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DOES PRIMARY SOVEREIGNTY RISK MATTER FOR BANK STABILITY? EVIDENCE FROM THE ALBANIAN BANKING SYSTEM

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Abstract
The paper studies the pass-through effect of primary sovereignty risk on bank stability. For this reason, we followed a new approach using on-site bank balance sheet information to construct our proxy, which represents each bank stability condition and uses a variety of internal and external factors to estimate a balance panel two-step General Method of Moments (GMM) approach for the period 2008 Q03 – 2015 Q03. 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. Rather improving macroeconomic and financial market conditions are found to be important components through which banks become more immune. The rest of the results imply that other bank-specific indicators, namely the extent of intermediation, off-balance sheet active, excessive capital, credit risk and profitability do not have a significant effect.

JEL Classification: C26, E32, E43, G21, H63
Key words: Bank Fragility, Primary Sovereignty Risk, Panel Data, Dynamic GMM

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1. Introduction

The recent global financial crisis (henceforth, GFC) of 2007 – 2009 highlighted yet again that the stability of the Albanian financial sector is largely dependent 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 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 view of a possible Greek default crisis to which banking systems across the Central Eastern and South Eastern European (henceforth, CESEE) countries, and in particular Albania, were 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 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)]. Secondly, 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 Emerging Market Economy (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 constructed 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 was expressed as a function of bank specific (internal) and macroeconomic (external) variables a using panel estimation approach based on a two-step Generalised Method of Moments (henceforth, GMM), and, specifically, the first difference transformation approach. Finally, we performed a variety of robustness checks. On the one hand, we included a set of control variables to mitigate in return potentially omitted-variable problems which ranged across bank-specific and market-specific indicators. On the other hand, we further augmented the model to evaluate the extent to which off-balance-sheet activities, 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 impact 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 non-significant. 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, this paper neither focused on real episodes of banking crises nor did we use a binary approach as a proxy for instability moments, both of which may either provide insufficient data for estimation purposes or be based on a threshold level and, therefore, 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 in-variant measure of the bank's risk-taking behaviour and distance from solvency, to which Fu *et al.* (2014) provide some arguments against, as a 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, which 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 included 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 crises 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, particularity in the case of the 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 ensures 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

The financial crisis of 2007/2009 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 latter category comprises macroeconomic and industry-specific variables that are outside the prerogative of bank-specific decisions and policies. Pill and Pradhan (1997) confirm a positive correlation regarding credit boom. To that, another group falls under heading problems of supervision and regulation patterns that consist of issues linked to the legal system and contract enforcement, bureaucracy and accounting standards, as well as the state of financial and banking system development and deposit insurance instruments [Demirguc-Kunt and Detragiache, (2002)]. Eichengreen and Rose (1998) place more emphasis on high interest spreads, which, either as a sign of banking problems or of curing inflation or of defending the exchange rate, are likely to hurt bank balance sheets, even if they can be passed on to borrowers, due to the tendency towards lower solvency conditions. Kaminsky and Reinhart (1998) also found that large and deteriorating fiscal deficits tend to increase bank crises probability, while the effect of the monetary base is negligible. Among these studies, Honohan (2000) finds that crises often occur in the latter part of boom – bust cycles, while a number of papers report that crises are less likely to happen in countries with strong or positive real growth, lower volatility of inflation pressure and better management of international capital [Demirguc-Kunt and Detragiache, (2005)]. Jahn and Kick (2012) concluded that the likelihood of bank distress is linked more highly to the concentration ratio in bank loan portfolios, and this is linked to the fact that specialised banks tend to be more stable than more diversified banks. At the same time, Boudebbous and Chichti (2013) report that high rates of credit expansion may finance an asset price bubble that increases bank fragility; these are often preceded by deteriorating terms of trade, but also by exchange rate appreciation, even though Domac and Martinez-Peria (2003) conclude that the duration of crises does not seem to be affected by developments in the exchange rate. On the other hand, Cole and White (2012) also analysed for years before 2007. The authors used a multivariate logistic regression model to analyse why commercial banks failed during the recent financial crisis. They found that traditional proxies for CAMELS components, as well as measures of commercial real estate investments, do an excellent job of explaining the failures of banks that were closed during 2009, providing support for the CAMELS approach to judge the safety and soundness of commercial banks. Fahlenbrach *et al.* (2012) show that stock return performance during the 1998 crisis could predict the probability of failure during the crisis. The authors also showed that reliance on short-term funding, high leverage, and high growth rates are all associated with poor bank performance in both crises.

Among other studies, Aubuchon and Wheelock (2010) examine bank thrift failures between 1 Janurary 2007 and 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. 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, while asking whether pre-crisis choices which shifted the balance of each portfolio towards real estate products increased the probability of bank failure during the Great Recession.

3. Methodology and the sample

3.1 The variable selection Approach

3.1.1 Dependent variable

A review of relevant 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 best fits 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 constant changes to the financial and banking environment. For example, some view it in the absence of excessive volatility, stress or crises and as a 'stable 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 between those that make use of and those that focus on analysing the determinants of stability indicators. The former range among those studies that use single or composite indices variables or other studies that identify leading indicators of bank fragility, as well as build early warning signals models, in which they empirically evaluate the causes of instability periods in an *ex post* approach. For example, some, use Z-Score, which indicates banks distance from default by calculating the difference between the bank's profitability and the bank's equity ratio, scaled by the volatility of bank profitability [Demirgüç-Kunt *et al*. (2008), Berger *et al.* (2009), Kasman and Kasman (2015), Dushku (2016), Noth and Tonzer (207)]. Others use the non-performing assets, which include loans 30 or 90 days past due date, nonaccrual loans and other real estate properties, indicating what bank asset risks are used [Berger *et al.*(2009), Jiménez *et al.* (2013), Noth and Tonzer (207)]. There is also another group of studies that use loan loss provisions as a means of future losses that reduce the operating income for the current period or/and loan loss reserves as an indicator that reflects the amount of loan provisions on banks' balance sheet and reduces the book value of loans.

In the macro-prudential regulatory frameworks, some have succeeded in developing one-stop indicators that combine macroeconomics and bank level data for which they use a binary approach to signal instability periods [Illing and Liu (2006)].[2] 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 successfully fend off a crisis using less spectacular means. In return, using a non-probit model, Fiordelisi *et al.* (2011) approached bank risk through the means of a cumulative Expected Default Frequency (EDF) for each bank calculated by Mood's KMV and Ötker and Podpiera (2010) use Credit Default Swaps (CDS). Other papers use accounting risk-taking measurements, such as Z-score [Cleary and Hebb (2016)], in the belief that this allows the analysis of the entire variable profile of a firm simultaneously, rather than sequentially, so as to examine 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.

2. See also Jahn and Kick (2012) and Cevik *et al.* (2013).

Empirical literature provides a good description of how one may attempt to build a composite indicator of stability, but, obviously, 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).[3] 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.[4] The formula is as follows:

$$Z_t = \left(\frac{X_t - \bar{\bar{\mu}}}{\bar{\sigma}}\right) \tag{2}$$

Where, X_t represents the value of indicators X during period t; μ is the mean value and σ 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:

$$CAELS_{t,w} = \omega_1 \sum_{i=1}^{n} Z^*_{t,C} + \omega_2 \sum_{i=1}^{n} Z^*_{t,A} + \omega_3 \sum_{i=1}^{n} Z^*_{t,E} + \omega_4 \sum_{i=1}^{n} Z^*_{t,L} + \omega_5 \sum_{i=1}^{n} Z^*_{t,S} \tag{3}$$

$$\sum_{*=a,b,c,d,e} \omega^* = 1 \tag{4}$$

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

3. CAELS is an acronym for Capital adequacy; Asset quality; Earnings; Liquidity; and Sensitivity to market risk. This rating system was first introduced to assess the health of individual banks. Following an onsite bank examination, bank examiners assign a score on a scale of one (worst) to five (best) for each of the five CAELS components. They also assign a single summary measure, known as 'composite' rating. See also Cole and White (2010). 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.
4. Normalizing the values avoids introducing aggregation distortions arising from differences in the mean value of indicators.

stability index. Then, the index estimated 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-side examination, rather than a substitute for them [Betz *et al.* (2014)], and, 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 and 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. 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 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.

3.1.2 The set of Independent variables

The structure of a bank balance sheet can influence the vulnerability of banks to both internal and external shocks. First, bank size, which is also referred to as an indicator of the bank's market share, is included in the argument that banks assess their performance in comparison to each other on this basis [Berger and Bouwman (2013)]. It is expected that size should have a positive coefficient, assuming that probability to cope with instability periods increase with bank size, as opposed to smaller banks. However, some theories imply that, under certain circumstances, an increasing market share could be counter-productive. If a higher market share comes through higher capital or/and more aggressive policies, this may then lead to higher attractiveness of innovative, but risky products, which entails higher deposits or/and higher leverage and inversely increases bank risk taking, and, therefore, the probability of default [Besankoa and Kanatasb, (1996)].

Second, Hughes and Mester (2009) advocate the inclusion of efficiency indicators, while Fiordelisi *et al.* (2015) believe that supervisory authorities may allow efficient banks (with high quality management) greater flexibility in terms of their overall stability condition, *ceteris paribus*, and *vice versa*. Furthermore, Shawtari *et al.* (2015) support that variability of 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.

Third, 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.

Finally, in order to solve the problem of omitted variable bias in the regression and to capture adverse macroeconomic shocks, which may affect bank stability conditions, we also include an indicator linked to economic activity and another one associated with primary sovereignty risk. The former captures the state of the economy, which means that higher economic growth or upward movement in expectations of economic performance, which enhances the ability for economic agents to meet their commitments, makes bank instability less likely. This is why we expected economic activity to have a positive sign. The latter, presents a collection of concentrated risks (e.g., political risk, exchange rate risk, economic risk, sovereign risk and transfer risk) associated with investing in a foreign country, which can reduce the expected return on portfolio investments and must be taken into consideration whenever investing abroad. This risk is expressed as the spread between the domestic rate and an assumed risk-free rate [Jutasompakorn, *et al.* (2014)].[5] Therefore, a higher sovereignty risk inducing 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.

3.2 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 infor-

5. These authors use the Libor and Overnight Index Swap (OIS) spread on the belief it is a widely accepted, generous proxy used for the repo haircuts. The former is the unsecured interbank borrowing rate. The latter is a risk free rate, as it is an accurate measure of investors' expectations of the effective repo rate or the monetary authority target.

mation. 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.[6] These include a total panel of balanced observations with 448 observations and 28 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.

With regards to the sample, Table 2 in the Appendix provides some stylised facts with regards to the Albanian financial sector. First, we notice that the value of financial sector assets as a ratio to the GDP has increased substantially from 78.6% in 2008 to nearly 105.1% in 2015. A large portion of financial intermediation is due to the banking sector, where bank assets shifted from about 75.9% in 2007 to nearly 94.9% by the end of 2015. At the same time, bank deposits are the main funding source of the banking system. Bank deposit to GDP ratio reached nearly 74.2% in the year 2016 from as low as 63.6% before the financial crisis. Second, the actual structure of the banking sector is privately owned. We also notice that in 2016 the largest

6. 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.

4 banks (CR-4) held nearly 68.7% of total assets from nearly 63.1% in 2007, while the banking system is considered to be moderately concentrated as the *HHI* shows. Similarly, in Table 3 in the Appendix, we summarise the main variables that we use in our empirical analyses, with regards to quarterly observations. The data show that the mean (median) GDP annual growth rate is 3.1% (2.5%), with a maximum value around 9.7% and a minimum of 0.5%. The sovereignty primary risk (*PSRISK*) has a mean value of nearly 5.9% with a maximum of nearly 8.6% and a minimum of nearly 3.2%. Equity to asset ratio (*LEVERAGE*) has a mean value of nearly 14.2%, with a maximum value of 23.1% and a minimum of nearly 6.9%. Capital adequacy ratio (CAR), which banks are expected to meet at 12% under the Basel I rules, has, on average, been at nearly 30.1%. At the same time, in Table 4 we present the correlation matrix between the variables of our interest for the period 2008 Q03 – 2015 Q04. Results show that there is positive correlation between our stability index, *CAELS*, with variables such as *GDP*, *LEVERAGE* and *SIZE*, while correlation with *PSRISK* and *EFFICIENCY* is negative. The degree of correlation with *GDP* and *EFFICIENCY* is stronger. In addition, correlation – covariance analysis between left-hand-side and right-hand-side variables, as reported in Table 4 in the Appendix, show that *CAELS* is positively linked to *GDP*, *SIZE* and *LEVERAGE*. On the other hand, there is negative correlation with regards to *PSRISK* and *EFFICIENCY*. This relationship is relatively stronger with regards to *GDP*, *EFFICIENCY* and *SIZE* and relatively weaker with *PSRISK* and *LEVERAGE*. These results are a preliminary way of confirming our expectations as the correlation matrix does not necessarily indicate a causation relationship.

Finally, prior to empirical estimation, all data were subjected to a unit root test procedure in an effort to understand their properties and to ensure that their order of integration fulfilled the criteria for our empirical estimation approach. The latter is a pre-requisite condition so as to generate consistent and unbiased results. Therefore, the unit root test approach includes the Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) Fisher Chi-square tests. The reason is twofold: First, these tests are built on the same null hypothesis that panel variables are stationary. Second, they are mostly used for unbalanced panel models, such as our sample. Results are presented in Table 5 in the Appendix. Findings imply that some of the variables included in our specified model are integrated of order zero I (0). This means that they are stationary. Therefore, they enter the model at level. This set of variables includes *EFFICIENCY* and *LEVERAGE*. 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.[7] Finally, data on *GDP*, *CPI* and *HPI* are taken from the Albanian Institute of Statistics (INSTAT). Data on domestic T-Bills

7. These results are also robust for use in other unit root test approaches, including the Im. Pesaran and Shin W-stat test and Fisher test. Data can be provided upon request.

rate are taken from the Ministry of Finance. Data on German 12 months T-Bills rate and German Consumer Price Index are taken from Bloomberg. The rest of the data are taken from the Bank of Albania.

3.3 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:

$$CAELS_{i,t} = \alpha + \beta_i * X'_{i,t} + \varepsilon_{i,t} \quad (1)$$

Where, $CAELS_{i,t}$ 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 [1] 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. 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). Han and Phillips (2010) suggest GMM be constructed so as to achieve partial identification of the stochastic evolution and to be robust to the remaining un-modelled components. The GMM does not require distributional assumptions on the error term and it is more efficient than the Panel Least Square, Robustness Least Square and the Two Least Two Square approach, since it accounts for heteroscedasticity [Hall (2005)]. Another potential problem is the issue of endogeneity, given that our left hand side variables also include information used in the right hand side as explanatory variables.[8] Therefore, in practical terms, GMM is also a virtuous approach to deal

8. Theoretically, this issue would not be a problem, given that the estimation approach to calculate our dependant variable also considers the advantages of the PCA, which would highlight the most common factor identifying patterns in the data. Nevertheless, PCA, by no means, guaranties that it can solve endogeneity problems.

with potential endogeneity and dynamic panel data problems in model estimation [Anderson and Hsiao (1981)]. This approach also resolves up-ward (downward) 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 [Judson and Owen, (1999); Bond and Windmeijer (2002); Ansari and Goyal (2014)]. This is especially true in the case of a data sample with a relatively small cross-section dimension [Arellano and Bond (1991)]. The instrument variable is based on past information of $X'_{i,t}$, 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. Then, the Sargan and Hansen test is used for over-identifying restrictions based on the sample analogy of the moment conditions adapted in the estimation process, so as to determine the validity of instrument variables (i.e. tests of the lack of serial correlation and consistency of instrument variables).

4. Empirical Results

4.1 The benchmark model

This section reports the main results from the model, as specified in Equation [1], which are reported in Column [1] of Table 6 in the Appendix. The panel GMM model considers the period of the GFC aftermath. The sample includes a dataset with quarterly data for the period 2008 Q03 – 2015 Q04, which includes a total panel of balanced observations with 448 observations and 28 periods. The model includes fixed cross-section effects and makes use of 'White Cross-Section' standard errors and covariance (degree of freedom corrected). At the bottom of the table, we report General Method of Moments (GMM) weight differences (AB-1-step) and specification test results for the GMM estimation. First, AR (1) and AR (2) are the Arellano-Bond tests for first and second order autocorrelation of residuals. One should reject the null hypothesis of no first order serial correlation, but not the null hypothesis of no second order serial correlation of residuals. Second, the Sargan and Hansen test of over-identifying restrictions indicates whether instruments are uncorrelated with the error term. The GMM does not require any distributional assumptions on the error term and it is more efficient than the Two Least Two Square approach, since it accounts for heteroscedasticity [Hall (2005)]. Results show that, in our case, the requirements are met as suggested by the p-values of AR (1) and AR (2) tests. In addition, the Sargan and Hansen test suggests that the instruments used in all specifications are appropriate. This means that our model is properly specified and that the empirical analyses are robust and consistent with the GMM estimation criterion.

A glance at the results confirms that stability conditions of banks react in relation to the responses of other explanatory variables according to the predictions obtained from the theory.[9] For example, the coefficient of *GDP* has a positive sign, as expected. This suggests, as in the case of Demigruc-Kunt 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 percentage (%) 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.

Second, *PSRISK* has the negative effect expected on bank stability.[10] 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, the energy sector, etc. Third, banks in Albania operate under a flexible interest rate onto which they impose a marginal fixed rate. There-

9. However, as instrumenting is technically difficult in the Arellano-Bond model, we also apply a standard panel Ordinary Least Square (OLS) approach with random effect and with fixed effect, including the lagged dependent variable as an additional regressor. The former also included some fixed effect factors that distinguish two important components, namely small versus large banks and foreign-owned versus domestic-owned. Results came out to be relatively similar to our findings through the difference GMM approach, while findings through means of fixed effects were more consistent and robust with the estimation through random effects. Results are also relatively robust and similar to findings when CAELS is estimated based on the simple average approach rather the PCA approach and the model is estimated with panel first difference GMM with the second step difference approach. Finally, they are also robust to the estimation of the two-step GMM estimation approach.

10. To ensure 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. Results were relatively similar. The estimated effect is found to be relatively small, even though statistically significant.

fore, 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.

The picture on the bank stability patterns becomes much clearer when analysing the market-specific and bank-specific factors. First, 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 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 Alternative Augmented model

To control the potentially omitted variables problem, following Berger *et al.* (2013), our benchmark model, as specified in Equation [1], is re-specified and augmented to contain a second broad set of control variables, *Z*, to the extent that this allows us to analyse the determinants of bank stability by simultaneously including an extra control variable into the benchmark model. These variables consist of 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, *HPI* proxy for the housing market price index and *REER* proxy for the market exchange rate pressure. We also include two other variables that may better capture issues linked to payment solvency risk and liquidity risk, such as *MCI* proxy for the monetary conditions index and *CoBM0* proxy for currency out of the banking system.[11] The second group of variables also includes a set of indicators, namely, *DL* to account for the extent of intermediation effect; *DEPOSIT* (*LOAN*) to account for bank sensitivity to the level of deposits (loans) patterns within the bank; *CAPITAL for* the effect that excessive capital has on bank stability, and, finally, *NPL,* which represents the effects of non-performing loans.[12]

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11. *DEBT* represents the ratio of total public debt (internal and external) to the nominal *GDP*. *FSI* represents 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 average performance during the year 2010. The estimated *FSI* is a relative 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 in the real estate market, calculated as the first difference of the log-transformed of the housing price index. *REER* presents the real effective exchange rate. *MCI* is the monetary condition index of Albania taken from the Bank of Albania. *CoBM0* is the ratio of currency out of the banking system to monetary base, *M0*. Data are log-transformed. *DEBT* and *HPI* enter the model in first difference, while the rest is included in their stationary form.

12. *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 loans to total bank loans. *CAPITAL* represents 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% threshold level required by Basel II capital adequacy regulations. NII represents revenues from non-interest activities divided by total revenues. All data are log-transformed, except *CAPITAL*. They enter the model specification in their stationary form.

The model is estimated at a level based on the results of the Unit Root tests approach (See Table 5 in the Appendix). It also includes cross-section fixed effects and makes use of 'White Cross-Section' standard errors and covariance (degree of freedom corrected). The results are presented in Table, 6 Equation (2) to Equation (7), and Table 7 in the Appendix. They show that the behaviour of variables does not change and findings are robust around the same findings as in Equation (1) analysed in Section 4.1.

The bulk of evidence reported in Tables 6 and 7 in the Appendix indicates that the inclusion of the set of control variables does not alter results, which are generally qualitatively similar to the main results of core variables in our benchmark specification, Equation [1]. Findings demonstrate the robustness of results with respect to the sign of the coefficient, even though in some cases their level of significance changes. With regards to macroeconomic variables, *GDP* has a positive and statistically significant effect on *CAELS*. To that effect, *PSRISK* continues to exhibit a reverse relationship, which continues to have the lowest effect among core variables, albeit with non-statistically significant properties in some of the model specifications. Other results show that *SIZE* does, still, positively affect *CAELS*, even though it becomes statistically insignificant. Yet again, *EFFICIENCY* continues to be negatively related to *CAELS*. At the same time, *LEVERAGE* positively contributes to *CAELS*. Both of these indicators are statistically significant through all models.

Turning to our set of control variables, we found that the financial market stance has the negative effect expected on bank stability. This effect is also found to be statistically significant at 5%. This is potentially due to the fact that the banking sector and financial sectors developments are more closely interconnected, even though the state of the financial sector in Albania is not fully developed. Similarly, as expected, bank stability is found to have a negative and statistically significant relationship with the fiscal policy stance, which is also similar to the findings of Demirguc-Kunt and Detragiache (2005). Therefore, any policy action that leads to lower borrowing or/and improves the fiscal stance is found to have a positive impact on bank stability. The IS-LM is also linked to the crowding-out effect of fiscal policy on economic activity, but also to the costs burden it places and the impact it has on the solvency status of borrowers. On the other hand, these results also confirm that banks in Albania are quite sensitive to the effect that a deteriorating fiscal stance has on interest rates, although they have been well-capitalised and on the verge of a lower bank credit leverage government bond instrument that was an investment opportunity.

Concerning pressure from housing market, results show that behaviour HPI has a statistically significant effect on bank stability, even though, by contrast, at a magnitude of nearly -0.0935pp, banks are relatively sensitive to rapid up-turn or/and downturn changes in housing market development, since a great portion of their lending is concentrated in mortgages loans, but not to the extent of the other risk examined above. This could be explained by the fact that Albania has not suffered any significant asset price bubble or/and any consistent price reduction after the GFC. In addition, banks exposed to an asset price bubble are covered to the extent that they provide mortgage loans though collateral coverage. In general, throughout the banking system, this collateral coverage does not go below 120% of the mortgage loan provided. This means they are well covered against the explosion of real estate patterns.

Surprisingly, we find that increasing MCI is positively associated with CAELS. This means that tightening of monetary conditions would increase bank stability. This effect is found to be statistically significant at conventional level. One possible explanation may be the fact that most bank revenue comes through bank lending to the private sector and to the government. Therefore, this is positive relationship may be due to higher profits that banks have through higher interest rates. On the other hand, we also find that the systemic liquidity risk, as measured by CoBM0, is negatively related to CAELS. However, this effect is statistically insignificant at conventional level.

Among other bank-specific variables, results show that all indicators have the sign expected, but, except for *CAPITAL*, they are estimated to be statistically insignificant and relatively small. 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. Similarly, the coefficient of *DEPOSIT* suggests that increasing stock of deposits, which are the main bank funding sources of loans, would enhance bank stability. In addition, we find a positive relationship between *LOAN* and *CAELS*. On the one hand, this is another sign that the credit channel is quite important for bank stability in the case of Albania. On the other hand, this also reveals that credit risk with regards to the extent to which banks support the lending channel and to which they are exposed remains low and positive in regard to their stability conditions.[13] Regarding other variables, the regulatory capital variable is also positive and statistically significant, suggesting that higher excessive capital may raise bank stability. Finally, *NPL* is found to significantly affect *CAELS*. Such a relationship is consistent with *a priori* expectations and in line with previous empirical findings of Cleary and Hebb (2016). The negative coefficient suggests that Albanian banks lack efficiency in their asset quality.

13. Results are similar even when tested for the effect of loan to GDP ratio or the effect of loan concentration to mortgage lending.

4.3 Other Robustness Checks

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*[14]) to evaluate the extent to which non-traditional activities, in which banks are engaging, may have an effect on bank stability.[15] 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 8 and 9 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.

14. 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.
15. 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. Conclusions

This chapter empirically investigates the effects of macroeconomic, market and bank-specific characteristics on stability conditions of 16 banks operating in Albania during the 2008–2015 period. This study improves existing literature along four crucial dimensions. First, in contrast to other bank-level studies, this is the first study to empirically analyse the extent to which the primary sovereignty risk can be attributed to bank fragility conditions at a time when the Albanian economy and the banking sector, in particular, are still lingering in the negative consequences of the GFC. Second, we introduce a new stability index for the Albanian banking sector based on a set of different indicators generated from a unique supervisory dataset collected by the Bank of Albania, which is the most direct measure of bank stability available that widely reflects the Albanian financial structure, which, at the same time, is meant to provide a continuous rating-based macro-prudential approach for banking supervisors and policy-makers to analyse bank stability conditions developing at a given moment. Third, the adaption of the PCA approach helps us solve any endogeneity problems during empirical estimation. At the same time, the empirical study is based on the difference GMM approach, which is another way of solving for endogeneity problems. Finally, we run a number of robustness checks to control the consistency of our results through a set of different explanatory variables.

In summary, the main results of this study suggest that macroeconomic variables have a significant effect on bank stability. Similarly, results show that the pass-through effect of sovereignty primary risk is relative. In return, both industry-specific and bank-specific variables have a significant effect on stability conditions. It appears that there is little difference in terms of assessing bank stability through the set of control variables. The findings from these regressions also remained robust, albeit with minor variations in significance changes, due to a number of alternative ways in which we ran the regression. Empirical results support the view that stability decreases with higher interest spreads, but the extent of the effects of a higher sovereignty primary risk is relatively small. Findings can be summarised as follows: Bank stability is promoted through better economic performance and diminishes with the deterioration of financial market conditions, fiscal policy and an asset prices bubble. The latter could also be an alternative way to assess the sovereignty risk. Trade-offs with stability are observed in relation to efficiency operations. Our results, however, do not confirm an overall outstanding explanatory power of bank intermediation indicators for the entire Albanian banking system. Nor do findings suggest leading indicator indices with regards to excessive capital. However, credit risk remains a relatively important concern, given its estimated impact and statistically significant level. We also found that the scale of off-balance sheet activities is positive, but relatively small and non-significant. Moreover, stability appears to be promoted in line with a higher market share and a higher capital ratio.

The latter seems to have the highest effect among bank-specific variables.

This paper sheds some light on determinants of bank fragility, which have several implications for policy makers in EME. First, regarding external factors, economic performance is of the highest importance. Therefore, macroeconomic policies that contribute to economic growth would have a positive effect on the Albanian banking sector stability. Second, the implication of this study is to re-emphasise the important role of policy makers in ensuring that sovereignty risk within and outside banks remains low. Therefore, primary sovereignty risk remains low, but the adverse effect of fiscal policy and financial market stance, as well as exposure to an asset price bubble should remain at the focal point and considered sensitive with regards to bank stability concerns. Additionally, internal factors result from a bank's policy and management and banks have means to influence them, which in our case, are operational management and capital structure. This implies the importance of banks to continue their work in two main directions. On the one hand, there is a need to undertake policies that in a way improve cost efficiency. On the other hand, it is of particular importance to continue work on developing appropriate techniques for capital management, and, consequently, on assessing the adequate level of bank capital as well as on improving the capital structure of the bank. However, apart from bank-specific variables, the extent to which banks aim to increase their market shares seems to help them secure a more confident and stable condition.

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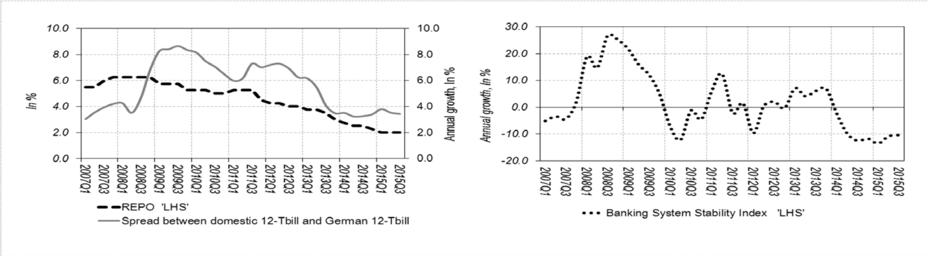
Appendix A

Graph 1. Spread and Banking System Stability

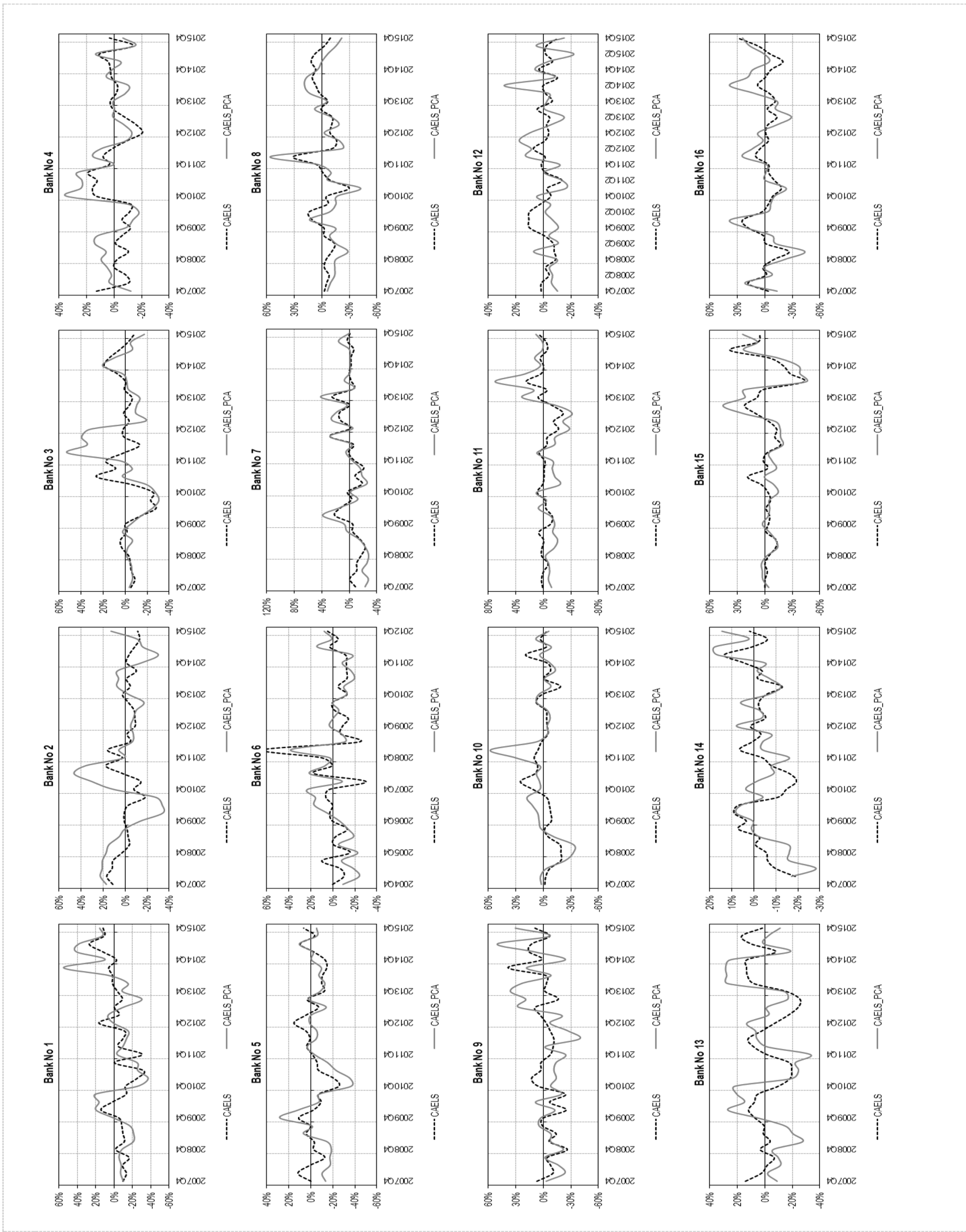


Source: Bank of Albania; Bloomberg; Author's Calculations

Table 1. Indicators of Bank Stability Index

Category	Indicator	Notation	Sub-Index
Capital	Capital Adequacy Ratio	C_1	Z_C
	Core Capital/Total Asset	C_2	
	Equity/Total Asset	C_3	
	Asset growth	C_4	
	Equity Growth	C_5	
	Fixed Asset/Regulatory Capital	C_6	
	ROE	C_7	
	Non-Performing Loan (net)/Regulatory Capital	C^*_8	
Asset Quality	Non-Performing Loan (net)/Total Loan (net)	A^*_1	Z_A
	Total Loan (net)/Total Asset	A_2	
	Growth of Loan Portfolio	A_3	
	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	E_1	Z_E
	The growth of revenue from interest	E_2	
	Interest revenue/Total Revenue	E_3	
	Net Interest Margin	E_4	
	Efficiency Ratio	E_5	
	Interest Revenue (Net)/Operating Revenues (Gross)	E_6	
	Dividend/Income (Net)	E_7	
	The growth of net interest revenue	E_8	
Liquidity	Net Loan/Average Deposits	L_1	Z_L
	Active Liquid/Total Asset	L_2	
	Asset – Passive with a maturity of three months/Total Asset that provide profit	L_3	
Sensitivity to Market Risk	Asset – Passive sensitive to interest rate with a maturity up to 3 months/Total Assets that Provide Profit	S^*_1	Z_S
	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			

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. Descriptive Statistics

Sample: 2008Q3 2015Q4						
Variable	No of Observations	Mean	Median	Standard Deviation	Maximum	Minimum
CAELS	464	99.79865	98.97366	16.80609	153.6974	54.56687
GDP (YoY)	464	0.031	0.025	0.023	0.097	0.005
PSRISK	464	0.059	0.062	0.018	0.086	0.032
SIZE	464	0.063	0.035	0.071	0.301	0.139
EFFICIENCY	464	1.05	0.99	0.21	2.32	0.69
LEVERAGE	464	0.14	0.09	0.14	0.72	0.05
NPL / ASSET	464	0.090	0.063	0.074	0.295	0.0
LOAN / ASSET	464	0.502	0.483	0.182	0.962	0.090
ASSET	464	68779.7	39142.6	80150.0	361152.6	1667.3
ASSET (YoY)	464	0.114	0.072	0.190	1.097	-0.420
CAR	464	0.301	0.165	0.455	2.669	0.041
ROA	464	-0.254	0.209	7.073	76.349	-44.859
ROE	464	-1.567	1.963	18.610	74.427	-70.923
YoY – Annual growth rate						

Source: Bank of Albania, INSTAT, Bloomberg, Author's calculations

Table 4. Correlation - Covariance Analysis: Ordinary*

Sample: 2008Q3 2015Q3 [Observations Included: 464]						
Covariance [*Correlation*]	*CAELS*	*GDPR*	*PSRISK*	*BSIZE*	*EFFICIENCY*	*LEVERAGE*
CAELS	0.005					
	[*1.000*]					
GDP	0.000	0.000				
	[*0.073*]	[*1.000*]				
PSRISK	-0.001	0.001	0.504			
	[*-0.028*]	[*0.042*]	[*1.000*]			
SIZE	0.000	0.000	0.001	0.004		
	[*0.067*]	[*0.032*]	[*0.034*]	[*1.000*]		
EFFICIENCY	-0.002	0.000	-0.006	0.000	0.034	
	[*-0.160*]	[*-0.012*]	[*-0.047*]	[*0.006*]	[*1.000*]	
LEVERAGE	0.001	0.000	0.021	-0.001	0.042	0.342
	[*0.013*]	[*0.002*]	[*0.050*]	[*-0.024*]	[*0.384*]	[*1.000*]
* Balanced sample (listwise missing value deletion).						

Source: Author's calculations

Table 5. Panel Unit Root Test

Variable	ADF - Fisher Chi-square			PP - Fisher Chi-square		
	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]

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 6. Results based on GMM approach using additional macroeconomic variables

Model Specification	[1]	[2]	[3]	[4]	[5]	[6]	[7]
ΔGDP	1.0344***	1.3619***	1.2117***	1.0584**	1.048***	1.129***	1.078***
ΔPSRISK	-0.0489*	-0.0225	-0.0287	-0.0610**	-0.044***	-0.023	-0.043**
ΔFSI		-0.2109**					
ΔDEBT			-0.5560*				
ΔHPI				-0.0935***			
REER					-0.344*		
MCI						0.518**	
CoBM0							-0.150
ΔSIZE	0.1496**	0.1207	0.1431	0.1193	0.608***	0.483***	0.151***
EFFICIENCY	-0.4404*	-0.4528*	-0.5055**	-0.4622*	-0.596***	-0.476**	-0.453***
LEVERAGE	0.6121**	0.4141**	0.6533***	0.6217***	0.252*	0.141	0.581**
Cross-sections included:	16	16	16	16	16	16	16
Instrument rank	20	24	24	24	24	24	24
Number of Observations	448	448	448	448	448	448	448
J-Statistics	17.7	21.9	17.4	23.1	12.7	21.2	18.6
Probability of J-Statistics	0.28	0.23	0.50	0.19	0.24	0.27	0.41
AR(1) [p-value]	0.000	0.000	0.000	0.000	0.003	0.000	0.000
AR(2) [p-value]	0.2834	0.025	0.058	0.032	0.152	0.056	0.036

The table shows bank-level GMM regression statistics on the empirical results of estimations using as an alternative the White Period 2nd Step Approach. Sargan and Hansen test (J-Statistics and the Probability of J-Statistics) investigates the validity of the instruments used, and rejection of the null-hypothesis implies that instruments are valid, since they are not correlated with the error term. The Arellano and Bond test results also require significant AR (1) serial correlation and absence of AR (2) serial correlation (See also Kasman and Kasman, 2015). Conventional level of significance as ***1%, **5%, and *10%.

Source: Author's calculations

Table 7. Results based on the GMM approach using additional bank-specific variables

Model Specification	[1]	[2]	[3]	[4]	[5]
ΔGDP	0.9774*	0.9960**	0.9754**	1.1559**	1.1657**
ΔPSRISK	-0.0428	-0.0495*	-0.0436	-0.0402**	-0.0389
ΔSIZE	0.1137	0.1749	0.0813	0.0608	0.1423
EFFICIENCY	-0.4597**	-0.4283*	-0.4478*	-0.6496***	-0.4239*
LEVERAGE	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*
Cross-sections included:	16	16	16	16	16
Instrument rank	24	24	24	20	24
Number of Observations	448	448	448	402	428
J-Statistics	21.0	22.7	19.8	23.4	17.6
Probability of J-Statistics	0.28	0.20	0.34	0.17	0.48
AR (1) [p-value]	0.000	0.000	0.000	0.000	0.000
AR (2) [p-value]	0.045	0.042	0.037	0.073	0.042

The table shows bank-level GMM regressions statistics on the empirical results of estimations using as an alternative the White Period 2nd Step Approach. Sargan and Hansen test (J-Statistics and the Probability of J-Statistics) investigates the validity of the instruments used, and rejection of the null-hypothesis implies that instruments are valid, since they are not correlated with the error term. The Arellano and Bond test results also require significant AR (1) serial correlation and absence of AR (2) serial correlation (See also Kasman and Kasman, 2015). Conventional level of significance as ***1%, **5%, and *10%.

Source: Author's calculations

Table 8. Robustness checks using an additional variable (Off-balance sheet activities)

Model Specification	[1]	[2]	[3]	[4]
ΔGDP	1.037**	1.374***	1.191***	1.058***
ΔPSRISK	-0.051*	-0.024	-0.033	-0.063***
ΔFSI		-0.233**		
ΔDEBT			-0.487*	
ΔHPI				-0.096***
ΔSIZE	0.064	0.026	0.049	0.034
EFFICIENCY	-0.346*	-0.355*	-0.401*	-0.355
LEVERAGE	0.537***	0.352**	0.577***	0.596***
ΔOFFBALANCE	0.012	0.014	0.012	0.015
Cross-sections included:	16	16	16	16
Instrument rank	24	28	28	28
Number of Observations	431	431	431	431
J-Statistics	23.4	27.7	23.0	27.2
Probability of J-Statistics	0.18	0.15	0.34	0.17
AR (1) [p-value]	0.000	0.000	0.000	0.000
AR (2) [p-value]	0.031	0.071	0.041	0.022

The table shows bank-level GMM regressions statistics on the empirical results of estimations using as an alternative the White Period 2nd Step Approach. Sargan and Hansen test (J-Statistics and the Probability of J-Statistics) investigates the validity of the instruments used, and rejection of the null-hypothesis implies that instruments are valid, since they are not correlated with the error term. The Arellano and Bond test results also require significant AR (1) serial correlation and absence of AR (2) serial correlation (See also Kasman and Kasman, 2015). Conventional level of significance as ***1%, **5%, and *10%.

Source: Author's calculations

Table 9. Other robustness checks

Model Specification	[1]	[2]	[3]	[4]	[5]
ΔGDP	0.984**	1.043***	1.032**	1.001**	1.168**
ΔPSRISK	-0.043	-0.049*	-0.041	-0.060**	-0.039
ΔSIZE	0.017	0.101	0.025	0.001	0.120
EFFICIENCY	-0.368*	-0.349*	-0.359*	-0.436*	-0.281
LEVERAGE	0.403**	0.345*	0.552**	0.011	0.527**
ΔOFFBALANCE	0.013	0.012	0.009	0.011	0.034
ΔDL	0.119				
ΔDEPOSIT		0.092			
ΔLOAN			-0.070		
ΔCAPITAL				0.011*	
ΔNPL					-0.106*
Cross-sections included:	16	16	16	15	16
Instrument rank	28	28	28	24	28
Number of Observations	431	431	432	385	423
J-Statistics	28.0	28.0	25.9	26.7	28.0
Probability [J-Statistics]	0.14	0.14	0.21	0.08	0.14
AR(1) [p-value]	0.000	0.000	0.000	0.000	0.000
AR(2) [p-value]	0.037	0.035	0.029	0.072	0.031

The table shows bank-level GMM regressions statistics on the empirical results of estimations using as an alternative the White Period 2nd Step Approach. Sargan and Hansen test (J-Statistics and the Probability of J-Statistics) investigates the validity of the instruments used, and rejection of the null-hypothesis implies that instruments are valid, since they are not correlated with the error term. The Arellano and Bond test results also require significant AR (1) serial correlation and absence of AR (2) serial correlation (See also Kasman and Kasman, 2015). Conventional level of significance as ***1%, **5%, and *10%.

Source: Author's calculations