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Does Concentration Matter for Bank Stability? Evidence from the Albanian Banking Sector

Abstract: Motivated by the debate on the concentration-stability nexus, this paper studies the impact of bank concentration on the likelihood of a country suffering systemic bank fragility. For this reason, we followed a new approach using on-site bank balance sheet information to construct our proxy that represents each bank stability condition and uses a variety of internal and external factors to estimate a balance panel dynamic two-step General Method of Moments (GMM) approach for the period 2008 – 2015. First, results provide supportive evidence consistent with the concentration-fragility view. Second, macroeconomic variables seem to have a significant effect on bank stability, which is not found for the sovereignty primary risk. By contrast, the bank-specific variables have also a significant effect on bank stability conditions. Finally, non-systemic banks are found to be more sensitive to macroeconomic condition and market concentration, while the better capitalised banks are less sensitive to fragility at the expense of lower operation efficiency.

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

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

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1. Introduction

The global financial crisis (GFC) of 2007 has not only shaken most of the financial market and institutions, but has also risen fundamental issues about the market power, such as concentration or market share, especially the role of bank equity capital, particularly from the standpoint of bank survival [Mirzaei, et al., (2013)]. Not surprisingly, public outcries for more bank capital tend to be greater after GFC, since bank with more capital has a greater probability of survival [Berger and Bouwman, (2013)] and can have significant positive impact on the efficiency and innovation of the production of financial services [Claessens and Laeven (2004)]. Indeed, bankers often assess their performance relatively to each other on the basis of market share, even though they often argue that greater market share may jeopardize their performance [Berger and Bouwman, (2013)] and the implications of having banks that are too-big-to-fail continues to rage the financial sector on the whole [Beck, et al., (2006)]. But, if many small banks behave aggressively and recklessly to their aim for higher market share and therefore get into bank distress at the same time, together they may also be too important to fail [De Haan and Poghosyan, (2012a), De Haan and Poghosyan (2012b)].

Both country experience and the academic debates suggest that higher market share or/and market concentration has an ambiguous effect on bank stability [Kasman and Carvallo, (2014)]. The empirical literature dealing with this issue shows two possible connections in the sense that the concentration may promote stability [Beck, et al., (2006); Evrensel, (2008); De Haan and Poghosyan, (2012a), De Haan and Poghosyan (2012b)], as it can also be a source of bank fragility [Boyd, and De Nicoló, (2005); Boyd, et al., (2006); Uhde and Heimeshoff, (2009); Fu, et al., (2014); Pawlowska (2016)], which are mostly costly for developing countries [Demirguc-Kunt and Kane (2002)]. However, whether banking concentration is a source of stability or, on the contrary, an amplification factor of banking crises, this subject requires particular attention because the financial situation of banks heavily affects the performance of the real economy [Dell'Ariccia, et al., (2008)], particularly since the GFC, which has affected the global financial system, particularly the banking sector deeply, with many banks suffering large losses and needing to raise additional capital [Kasman and Kasman, (2015)]. To that the financial liberalisation and the restructuring efforts of the last decade have changed the concentration conditions in the banking sector.

This shortcoming becomes even more important in fragmented banking system, such as that in Albania, where a large number of banks operate in a specific small opened economy. In particular, the Albanian banking system showed an apparent resilience during the GFC. In particular, improving market conditions and

legislation and macroeconomic state of the economy, motivated larger foreign banks in more developed countries, most in the Eurozone, operating at relatively low margins to extend cross-border operations into potentially new and more profitable market. However, increasing competition has been considered the main driving force behind the acceleration in the consolidating process, and it is also raising concerns about increased concentration in the banking sector as it is often criticised for being "overbanked".

The last decade has witnessed dynamic growth within the banking assets. The value of the assets of the entire banking sector is equivalent to 90% of the Albania Gross Domestic Production (GDP). Additionally, before the GFC we observed a sharp increase in lending, which shifted their focus towards increasing profits while ceasing to monitor and properly assess risk. At the same time, the problem of banks being "too-big-too-fail has also emerged, especially in terms of market share as the 6 largest banks (systemic banks as defined by the Bank of Albania) hold nearly 80% of the market. To that, still at a ratio of nearly 16.2% for the whole market and 22.2% for the systemic banks, the Herfindahl–Hirschman index suggests that the banking sector is "moderately concentrated". Similarly, despite accommodating policies by Bank of Albania to lower market concentration, still tendency towards a more concentrated market is found to be associated or even foreheads banking system fragility (See also Graph 1 in Appendix). Unlike the US and European counterparts, and similar to the Asia Pacific banking industry [Fu, et al., (2014)], the Albanian banking system emerged from the GFC in a relatively stable position without requiring anywhere near the same degree of government support and bailouts. These patterns make it a particularly interesting environment for studying the concentration-stability nexus in banking.

Against this background, the existing literature provides a fairly comprehensive review of the main internal and external determinants on bank stability, but these cases still require one question to be answered empirically as there is no evidence on how market concentration effects bank stability, in particular in the case of an emerging economy, namely Albania. Therefore, this paper analyses the concentration-stability nexus for 16 banks operating in the Albanian financial sector over the period 2008 – 2015. For this reason we followed a five-step procedure. First, we constructed a composite individual stability indicator by compelling the on-site bank balance sheet information and expressed it as a function of internal and external variables using an unbalance panel with quarterly data for the period 2008 Q04 – 2015 Q03. Then, we used a dynamic two-step General Method of Moments (GMM) approach, particularly the first difference transformation approach. Additionally, empirical analysis is accomplished through a set of robustness check. First, we analyse our benchmark model, which includes

macroeconomic, market-specific and bank-specific factors. Then we extend our research to analyse market concentration behaviour either by augmenting further our benchmark model or with regards to other sectors, especially those related to liabilities, deposits and loan. This in return provides an alternative approach to conclude also on the robustness of our model. Finally, we also assess the sensitivity of our model specification to methodological changes.

By way of preview, our empirical results suggest that greater bank concentration tends to enhance the likelihood that a country will suffer systemic bank fragility, which supports the concentration-fragility theory. Improving macroeconomic is found to boost bank stability, which was not found to be the case with regards to primary sovereignty risk. Among the bank-specific factors, operational efficiency and the capital structure of the bank are found to be relatively important components. At the same time, we also split the sample between systemic and non-systemic banks. The latter are found to be more sensitive to market concentration and macroeconomic condition. The former causes great concerns to operational efficiency, while capital structure seems to be of less relevance compared to non-systemic banks.

This paper complements and extends existing literature on this issue in several aspects. First, to the best of our knowledge this is the first study to investigate empirically the concentration environment of universal banks in Albania, considering both cross-sectional time-series dataset for individual banks and focusing only on the period after the GFC. Thus, the results of the study may highlight the impact of the global turmoil on individual bank risk exposure. Analysing this issue is important because banking system is the most prominent agent in the financial markets which provide a wide range of financial services to the economic anchors that may be vulnerable to bank instability. In contrast to many studies in this literature, Albania as a developing country provides a fertile laboratory to examining concentration-stability nexus since the country has engaged in a process of greater structural reforms and liberalisation process, privatisation, economic integration and technological change, while the system is witnessing more consolidation and was not directly affected by the GFC. Third, since it focuses only on a single country, it avoids any pitfall as described by Uhde and Heimeshoff (2009) related to data issues and ensure comparability across both dependent and independent variables. Nor do we use data from the Bankscope database. Moreover, different from previous empirical work, this paper neither focuses on real episodes of banking crises nor uses binary approach as a proxy for instability episodes, or uses the Z-score or credit risk as an in-variant measure of the bank's risk-taking behaviour and distance to solvency, to which Fu, et al., (2014) provides some arguments against. In fact, we extend empirical findings by including

instead a more sophisticated proxy for bank stability that is based on a wide set of consolidated balance sheet data and the principal component analyses approach as explained by Shijaku (2016). The other contribution of this paper is that it also extends and enhances previous findings by using instrument variables regressed to address likely reverse causality due to probable two-sided relationship between concentration and bank stability. Finally, we provide appropriate evidence, by fragmentising this sector according to the size of the banks, addressing whether certain institutions show different concentration behaviour than others.

The rest of the paper is as follows. Section 2 provides a brief review on the structure of banking sector in Albania. Section 3 presents the related theoretical and empirical literature review on the banking market concentration and bank stability nexus. Section 4 presents the methodology, data description and estimation approach. The empirical results of the estimations are reported in Section 5. Finally, the paper's concluding remarks are provided in Section 6.

2. Literature review

The relationship between concentration and banking stability has been a controversial issue long before the GFC started. Both at theoretical and empirical level, the issue remains ambiguous and unresolved, despite a large body of literature.

2.1. Theoretical literature

The theoretical literature concerted around two major streams with utterly opposite conclusions. They are arranged according to whether they support the idea that banking concentration has a stabilizing effect (concentration-stability view) or whether on the contrary it has a destabilising effect (concentration-fragility hypothesis).

The concentration-stability paradigm, which is also referred to as the franchise value paradigm proposed first by Keeley (1990), argues, on a (positive) margin effect hypothesis, that banks operating in a concentrated market signal or that have some market power (i.e. positive franchise value) might be more prudent in the aspect of risk-taking. It is assumed that larger banks tend to undertake "credit rationing" since fewer, but more qualitative credit investments will increase the return of the singular investment and hence foster financial soundness [Boot, et al., (2000)]. Similarly, banks in concentrated banking system may enhance profits, through either higher interest rates or less loan loss provision, [Boyd, et al.,

(2004)] as the higher the franchise value of the greater the opportunity cost of bank when going bankrupt, and therefore risky investments that could jeopardize future profits may not be accepted by banks authorities [Hellmann, et al., (2000)]. Higher profits, on the other hand, may provide higher "capital buffer" that protects them from adverse external macroeconomic, loan losses and liquidity shocks and eventually increase the charter or franchise value of the bank, reducing the incentives for banks to take excessive and unwarranted risk and thus reducing the probability of default [Beck, et al., (2006); Berger and Bouwman, (2013)]. Further, larger banks may even be able to diversify (even geographically) loan portfolio risks more efficiently due to higher economies of scale [Diamond, (1983); Uhde and Heimeshoff, (2009)]. In another aspect, as Allen and Gale, (2004) states, it would also prove substantially easier for bank supervisors to monitor a few banks in a concentrated banking system in which a few larger banks hold more diversified portfolios. Such a concentrated banking system's resilience to higher risk absorption would be more pronounced, leading to fewer crises.

In contrast, proponent of the "concentration-fragility view" argues that banks operating in a more concentrated environments, exploiting arbitrary their monopoly power in the loan market, tend to induce higher loan rates [Boyd and De Nicolo (2005)], which in return, create moral hazards and eliminate the least risky part of the banks' customers [Berger, et al., (2009)], or even make it harder for them to repay loans [Mirzaei, et al., (2013)]. In this context, default risk will surge, while large banks are of particular importance because their failure could pose significant risks to the collapse of financial institutions and the financial system as a whole, as the crisis in US has shown [De Haan and Poghosyan, (2012a), De Haan and Poghosyan (2012b)]. This could also negatively affect the monetary system and real production. To ensure financial stability, those institutions considered as "too-big-to-fail" might implicitly or explicitly be protected by public guarantees or subsidies, as observed during and in the aftermath of GFC [Moch, (2013)], which in return may intensify risk-taking incentives and hence increase banking fragility [Mishkin, (1999)]. In another aspect, Cetorelli, et al., (2007) stress that a lower degree of diversification may end up deteriorating managerial efficiency, less effective internal corporate control and increased operational risk that may be prone to supervisory failures.

2.2. Empirical literature

In line with appropriate theoretical literature even empirical work is ambiguous on the relationship between market concentration and stability in the banking

system. As an important challenge to the franchise value paradigm, Demsetz, et al., (1996), following Keeley, (1990) use the Tobin's q as an indicator of market power and examine the role of franchise value on risk-taking behaviour of bank in U.S. over the period 1986-1994. Both authors report empirical evidence on the support of concentration-stability view as they find a negative relationship between franchise value and risk. Similarly, Boyd and De Nicolo (2005) also develop a model, modifying one presented by Allen and Gale (2004), explaining that in a concentrated market banks tend to be more risk-taking and an increase in concentration both in loan and deposit markets brings in higher loan rates charged to borrowers. Beck, et al., (2006) examine the link between market concentration and banking crises using country-specific data on individual bank failures and reports by national supervisory agencies and a concentration index based on total assets held by the largest three banks in each country, using a dataset on 69 countries for the period 1980-1997, and in contrast to De Nicolo, et al., (2004) found that crises are less likely in economies with more concentrated banking systems.

De Haan and Poghosyan (2012b) use quarterly data, for the US banking system for the period 1995-2010. Similarly, Boyd, et al., (2006) use measures of bank profitability, namely return on asset (RoA) and return on equity (RoE), and Z-Index and the Herfindahl-Hirschmann Index (HHI) as proxy for bank risk and concentration respectively assessing the joint effects of market structure and risk on profitability[2]. The authors provide empirical evidence supporting the risk-shifting as earnings volatility decreases with market concentration. On the other hand, different to Matutes and Vives (2000), using data from 2600 banks across the EU-25 over the period 1997-2005 and similar to Uhde and Heimeshoff (2009) found that banking market concentration has a negative impact on European banks' financial soundness as measured by the Z-score, but is associated with a positive effect on banks profitability as measured by RoA. To that, using a unique dataset for the Spanish banking system, Jimenez, et al., (2013) report that standard measure of market concentration do not affect the non-performing loan, proxy for bank risk, but found evidence in favour of the franchise value paradigm when using the Lerner indexes.

The empirical literature has also supported the possibility of a negative correlation showing that a concentrated market could have a destabilizing effect on financial stability by making reference to the "too-big-too-fail" hypothesis. Nickell,

[2] Other papers using the Z-score and HHI as measurement of bank risk and concentration are de Haan and Poghosyan (2012a); Mirzaei, et al., (2013); Fu, et al., (2014); Kasman and Kasman (2015); Căpraru and Andrieș, (2015); Fernández, et al., (2016).

et al., (1997) finds that firms enjoying market power tend to operate inefficiently rather than to reap all potential rents. The study by Boyd, et al., (2006), based on the HHI and Z-score for a cross-section of 2500 small rural banks operating in the U.S. and a panel of 134 countries over the period 1993-2004, shows that the effect of riskier portfolios dominates despite increased revenues related to the concentration of the banking sector. This study has been extended by De Nicolo and Loukiaonova (2007) using data from 133 non-industrialised countries over the period 1993-2004. They find that the result is stronger when bank ownership is taken into account. Schaeck, et al., (2009) using the Panzar and Rosse (1987) H-statistics and standard deviation of concentration measure for 38 countries over the period 1980-2033, using the logit approach. The authors present evidence of a concentration-fragility view. Pawlowska (2016) investigates the role of market concentration, measure through Z-score and HHI, and loan risk, as measured by NPL, by splitting a sample of annual data for each banking sector in the EU-27 countries with regards to their total assets into largest banking sectors (i.e., EU-15) the smallest banking sectors (i.e., EU-12) and a sample including all of the EU-27. The paper finds evidence that banking sectors within EU are not homogenous and there is also asymmetry between the performances of EU-15. The author reports also evidence for the existence of a "too-big-to-fail" effect within EU-15 banking sectors. In their analysis of 440 international domestic and cross-border mergers that took place between 1991 and 2009, Weiß, et al., (2014) find clear empirical evidence for a significant increase in both the idiosyncratic default and the systemic risk of acquirers following bank mergers, thus confirming the "concentration-fragility" hypothesis.

Finally, the third way reconciles the two strands and demonstrates that there exists a nonlinear relationship between concentration and stability. Recently, in addition to Caminal and Matutes, (2002), Martinez-Miera and Repullo (2010) encompass both of these competing approaches by proposing a nonlinear relationship between concentration on the assumption that less concentration may reduce the borrower's probability of default (risk-shifting effect), but also the interest payments from performing loans, which serve as a buffer to cover loan losses (margin effects). They find evidence that a U-shaped relationship between concentration and stability could exist. Hence, the probability of default first goes down but then rises after a certain point as bank competition increases. Similarly, Berger, et al., (2009) test the impact of market structure on risk potential of 8,235 banks in 23 developed nations using a nonlinear relationship between financial stability and market structure. Their results provide some support, consistent with the "concentration-fragility view" that market power increases loan portfolio risk. The authors show that this risk may be offset in part by higher equity capital ratios.

Overall, the existing literature provides a fairly comprehensive review of the effects of market power, financial structure and the bank activity determinants on banking stability in an individual country or panel of countries, but some questions in the aspect of the emerging market still need to be answered empirically, in particular to the period after the global financial crisis.

3. Methodology, variables and data

3.1. Benchmark model specification approach

The empirical model specification draws on the extensive review of previous studies, but it also departs from Shijaku (2016) who investigated the link between market share and bank stability. However, as in the case of Uhde and Heimeshoff (2009), in this paper our empirical analysis considers the link between concentration and instead of market power. The model is specified as follows:

$$CAELS_{i,t} = \alpha + \beta_1 * X'_{i,t} + \varepsilon_{i,t} \quad (1)$$

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

The model is estimated through the means of a dynamic two-step General Method of Moments (GMM), particularly the first difference transformation approach as suggested by Arellano and Bond (1991)[3] to the assumption this would eliminate endogeneity of some of the explanatory variables with the dependent variable and the individual fixed effects [Anderson and Hsiao (1981)] and inconsistent of small sample time [Han and Phillips, (2010)]. Then, based on Roodman (2009), we use all the past information of $X'_{i,t}$ up to 4 lags as instruments variable. Furthermore, the model is estimated with GMM weights differences (AB-1-step) would resolve for upward (downward bias in standard errors (t-statistics) due to its dependence to estimated values (as it uses the estimated residuals from one-step estimator), which might lead to unrealistic asymptotic statistical inference [Judson and Owen, (1999); Bond and Windmeijer (2002); Ansari and Goyal (2014)] especially

[3] See also Arellano and Bover, (1995) and Blundell and Bond, (1998).

in the case of data sample with relatively small cross section dimension [Arellano and Bond (1991)]. The Haussmann test is used for over-identifying restrictions based on the sample analogy of the moment conditions adapted in the estimation process, thereby as to determine the validity of the instrument variables (i.e. tests of the lack of serial correlation and consistency of instruments variables). To that, from our viewpoint, we consider our bank stability indicator to be a sensitive "thermometer" indicator that is affected contemporaneously by other factors.

3.2. The variable selection approach

3.2.1. Dependent variable

The empirical literature provides a good description of how one might attempt to build a composite indicator of stability, but obviously this paper follows the Uniform Financial Rating System approach, introduced by the US regulation in 1979, referred to as CAELS rating (Capital adequacy, Asset quality, Earnings, Liquidity and Sensitivity to market risk (See Table 2 in Appendix)[4]. First, using the statistical methods, each indicator included in each of these categorises is normalised into a common scale with mean of zero and standard deviation of one[5]. The formula is given as:

$$Z_t = \left(\frac{X_t - \bar{\mu}}{\bar{\sigma}}\right) \tag{3}$$

Where, X_t represents the value of indicators X during period t; μ is the mean and σ is the standard deviation. Second, all the normalised values of the set of correlated indicators used within one category are then converted into a single uncorrelated index by means of the statistical procedure, namely the principal component analysis (PCA) approach, which is yet again standardised through the procedure in Eq. (3). Then, the estimated sub-index is transformed between the values [0, 1] using exponential transformation [1 / (1 + exp(-Z*)]. Finally, the BSI is derived as a sum of the estimated exponential transformed sub-indexes, as follows:

$$BSI_{t,w} = \omega_1 \sum_{i=1}^{n} Z^*_{t,C} + \omega_2 \sum_{i=1}^{n} Z^*_{t,A} + \omega_3 \sum_{i=1}^{n} Z^*_{t,E} + \omega_4 \sum_{i=1}^{n} Z^*_{t,L} + \omega_5 \sum_{i=1}^{n} Z^*_{t,S} \tag{4}$$

[4] This approach is also used by International Monetary Fund Compilation Guide 2006 on Financial Soundness Indicators, but others authors e.g. Altman (1986), Sere-Ejembi, et. al., (2014) and Cleary and Hebb (2016).

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

$$\sum_{*=a,b,c,d,e} \omega^* = 1 \tag{5}$$

Where, *n* is the number of indicators in each sub-index; *'C'* relates to the capital adequacy; *'A'* represents a proxy to asset quality; *'E'* represents a proxy to earnings; *'L'* represents a proxy to liquidity efficiency categorises; and *'S'* is related to the sensitivity of market risk. Z* is the exponential transformed simple average of the normalised values of each indicator included into the sub-index of the individual bank stability index. Then, the estimated index is a relative measurement, where an increase in the value of the index at any particular dimension indicates a lower risk in this dimension for the period, compared with other periods.

The advantage of this approach is fourfold. First, CAELS represents a useful "complement" to on-side examination, rather than a substitute for them [Betz, et. al., (201], and thereby creates an internal comprehensive monthly-based supervisory "thermometer" measurement to evaluate bank stability in real time and on a uniform basis and for identifying those institutions requiring special supervisory attention and concern with regards to both the present and future banking sector conditions. Second, as suggested by ECB (2007), it reflects more the Albanian financial structure by attaching more weight to banking sector as it is the most prominent agent in the financial markets, while it takes advantages of a broad range of bank level data. Third, the PCA approach highlights the most common factor identifying the patterns in the data without much loss of information, which at the same time solves any problem of endogeneity mentioned above. Four, it does not take the probability form of the binary approach, which might expose it either to limitations of insufficient number of episodes or to the vulnerability of the methodology employed to calculate the threshold level, which might even provide falls banking distress signals. Rather it consists of a simpler approach that is easier to explain and implement and most importantly allows analysing the state of the bank as it develops and to that it is applicable for cross-section comparisons. Finally, the estimated index is a relative measurement, where an increase in the value of the index at any particular dimension indicates a lower risk in this dimension for the period, compared with other periods.

3.2.2. The set of independent variables

The structure of bank balance sheet can influence the vulnerability of banks to both internal and external shocks. First, as Căpraru and Andrieş, (2015) state, most of the used structural indicator to quantify the level of the banking system concentration rate is the Herfindahl-Hirschanman Index (HHI) and the con-

centration rate of the top largest banks (CR). It is included on the argument that banks assess their performance relative to each other on the basis of their market share [Berger and Bouwman (2013)]] even though in doing so they end up in a more concentrated market. Given the small size of the banking sector relative to the large numbers of banks operating, it is expected to have a negative sign even though a positive sign is not excluded given that there is supportive empirical evidence with regards to both concentration-fragility view and concentration-stability view.

Second, Hughes and Mester, (2009) advocate inclusion of efficiency indicators, while Fiordelisi et. al., (2015) believe that supervisory authorities may allow efficient banks (with high quality management) a greater flexibility in terms of their overall stability condition, ceteris paribus, and vice versa. To that, any policy-decision by the bank authority to be more attractive or/and more competitive and vice versa would be reflected to the bank balance sheet income-cost indicators. Therefore, it is expected to have a negative sign to our assumption that a decreasing efficiency would deteriorate bank health positions.

Third, sufficient amount of capital, which serves as a safety cushion, is important to bank's operations in that it acts as a buffer against financial loses, protecting banks from solvency risk [Betz, et. al., (2014)], as well as is able to fulfil minimum capital adequacy ratio under potential solvency risks Betz, et. al., (2014)]. Therefore, we assume any policy-making reflects the strength of capital structure and thereby stability is condition to their financial leverage. It is expected that solvency risk diminishes with a higher ratio of capitalisation, which allows bank to absorb any shock that it may experience; thereby it is expected to have a positive association with bank stability.

Finally, to solve the problem of omitted variable bias in the regression and capture the adverse macroeconomic shocks that hurt bank stability condition, we include also an economic activity and primary sovereignty risk indicator. The former captures the state of the economy. Thereby, a higher economic growth or upward movement in the expectations over economic performance, which enhance the ability for economic agents to meet their commitments, makes bank instability less likely. That is why we expected it will have a positive sign. The latter, present 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 an investment and must be taken into consideration whenever investing abroad. It is expressed as the spread between the domestic rate and a considered risk-free rate Jutasompa-

korn, et. al., (2014)[6]. Therefore, as Domac and Martinez-Peria (2003) put forward, a higher sovereignty risk that induces a higher domestic interest rates make solvency condition harder and adversely affect banks solvency and making bank stress more prominent, and vice versa. Therefore, we expect that an increase in the sovereignty spreads would affect negatively bank stability.

3.2.3. Data

The sample data for this study include panel data with quarterly frequency for individual bank balance sheet and income statement items of 16 banks operating in Albania and some macroeconomic indicators for the period 2008 Q04 – 2015 Q03. That includes a total panel balanced observations with 448 observations and 28 periods.

The variables are approximated as follows. CAELS represents an individual bank stability index as explained in Section 3.2.1 (See also Table. 2, in Appendix). It is transformed into an index, taking as the base year the average performance during the year 2010 and enters the model as log-transformed. It is a relative measurement, where an increase in the value of the index at any particular dimension indicates a lower risk in this dimension for the period, compared with other periods. *EFFICIENCY* is proxy as gross expenditure to gross income ratio. *LEVERAGE* presents the logarithm of the equity to asset ratio of individual banks. *HHIA*, follows the Herfindahl-Hirschman Index approach, which is defined as the sum of squared market shares of banks operating in the Albanian banking sector[7]. The macroeconomic variables are aggregated indicators that represent the state of the economy. *GDP* represents the gross domestic production. It is transformed in real terms by deflated with the Consumer Price Index. *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 rate. All the data represent the end-period values. They are log-transformed, besides the *PSRISK*. The bank-specific variables and the stability indicator are estimated individually for each bank.

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[6] These authors use the Libor and Overnight Index Swap (OIS) spread on the belief that is a generous accepted widely used proxy 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.

[7] The HHIA is calculated using bank total asset as inputs ($\text{HHIA} = \sum_{i=1}^{n} s_i^2$ where s represents the market share of each bank in total assets in the market).

Finally, the dataset developed for this paper has several sources. Data on GDP are taken from the Albanian Institute of Statistics. Data on the domestic T-Bills 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 Bank of Albania.

4. Results

4.1. The benchmark model

In this section, we discuss the empirical analysis, following a two-step approach. First, prior to the empirical estimation, all the data have been subject to a unit root test procedure on the argument to understand their properties and also to be sure that their order of integration fulfils the criteria for our empirical estimation approach. The latter is a pre-required condition in order to receive 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 variable are stationary. Second, they are mostly used for unbalanced panel model, as it is our sample. Results are presented in Table 2 in Appendix. Findings imply that some of variables included in our specified model are integrated of order zero I(0). This means that they are stationary. Therefore, they enter the model in level. This set of variables includes *HHIA, EFFICIENCY* and *LEVERAGE*. The other variables, namely *CAELS,* GDP and PSRISK are found to be integrated of 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[8].

Then, the model specification is estimated though a dynamic panel GMM approach. The sample considers the period in aftermath of the global financial crises. Therefore, it includes a dataset with quarterly data for the period 2008 Q4 – 2015 Q03, which includes a total panel balanced observations with 448 observations and 28 periods. The empirical model is estimated in level based on the results of the unit root test approach as explained previously. It includes cross-section fixed effects and makes uses of 'White Cross-Section' standard errors and covariance (d.f. corrected). The Haussmann test (Prob. of J-Statistics) supports the validity and consistency of the instrument variables.

[8] 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.

The results of our benchmark model estimated are presented in Table 4, Eq. (1) in Appendix. The parameters of the variables have the expected signs. First, the extent of market concentration in the banking sector, HHIA, which also incorporates the effect of economies of scale in bank behaviour, has a negative sign. It is also statistically significant. This result suggests that the change in the overall concentration would have a significant impact on banking system stability, ceteris paribus. This is in line with Beck, et al (2006), especially Mirzaei, et al. (2013) that report also a significant negative coefficient for emerging economies. Findings show that CAELS tumbles on average by nearly 0.943 percentage point (pp) in response of a 1pp negative shock on *HHIA*. Additional to the relatively high value of the parameter of concentration variable, this evidence provides more support to the arguments that concentration-fragility view can be accepted and generally confirms empirical findings by Boyd, and De Nicoló, (2005); Boyd, et al., (2006); Uhde and Heimeshoff, (2009); Fu, et al., (2014); Pawlowska (2016). This indicates that with increasing competition to reduce market concentration the regulatory authorities should lift more constraints on large banks to peruse their business to bank system stability concerns. Therefore, as Fu, et al., (2014) suggests, preventing excessive concentration, regulators should adopt a prudent approach to evaluating merger and acquisition applications.

At the macroeconomic level, *GDP* has the most important effect on *CAELS* among the other variables. As it is expected, it shows a positive sign. It is also statistically significant at conventional level. The magnitude of the parameter suggests that bank stability improves by nearly 1.260pp in response of a 1pp positive shock on output. Our results also corroborate findings by Fu, et al., (2014). This means that the performance of economic activity play relatively a crucial role for bank stability behaviour and at the same time banks place arelative consider manner to the economic conditions in which they operate, since an upward movements in economic activity would improve the situation of the banking system through a higher financial intermediation or for low risks related to bank sovereignty risks[9]. At the same time, the magnitude of the coefficient higher than unitary is possible due to the fact that as a scale variable it captures the effect of other variables namely, exchange rate and/or inflation pressure.

As expected, *PSRISK* exhibit a negative sign, complementing findings by Jutasompakorn, et al., (2014), but by contrast, this marginal effect is considered to be relatively small. In fact, it has the smallest effect among other variables. Yet it is also statistically significant at conventional level. The size of the parameter suggests that there exists a reverse relationship between bank stability and sov-

[9] These results are relatively similar to the inclusion of GDP with no lags effect.

ereignty primary risk as CAELS improves by nearly 0.026pp for any 1pp positive shock on *PSRISK*. This suggests that banks do consider shock related to primary sovereignty risk, even though such effects on bank stability play a relatively small effect. 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 structural reforms to minimise possible fiscal risks. Third, but not the least, all the banks in Albania operate under a flexible interest rate to which they place a marginal fixed rate. Therefore, any negative shock that leads to an interest rate hint is reflected immediately to their interest barging, making them to some extend hedge to interest rate. Finally, and not the least, different from other countries, banks in Albania have been well-capitalised and despite the recent trends and financial disintermediation were not vulnerable to a shortage of liquidity.

All external factors analysed have influenced bank stability, but at the same time the parameter and the significance of the bank-specific variables also have the expected sign and are found to be relatively significant. The variable of capital structure, as measured by *LEVERAGE*, has the most important effect on bank stability among the internal variables. As it is expected, the parameter unveils a positive sign. The size of the parameter implies that for any 1pp shock effect on *LEVERAGE*, the empirical response of *CAELS* is estimated to be nearly 0.6395pp. This effect is statistically significant at conventional level. This suggests that increasing bank capital is a very important factor and stability condition improves as bank becomes more capitalised. By contrast, based on size of the coefficient, bank capitalisation is the third most important factor in effecting the stability behaviour of the bank, under the specified model.

Finally, bank operation efficiency patterns, as measured by *EFFICIENCY*, are found to have a negative relationship with their stability condition. The size of the parameter implies that a decrease by 1pp on *EFFICIENCY* boosts *CAELS* upward by nearly 0.4167pp. The coefficient is found to be statistically significant at 10% level, suggesting that efficiency in management is a robust determinant of bank stability. Therefore, bank should be aware that any policy-decision making to make bank more attractive, but that might lead to lower productivity growth (expenses that is channels to lower profits), would put more pressure to the stability condition. The reason is twofold. First, in order to be competitive and attractive, banks may find it difficult to pass all the cost to their clients. Second, a few large banks dictate the rule interest rate policy, so the others need to follow them, and that does not allow them to "overcharge".

4.2. Robustness checks

In this section we present the results of a set of robustness checks. This time, we focus on two types of robustness check. First, we analyse the results though means of alternative measure of banking sector concentration. Second, we add to our benchmark model also a variable that accounts for the market share of each respective bank, measured as the ratio of bank total asset to the sum of banking system total asset, *SIZE*. The sample consists of quarterly data for 2008 Q2 – 2015 Q3. Results are reported in Table 5 in Appendix. The first column reports the effect of concentration with regards to liabilities (*HHIL*). The second column reports concentration with regards to deposits (*HHID*). The third one reports results with regards to concentration of bank credit (*HHIC*). The last column reports the results of our augmented benchmark model based on the GMM approach.

A glance at the results confirms previous findings. All the variables have the expected sign, albeit with some relative small changes on the magnitude and statistical significance level. In particular, all concentration indicators have a negative sign and besides *HHIC* are found to be statistically significant at conventional level. This confirms the negative relationship between banking system concentration and the probability of suffering a bank distress, which holds even when including alternative measures of concentration ratio. Therefore, all of them are consistent with the concentration-fragility view. By contrast, results show the effect of HHIC is smaller than that related to *HHID*. This suggests that bank stability is less concerned with credit concentration patterns compared to the deposit concentration developments possible due to the fact that deposits comprise the main source of bank liquidity while the stock of loan still remains at relatively low level and banks have other forms of investing their liquidity. Results also confirm insensitiveness of the results towards the inclusion of the variable in our augmented model specification. Market share, as measured proxy by *SIZE*, has a positive sign, but is statistically insignificant. By contrast it has a relatively smaller explanatory power compared to the estimated effect of bank concentration. This suggests that concentration patterns prevail the positive impact of higher market share in the banking sector.

Finally, as the 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. This approach included also some fixed effect factors that distinguish two important components, namely small versus large banks and foreign-owned versus domestic-owned. Results are reported in Table 6. Finding

suggests results are also insensitive to methodological changes. They come out to be relatively similar to our findings through the difference GMM approach, while findings through means of fixed effects are more consistent and robust to the estimation through random effects[10].

4.3. Other set of robustness checks: Systemic versus non-systemic banks

This section presents another set of robustness check that includes the results of concentration-stability nexus by splitting the sample with regards to large and small banks, which Bank of Albania distinguishes as the systemic banks (SB) and non-systemic banks (NSB)[11]. The model specification with regards to both samples is estimated yet again through a dynamic panel GMM approach, which includes cross-section fixed effects and makes uses of 'White Cross-Section' standard errors and covariance (d.f. corrected). Based on the unit root test approach, they are estimated in level. The Hausmann test (Prob. of J-Statistics) supports the validity and consistency of the instrument variables.

Column [6] in Table 4 in Appendix reports the results with regards to SB. Those referred to NBS are presented in Column [7]. These evidences show that splitting the sample does not alter the results, which are generally qualitatively similar to the main results of the core analysed in Section 4.1., albeit with some relative small changes on the magnitude and statistical significance level. Most importantly, the negative effect of market concentration is found to be greater for NSB. This suggests that NSB is more fragile to concentration patterns compared to SB. In fact, results show that concentration has the highest effect on bank stability condition. Similarly, economic performance and sovereignty risk seem to have a bigger effect in the case of NSB. At the same time, results provide supportive evidence that efficiency is a greater concern for SB, while by contrast capital structure matter more for NSB. This means that as fragility concerns diminish, a bank get larger and well capitalised at the expenses of lower operation efficiency.

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[10] 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.

[11] SB includes 6 biggest banks, namely, Apha Bank, Tirana Bank, Credins, National Commercial Bank, Raiffeisen Bank, Intesa San Paolo Bank. This group holds nearly 80% of the banking system assets and are among the main credit providers to the public and the private sector. The NSB includes the other 10 banks.

5. Final remarks and policy implication

This paper empirically investigates the effects of macroeconomic, market and bank-specific characteristics on stability conditions of 16 banks operating in a small opened emerging economy, namely Albania during the period 2008 – 2015. In particular, we assessed the extent to which the market concentration can be attributed to bank fragility. For these reasons, we make use of a stability indicator of each individual bank operating in the Albanian banking sector, which consists of a wide set of bank balance sheet account-based information. At the same time, the adaption of the principal component analysis helps to solve any endogeneity problems during the empirical approach. The empirical study is based on the difference GMM approach.

In summary, the main result of this paper indicates that concentration is negatively related to bank stability. This is consistent with the concentration-fragility view, but is inconsistent with the concentration-stability views. It reveals that bank concentration tends to enhance the likelihood that a country will suffer systemic bank fragility. The nexus holds even when using different indicators of concentration ratios and after estimation through different econometrical approaches, albeit with minor variation on significance changes, to a number of alternative ways to which we run the regression.

In terms of other variables, the macroeconomic variables seem to have a significant effect on bank stability, which is not found for the sovereignty primary risk. By contrast, the bank-specific variables also have a significant effect on bank stability conditions. The findings can be summarised as follows. Bank stability is promoted through better economic performance. The trade-offs with stability condition is observed in relation to the efficiency operations. Moreover, stability appears to be promoted in line with higher market share and higher capital ratio. The latter seems to have the highest effect among the bank-specific variables. Similarly, small banks are found to be more sensitive to market concentration and macroeconomic risks. Finally, capital plays a greater role for non-systemic banks, while the trade-offs of stability-efficiency is found to be greater for larger banks.

Beyond the scope of this paper, future work should focus on the fact that further research is needed to develop indicators that adequately map increasing bank cross-section exposures risk that came importantly during the recent financial crisis of 2008 – 2009. First, we have check for the robustness of our bank fragility index by constructing an index that includes also a sub-index on Management, so that our index falls under the criterion of CAMELS. Second, while we found

supportive evidence on the concentration-fragility view, we do not explore the channels through which competitiveness impacts bank stability as concentration is an insufficient measure of bank competitiveness.

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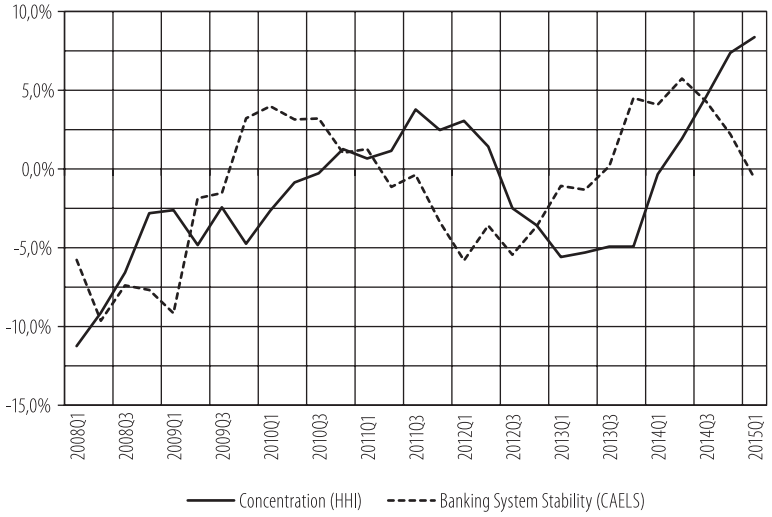
Appendix

Graph 1: Concentration – Stability Nexus Evidence from Albanian Banking System, in annual growth rate.



Source: 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 Asset that Provide Profit	S^*_1	Z_S
	Asset – Passive sensitive to interest rate with a maturity up to 12 months/Total Asset that Provide Profit	S^*_2	
	Net Open Position in foreign currency	S^*_3	

* linked to reverse risk order

Source: Authors' Calculations

Table 2. Correlation Analysis: Ordinary

Sample: 2008Q2 2015Q3
Included observations: 480
Balanced sample (listwise missing value deletion)

	CAELS	GDP	PSRISK	HHIA	EFFICIENCY	LEVERAGE
CAELS	1					
GDP	0.1042	1				
PSRISK	-0.0709	-0.0162	1			
HHIA	-0.0494	0.3563	0.3413	1		
EFFICIENCY	-0.0921	-0.0366	-0.0302	-0.0311	1	
LEVERAGE	0.0029	0.0073	0.0454	0.0693	0.3763	1

Source: Author's calculations

Table 3. 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]
ΔSIZE	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
HHIA	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
HHIL	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
HHID	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]	[0.0000]
HHIC	[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]

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. Empirical results on CAELS through means of GMM approach.

Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]
ΔGDP	1.2604	1.155	1.1067	0.9076	1.2907	0.4525	1.2374
	[0.01]	*[0.01]*	*[0.00]*	*[0.01]*	*[0.00]*	*[0.39]*	*[0.03]*
ΔPSRISK	-0.0258	-0.0350	-0.0418	-0.0348	-0.0228	-0.0352	-0.0665
	[0.08]	*[0.02]*	*[0.06]*	*[0.00]*	*[0.16]*	*[0.03]*	*[0.01]*
SIZE					0.2165		
					[0.21]		
HHIA	-0.9430				-0.9094	-0.9043	-1.3646
	[0.03]				*[0.03]*	*[0.06]*	*[0.00]*
HHIL		-0.7620					
		[0.00]					
HHID			-0.4380				
			[0.02]				
HHIC				-0.2684			
				[0.39]			
EFFICIENCY	-0.4167	-0.4125	-0.4432	-0.4607	-0.4517	-0.4027	-0.3185
	[0.09]	*[0.16]*	*[0.07]*	*[0.00]*	*[0.06]*	*[0.06]*	*[0.28]*
LEVERAGE	0.6395	0.3110	0.3551	0.0185	0.7048	0.0834	0.4716
	[0.00]	*[0.07]*	*[0.05]*	*[0.79]*	*[0.00]*	*[0.64]*	*[0.03]*
Cross-sections included:	480	16	16	16	16	6	10
Total panel observations:	16	464	448	464	480	174	280
Probability (J-statistic)	*0.24*	*0.15*	*0.11*	*0.42*	*0.29*	*0.33*	*0.22*

Source: Author's calculations

Table 5. Empirical results on CAELS through means of OLS approach

Variable	[1]	[2]	[3]	[4]
C	1.5152	1.8121	1.5152	1.5780
	[0.00]	*[0.00]*	*[0.00]*	*[0.00]*
ΔGDP	0.7592	0.7440	0.7592	0.7576
	[0.03]	*[0.03]*	*[0.03]*	*[0.03]*
ΔPSRISK	-0.0051	-0.0057	-0.0051	-0.0034
	[0.43]	*[0.40]*	*[0.43]*	*[0.63]*
HHIA	-0.4225	-0.4435	-0.4225	-0.4034
	[0.01]	*[0.01]*	*[0.01]*	*[0.01]*
EFFICIENCY	-0.0944	-0.1521	-0.0944	-0.1148
	[0.00]	*[0.00]*	*[0.00]*	*[0.00]*
LEVERAGE	0.0165	0.0276	0.0165	0.0118
	[0.00]	*[0.12]*	*[0.00]*	*[0.01]*
ΔCAELS(-1)	-0.3283	-0.3404	-0.3283	-0.3341
	[0.00]	*[0.00]*	*[0.00]*	*[0.00]*
D_CRISIS				-0.0094
				[0.26]
D_OWNERSHIP				0.0042
				[0.57]
D_SIZE				-0.0228
				[0.01]
Adjusted R-squared	0.13	0.12	0.13	0.13
DW Statistics	2.1	2.1	2.1	2.1
Effects specification	None	FE	RE	RE
Periods included	30	30	30	30
Cross-sections included:	16	16	16	16
Total panel observations:	480	480	480	480

Source: Author's Calculations