the estimated marginal effect is considered to be relatively small, even though it is statistically significant at 10%. This suggests that banks consider shocks related to primary sovereignty risk, even though the pass-through is relatively small. The reason is fourfold. First, public borrowing has been orientated towards longer-term maturities and towards foreign borrowing. This has lowered the pressure on banks and at the same time has provided the market with more foreign liquidity. Second, the government has taken several structural reforms to minimise possible fiscal risks, which includes the pension system reform, energy sector, etc. Third, banks in Albania operate under a flexible interest rate onto which they impose a marginal fixed rate. Therefore, any negative shock that leads to an interest rate hike is immediately reflected on their interest bargaining, enabling them to hedge interest rates to a certain extent. Last, but not the least, contrary to those in other countries, banks in Albania have been well-capitalised and have not been vulnerable to a shortage of liquidity, despite recent trends and financial disintermediation.

On the other hand, the coefficient of GDP has also a positive sign, as expected. This suggests, as in the case of Demigruc-Kunt

[14] The empirical model includes also the cross-section fixed effects and makes uses of 'White Cross-Section' standard errors and covariance (degree of freedom corrected). The diagnostic tests are based on the results of the Sargan and Hansen test and the critical values of AR(1) and AR(2) of the Arellano-Bond tests, which are reported at the bottom of table 4 in Appendix.

[15] To assure the authenticity of our results, under the assumption of robustness checks, we also specified the model by using a primary sovereignty indicator that accounts only for the effect of monetary policy shock, proxy in this model as the spread between real term overnight rate and the real EONIA rate. The results were relatively the same. The estimated effect is found to be relatively small, even though statistically significant.

and Detragiache (2002), that increases in economic growth have a positive effect on bank stability. The effect is found to be statistically significant at 1 % level. Therefore, one would expect that higher economic growth would play a relatively crucial role for bank stability conditions. It is also of great importance to understand, however, that, from another point of view, this result implies that banks also have a relatively significant role for the economic conditions in which they operate, since an upward movement in economic activity would improve the situation of the banking system through higher financial intermediation or low risks related to bank sovereignty risks.

Regarding other indicators, the results show that the extent to which banks are positioned with respect to their market share, SIZE, which also incorporates the effect of economies of scale in bank behaviour, has a positive effect on bank stability, as expected. The coefficient is statistically significant at 5%. On the one hand, stability patterns are positively linked with a positive shock due to a policy decision-making that drives banks toward larger market shares. On the other hand, it is a sign that, in the case of the Albanian banking industry, the economy of scale persists. Therefore, as Berger and Bouwman (2013) put forward, our interpretation is that bank size and the market share value could be a source of economic strength for the bank, and, just like capital, they could make banks more attractive and more confident to either support higher loan levels at lower costs or to support a turbulent moment caused by both endogenous and exogenous factors.

Similarly, other bank-specific variables associated with patterns at bank level are found to be crucial for bank stability. They have the expected sign and are statistically significant at conventional level. For example, the coefficient related to EFFICIENCY is found to have the negative sign expected, supporting the existence of a reserve relationship between operational efficiency and bank stability conditions. It suggests that bank stability would increase proportionally to any upturns in operational efficiency. At the same time, this relationship is also statistically significant at a 10% conventional level, suggesting that it is a fundamental issue in terms of stability. Therefore, banks should be aware that any policy

decision-making, in an attempt to make banks more attractive, may lead to lower productivity and would come to a cost in terms of their stability. The reason is twofold. First, in order to be competitive and attractive, banks may find it difficult to shift all the cost to their clients. Second, a few large banks dictate the ruling interest rate policy, so the others need to follow suit, and that does not allow them to 'overcharge'. Finally, as the coefficient related to LEVERAGE shows, capital patterns are found to have the expected positive effect on CAELS. The relationship is also found to be statistically significant at 1%. This suggests that increasing bank capital is also quite an important factor and stability conditions improve as banks become more capitalised. One important consideration is the fact that LEVERAGE has the highest coefficient among other bank-specific variables. This is not surprising, given that most policy decision-making at bank level is based on the degree of bank capitalisation. From a policy point of view, it is quite important to understand that results show that the stability of banks operating in Albania is quite sensitive to bank capitalisation. Therefore, banks should also be aware that policy making, with regards to lending or stock of deposits, should be based on the degree of the bank's ability to fulfil capital and liquidity requirements. From a policy point of view, it is also crucial to point out that bank-specific variables are found to have the highest effect compared to other macroeconomic and market specific indicators. This implies that bank stability is more sensitive to developments within the banking sectors rather than outside it.

4.2. THE ROBUSTNESS CHECKS

4.2.1. THE ALTERNATIVE AUGMENTED MODEL

To control for potential omitted variables problem, following Berger, et al. (2013), our benchmark model, as specified in Equation [4] is re-specified and augmented to contain a second broad set of control variables, Z, to the extent that it allows us to analyse the determinants of bank stability by including simultaneously an extra control variable to the benchmark model. These variables consist among a group of macroeconomic and bank-specific variables.

The group of macroeconomic variables includes indicators such as DEBT proxy for the fiscal policy stance, FSI proxy for the financial market stress condition, and HPI proxy for the housing market price index[16]. The second group of variables includes also a set of indicators namely, DL to account for the extend of intermediation effect; DEPOSIT (LOAN) to account for bank sensitivity to the level of deposits (loans) patterns within the bank; CAPITAL the effect that excessive capital have on bank stability; and finally, NPL represent the effects of non-performing loans[17]. The model is estimated in level based on the results of the Unit Root tests approach. The results are presented in Table 4 Equation (2) to Equation (9) in the Appendix. They show that the behaviour of variables does not change and findings are robust around the same findings analysed in Section 4.1. They reconfirm the robustness of results with respect to the sign of the coefficient, even though in some cases their level of significance changes. For example, PSRISK continues to exhibit a reverse relationship with CAELS. This effect continues to remain the lowest among the core variables, albeit with non-statistically significant properties in some of the model specification. On the other hand, the coefficient associated with GDP remains still positive and statistically significant, confirming that positive development and macroeconomic expectations are crucially important for boosting banking stability. Other results exhibit also the same effect. For example, SIZE does still affect CAELS positively, even though it becomes statistically insignificant. Yet again EFFICIENCY

[16] DEBT represents the ratio of total public debt (internal and external) to the nominal GDP. FSI represent a proxy for the Albanian financial stability condition and follows the methodology by Shijaku (2014)]. It is transformed into an index, taking the base year the average performance during the year 2010. The estimated FSI is a relatively measurement, where an increase in the value of the index at any particular dimension indicates a higher risk in this dimension for the period, compared with other periods. HPI presents the inflation rate on the real estate market, calculated as the first difference of the log-transformed of the housing price index. Data are log-transformed. DEBT and HPI enter the model in first difference, while the rest is included in their s tationary form.

[17] DL represents the ratio of deposit-to-loan of individual banks. DEPOSIT (LOAN) represents the ratio of deposit-to-asset (loan-to-asset) of individual banks. NPL represents the ratio of non-performing loan to total bank loan. CAPITAL represents the excessive capital over the minimum regulatory threshold level. It is generated as the difference between the actual capital adequacy ratio calculated as the ratio of equity over risk-weighted assets and the 12 percentage threshold level required by Basel II capital adequacy regulations. NII represent the revenues from non-interest activities divided by the total revenues. All the data are log-transformed, besides the CAPITAL. They enter in the model specification into their stationary form.

continues to be negatively related to CAELS. At the same time, LEVERAGE contributes positively to CAELS. Both of these indicators are statistically significant through all the models.

The analysis of other explanatory indicators also shows that the empirical findings are relatively similar to theoretical expectations. The macroeconomic indicators included in this analysis suggest that macroeconomic conditions are essential for the stability of banks. For example, it has been found that the FSI is accompanied by an expected negative coefficient. This means that positive shocks in the financial sector are expected to be accompanied by an improvement in banking stability. This effect is also found to be statistically significant at 5% level. This implies that developments in the financial sector are quite essential to the banking system as a whole, starting from the reciprocal interconnection between them. Therefore, any developments that is related with it are expected to be immediately reflected in the banking sector. Similarly, as expected, bank stability is found to have a negative and statistically significant relationship with the fiscal policy stance. This result is relatively similar to the findings of Demirguc-Kunt and Detragiache, (2005) in the case of developing economies. This suggests that any policy action that leads to lower borrowing or/and improves fiscal stance is found to have a positive impact on bank stability. At the same time, the relationship between them has been found to be statistically important. This means that banks in Albania are quite sensitive to fiscal positions. Also, developments related to the real estate sector have been found to have a negative and statistically significant effect on banking stability, although, based on the value of the coefficient found, banks may be relativist less susceptible to these developments. These results prove once again that macroeconomic developments are very important for banking stability.

On the other hand, bank-specific variables are also found to have the expected sign, but besides CAPITAL, are estimated to be statistically insignificant and relatively small. For example, the positive sign of DL implies that a higher degree of intermediation level boosts bank confidence, even though the effect is found to be relatively small and statistically insignificant. DEPOSIT and LOAN

have also a positive coefficient[18]. This suggests that increasing in stock of deposits and loans, which are the main bank funding sources of loans and forms of investments, would enhance bank stability. These results confirm that confidence in the banking sector increases with financial intermediation. Surprisingly, their effect has been found to be statistically insignificant. Regarding other variables, the negative effect of NPL implies that bank stability is indirectly linked with credit risk. This relationship is consistent with prior expectations and in line with previous empirical findings of Cleary and Hebb, (2016). However, from a statistical point of view this effect has been found to be irrelevant. Finally, it is noted that developments related to regulatory capital of banks have been found to have a very significant effect on banking stability, also due to the statistical significance of the coefficient associated with CAPITAL. Its positive sign suggests that the growth of equity shares beyond the minimum allowed level further promotes the stability of banks. This implies that good capitalization of banks is essential for their stability, which in some way confirms that banks operating in Albania managed to cope with the effects of the financial crisis on their good capitalization.

4.2.2. ANALYSING THE EFFECT THAT OFF-BALANCE SHEET ACTIVITIES HAVE ON BANK STABILITY

In this section we present the results of another set of robustness checks. This time, to further scrutinise the robustness of our results, we further augmented Equation [1] by including, similar to Mirzaei et al. (2013), an off-balance-sheet activities indicator (OFFBALANCE[19]) to evaluate the extent to which non-traditional activities, in which

[18] The results, is similar even when we tested for the effect of loan to GDP ratio or the effect of loan concentration to mortgage lending.

[19] Off-balance sheet items include total acceptance and given commitments (namely financial, loans, securities and guarantee commitments), which are then scaled by total assets. They are log-transformed. Then, they enter the model in first difference based on unit root test results.

banks are engaging, may have an effect on bank stability[20]. The model is specified at a level based on Unit Root results. The empirical analysis is based on the GMM approach, as before, while the use of diagnostic tests provides strong evidence that supports the consistency of our augmented model and the use of the instrument variables.

The estimated parameters are reported in Tables 5 in the Appendix. The first column reports the results of our benchmark augmented model. The following columns report the results we include in the set of control variables examined in section 4.2. Similarly to our base line results, we first evaluate our benchmark-augmented model. Overall, we observed that previous empirical findings are insensitive to the inclusion of a set of control variables that do not alter results. The estimated parameters of our core variables are generally qualitatively similar and converge to relatively the same conclusions as before. In addition, most importantly, increasing off-balance sheet activities is found to be associated with a positive effect on bank stability. This suggests that increasing anticipation of off-balance sheet activities, which includes mostly guarantees on mortgage loans, exposes banks to a more secure position. The reason can potentially be explained by the fact that the higher the guarantee commitments a bank gives or/and takes are, the safer its position during turbulent moments is, due to such guarantee commitments. However, by contrast, this relationship is considered to be relatively small and statistically insignificant. The reason is twofold. First, the exposure of banks to such activities is mostly concentrated to commitments made to collateral coverage for mortgage loans. Second, banks' exposure to commitments made constitutes only a relatively small portion, most of which relates to financially consolidated and well-capitalised companies.

[20] Casu and Girardone, (2005) argue that empirical studies would lead to biased results without the role of off-balance sheet activities. Cleary and Hebb (2016) considered it to be certainly anecdotal evidence (e.g., Leman Brothers) about the truth of which they were not generally clear. However, through their empirical research, they report a statistically significant, even if small, negative relationship. DeYoung and Torna (2009) also find that non-traditional activities influence bank stability.

5. CONCLUSION

This discussion paper empirically explores the link between banking stability and primary sovereignty risk in the case of the Albanian banking system. The aim is to analyse, from an empirical point of view, whether primary sovereignty risk affects banking stability, especially after the financial crisis. For this reason, first, we introduce a new stability index for the Albanian banking sector. This new index is based on the balance sheet data and financial statements of banks that are reported on the basis of the CAELS criteria, which were converted into a single index by means of PCA approach. Subsequently, the specified model is estimated through the GMM approach, which included internal and external explanatory indicators. Finally, we run a number of robustness checks to control for the sensitivity of our results associated with the inclusion of additional explanatory variables and changes of methodological approach.

This material complements the existing literature on this issue along three main aspects. First, in our best knowledge, this is the first study to address the issues of primary sovereignty risk and stability in the case of a developing economy, in particular in the case of the Albanian banking system. Second, the stability indicator is not based on widely used indicators, such as the Z-score and / or the ratio of NPLs, and / or other binary indicators. In contrast, the selected indicator includes various aspects of banking risk. Therefore, we strongly believe that this indicator is qualitatively better able to identify directly the main factor that best expresses fragility episodes in time and without losing much information. This approach is advantageous even to the fact that it avoids any pitfalls (e.g., insufficient number of data or false signals) of using the binary approach to crises episodes. The methodological approach followed provides also a simple instrument that can be understood easily and that can be used for periodic and sectoral analyses. Finally, the database of this analysis is accurate and relies on the most reliable source of bank data, such as those collected by Bank of Albania.

In summary, this study confirms that the pas-through effect of primary sovereignty risk exposure and the exposure of banks to this risk remains low and statistically insignificant, although developments related to the macroeconomic conditions have been found to have a significant effect on banking stability. Among them, it is worth noting that the risk associated with the fiscal dominance and fragility of the financial sector are among the main factors affecting banking stability. On the other hand, indicators related to the banking sector have been found to have a significant effect on banking stability. It is noteworthy that the dominance of the bank in the market is another important element for dealing with the situation of unfavourable shocks. Also, indicators specifically related to banking behaviour have resulted to impact stability significantly. It is worth noting that capital and operational efficiency are among the key factors to effect bank's performance in view of potential risks associated with banking fragility. Meanwhile, financial intermediation and credit risk, although are found to have the expected theoretical effect, are found to be relatively insignificant. This relationship is found even in the case when such analysis was focusing on the effect of bank's involvement in off-balance sheet activities. An important conclusion is related to the fact that despite the methodological approach, the results remain relatively similar and unchanged.

Beyond the focus of this study, future research work should focus on the fact that a further detailed research is needed to better understand the factors affecting banking stability. Among them, it is worth looking at how banking concentration and competition affect bank stability. Also, it is very important to analyse how prudent behaviour of banks further promotes stability. Much attention should be paid to building anti-cyclical trade. Understandable, further improvement of the stability indicator is essential. Incorporating the market-related aspects of banking management would provide a fairly substantial failure in this respect.

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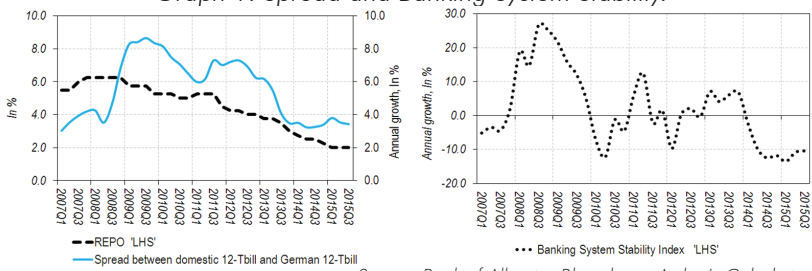
APPENDIX A

Graph 1. Spread and Banking System Stability.



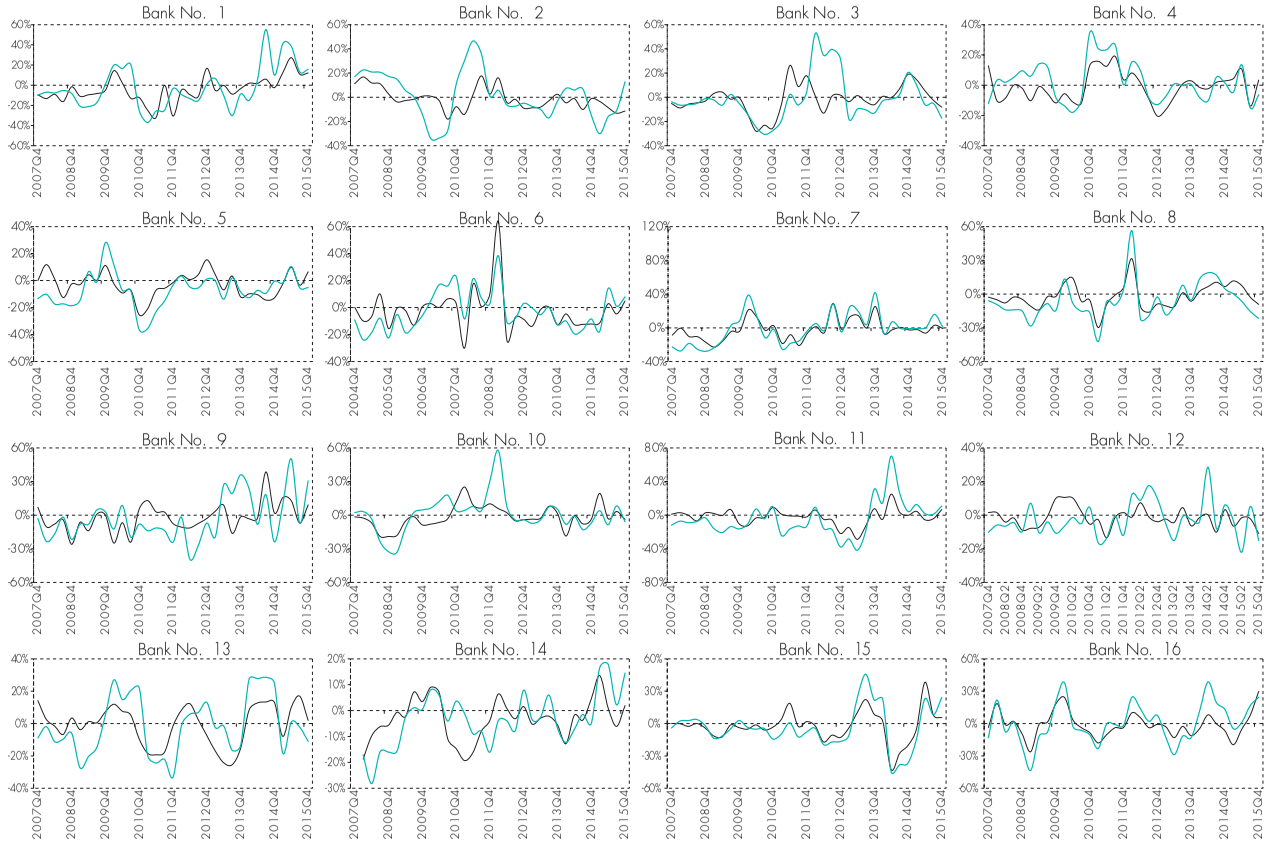
Source: Bank of Albania; Bloomberg; Author's Calculations

Table 1. Indicators of Bank Stability Index.

Category	Indicator	Symbol	Subindex
Capital	Capital Adequacy Ratio	C1	ZC
	Core Capital/Total Asset	C2	
	Equity/Total Asset	C3	
	Asset growth	C4	
	Equity Growth	C5	
	Fixed Asset/Regulatory Capital	C6	
	ROE	C7	
	Non-Performing Loan (net)/Regulatory Capital	C*8	
Asset Quality	Non-Performing Loan (net)/Total Loan (net)	A*1	ZA
	Total Loan (net)/Total Asset	A2	
	Growth of Loan Portfolio	A3	
	Credit Loss (Gross)/Total Loan (Gross)	A*4	
	Large Risks (the number of beneficiaries over rate)	A*5	
	Provisions for Loan Loss Coverage/ Non-Performing Loan (gross)	A*6	
Earnings	ROA	E1	ZE
	The growth of revenue from interest	E2	
	Interest revenue/Total Revenue	E3	
	Net Interest Margin	E4	
	Efficiency Ratio	E5	
	Interest Revenue (Net)/Operating Revenues (Gross)	E6	
	Dividend/Income (Net)	E7	
	The growth of net interest revenue	E8	
Liquidity	Net Loan/Average Deposits	L1	ZL
	Active Liquid/Total Asset	L2	
	Asset – Passive with a maturity of three months/Total Asset that provide profit	L3	
Sensitivity to Market Risk	Asset – Passive sensitive to interest rate with a maturity up to 3 months/Total Assets that Provide Profit	S*1	ZS
	Asset – Passive sensitive to interest rate with a maturity up to 12 months/Total Assets that Provide Profit	S*2	
	Net Open Position in foreign currency	S*3	
*linked to reverse risk order			

Source: Author's Calculations

Graph 2 Individual Bank Stability Indicators with and without PCA, Annual Growth Rates



Source: Author's Calculations

Table 2. Banking Sector Patterns

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total Banks	16	16	16	16	16	16	16	16	16	16
State owned-banks	0	0	0	0	0	0	0	0	0	0
Albanian owned-banks	2	2	2	2	2	2	2	2	3	3
Foreign owned-banks	14	14	14	14	14	14	14	14	14	14
Financial Intermediation	78.6	80.5	82.0	85.8	89.4	95.9	99.1	101.4	101.3	105.1
- Bank assets/ GDP	75.9	76.7	77.5	80.9	84.7	89.6	90.5	91.7	91.3	94.9
- Others' assets/ GDP	2.7	3.8	4.5	4.9	4.7	6.3	8.6	9.7	10	10.2
Bank loan / GDP					40.0	43.6	41.9	42.1	40.6	40.5
Bank Deposits / GDP	63.6	58.4	58.6	64.0	68.3	71.0	72.4	73.0	72.9	74.2
HHI (in %)	16.5	15.1	14.3	14.2	14.3	14.5	13.8	14.1	14.9	15.3
CR-4 (in %)	63.1	60.2	61.4	62.8	63.9	65.4	64.9	66.6	69.3	68.7

Source: Bank of Albania, Financial Stability Report (2016)

Table 3. Panel Unit Root Test.

Indicator	ADF - Fisher Chi²			PP - Fisher Chi²		
	Intercept	Intercept and Trend	None	Intercept	Intercept and Trend	None
ΔCAELS	[0.0000]	[0.0000]	[0.0000]	[0.0018]	[0.0000]	[0.0000]
ΔGDP	[0.0000]	[0.0000]	[0.0000]	[1.0000]	[0.0000]	[0.0000]
ΔPSRISK	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[1.0000]	[0.0000]
FSI	[0.0071]	[0.0000]	[0.0899]	[0.0000]	[0.0000]	[0.0001]
ΔDEBT	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
HPI	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
ΔSIZE	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
EFFICIENCY	[0.0000]	[0.0000]	[0.9649]	[0.0000]	[0.0000]	[0.8965]
LEVERAGE	[0.0000[	[0.0007]	[0.0001]	[0.0000]	[0.0006]	[0.0010]
ΔDL	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
ΔDEPOSIT	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
ΔLOAN	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
ΔNPL	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
CAPITAL	[0.0424]	[0.0537]	[0.3042]	[0.0000]	[0.0000]	[0.1607]
OffBALANCE	[0.0002]	[0.0149]	[0.9760]	[0.0000]	[0.0001]	[0.9669]
IKM	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
REER	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
PjBM0	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
Note: Δ is a first difference operator. Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.						

Source: Author's calculations

Table 4. Main results based on macroeconomic explanatory indicators

Specified model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
ΔGDP	1.0344***	1.3619***	1.2117***	1.0584**	0.9774*	0.9960**	0.9754**	1.1559**	1.1657**
ΔRSP	-0.0489*	-0.0225	-0.0287	-0.0610**	-0.0428	-0.0495*	-0.0436	-0.0402**	-0.0389
ΔFSI		-0.2109**							
ΔDEBT			-0.5560*						
ΔIçB (HPI)				-0.0935***					
ΔSize	0.1496**	0.1207	0.1431	0.1193	0.1137	0.1749	0.0813	0.0608	0.1423
EFFICIENCY	-0.4404*	-0.4528*	-0.5055**	-0.4622*	-0.4597**	-0.4283*	-0.4478*	-0.6496***	-0.4239*
LEVERAGE	0.6121**	0.4141**	0.6533***	0.6217***	0.4820**	0.4281*	0.6509***	0.0839	0.6403*
ΔDL					0.0974				
ΔDEPOSIT						0.0684			
ΔLOAN							-0.0986		
ΔCAPITAL								0.0215*	
ΔNPL									-0.0826*
Crossed sections	16	16	16	16	16	16	16	16	16
Order of instrumetns	20	24	24	24	24	24	24	20	24
No. of surveys	448	448	448	448	448	448	448	402	428
Statistics J	17.7	21.9	17.4	23.1	21.0	22.7	19.8	23.4	17.6
Probability [Statistics J]	0.28	0.23	0.50	0.19	0.28	0.20	0.34	0.17	0.48
AR[1] [value p]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR[2] [value p]	0.2834	0.025	0.058	0.032	0.045	0.042	0.037	0.073	0.042
*Conventional level of statistical significance by***1%, **5%, and *10%.*									

Source: Author's calculations.

Table 5. Main results based on macroeconomic explanatory indicators

Specified model	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
ΔGDP	1.037**	1.374***	1.191***	1.058***	0.984**	1.043***	1.032**	1.001**	1.168**
ΔRSP	-0.051*	-0.024	-0.033	-0.063***	-0.043	-0.049*	-0.041	-0.060**	-0.039
ΔFSI		-0.233**							
ΔDEBT			-0.487*						
ΔHPI (IçB)				-0.096***					
ΔSIZE	0.064	0.026	0.049	0.034	0.017	0.101	0.025	0.001	0.120
EFFICIENCY	-0.346*	-0.355*	-0.401*	-0.355	-0.368*	-0.349*	-0.359*	-0.436*	-0.281
LEVERAGE	0.537***	0.352**	0.577***	0.596***	0.403**	0.345*	0.552**	0.011	0.527**
ΔDL					0.119				
ΔDEPOSITS						0.092			
ΔLOAN							-0.070		
ΔCAPITAL								0.011*	
ΔNPL									-0.106*
ΔOFFBALANCE	0.012	0.014	0.012	0.015	0.013	0.012	0.009	0.011	0.034
Crossed sections	16	16	16	16	16	16	16	15	16
Order of instruments	24	28	28	28	28	28	28	24	28
No. of surveys	431	431	431	431	431	431	432	385	423
Statistcs J	23.4	27.7	23.0	27.2	28.0	28.0	25.9	26.7	28.0
Probability [Statistics J]	0.18	0.15	0.34	0.17	0.14	0.14	0.21	0.08	0.14
AR(1) [value p]	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2) [value p]	0.031	0.071	0.041	0.022	0.037	0.035	0.029	0.072	0.031
*Conventional level of statistical significance by ***1%, **5%, and *10%.*									

Source: Author's calculations

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