

Lerner index and Boone indicator to Albanian banking sector

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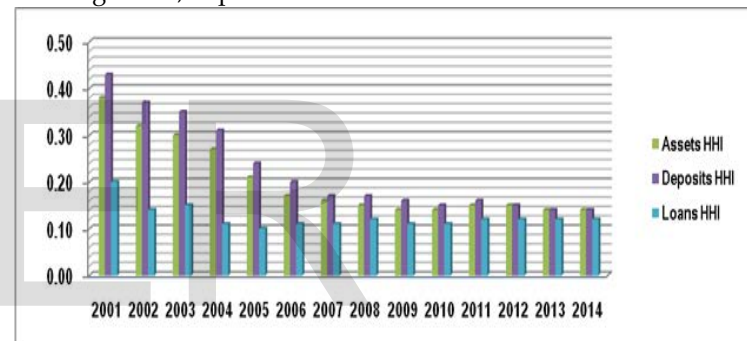
Abstract – The dynamic changes of Albanian banking sector have affected the banking concentration and behaviour. The article examines the banking competition using Lerner index and Boone indicator through the panel datasets of Albanian banking sector during 2005 - 2011. Applied results on the banking competition using Lerner index and Boone indicator confirmed the competitive behaviour into market structure. The comparative statics demonstrated that banks in Albania held the higher market power compare to European countries excluding the few countries and no high market power by banks during 2005 -2011. This article highlighted the robust support linking to the assessment of banking competition through the non – structural approaches.

Index Terms – Banking competition, Lerner index, Boone indicator

1 The slight dynamics on structural changes into Albanian banking sector

The Albanian banking sector dominates the financial system and remains the core section of financial intermediation in Albania. It accounts for 90.4% of financial system assets and 91.6% of GDP in December 2014. Albanian banking sector has been lately associated with the significant structural developments linking to the enlarged number of banks; restructuring and privatization of state-owned banks; establishment of domestic capital banks; entrance of powerful foreign banks through acquisitions of the existing ones. These structural changes have affected the Albanian banking sector converging into the dynamic environment. Estimations of concentration related to banking assets and deposits by using the HHI indicated the high levels of concentration, respectively by 2005 and 2006 referring to figure 1, while the subsequent period associated with the moderate level of concentration. The high concentration was inherited due to the attribute of historical banking monopoly of state banks until 1998, and then as the consequence of new banks entrance in market changed the banking behaviour toward the oligopolistic market related to the high concentration level. Meanwhile the estimation of banking loans concentration through the HHI reflected the moderated concentration. The results suggested that lending activity is the less concentrated activity in banking sector and it converged to the monopolistic competition behaviour. However, the upward trend of concentration level after 2007 attributed to the better position of G2 banks (referring to the banks classification by Bank of Albania) and realized the bank mergers during this period, but also it related to the tight lending in economy due to the transmitted effects of global financial crisis in 2008.

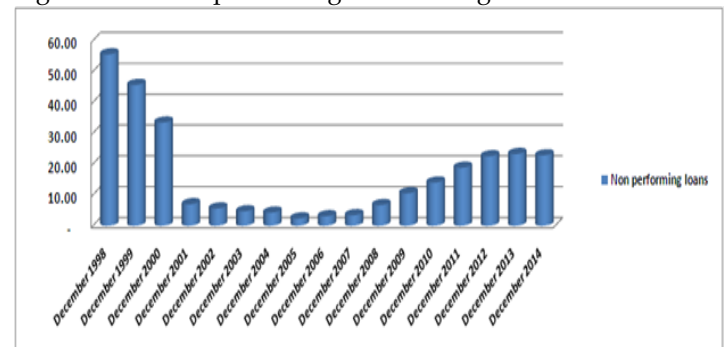
Figure 1 Herfindahl - Hirschman index according to banking assets, deposits and loans



Source: Bank of Albania

Despite the restrictive policy of banks according to bank lending due to the transmitted effects of global financial crisis in 2008, the non – performing loans associated with the diminishing trend after 1998 until 2005 referring to figure 2. After this year they enhanced by increasing trend. The non – performing loans denoted 22.8% of the loans portfolio during 2014 (Bank of Albania, 2014).

Figure 2 The non-performing loans during 1998 - 2014



Source: Bank of Albania

2 Methodology and results

Lerner index related to the indicators of non - structural approaches according to the assessment of banking competition. It is the direct indicator of the market power degree due to it concentrated on the power of price indicating the difference between the price and the marginal cost (Jimenez, Lopez, dhe Saurina (2007); Berger, Klapper, dhe Turk-Ariss, (2009)). The calculation of Lerner index calculation relied on the translog function of cost as follows:

$$\ln Cost_{it} = \beta_0 + \beta_1 \ln Q_{it} + \frac{\beta_2}{2} \ln Q_{it}^2 + \sum_{k=1}^3 \gamma_{ki} \ln W_{k,it} + \sum_{k=1}^3 \phi_k \ln Q_{it} \ln W_{k,it} + \sum_{k=1}^3 \sum_{j=1}^3 \ln W_{k,it} \ln W_{j,it} + \epsilon_{it}$$

where Q_{it} the total assets according to each bank i in the period t as the approximate indicator of the banking output, while $W_{k,it}$ are the prices of three inputs including the Panzar - Rosse model (PR). $W_{1,it}$ is the ratio of interest expenses to total assets as a proxy according to the input price of deposits, $W_{2,it}$ is the ratio of personnel expenses to total assets as a proxy related to the input price of labour, $W_{3,it}$ is the ratio of other operating expenses to total assets as a proxy according to the input price of equipment/fixed capital. The subscript i denotes bank i and the subscript t denotes year t . The marginal cost will be derived as follows:

$$MC_{TAit} = \frac{Cost_{it}}{Q_{it}} \left[\beta_1 + \beta_2 \ln Q_{it} + \sum_{k=1}^3 \phi_k \ln W_{k,it} \right]$$

Lerner index is given as

$$\text{follows: } Lerner_{it} = (P_{TAit} - MC_{TAit}) / P_{TAit}$$

where P_{TAit} is the price of total assets referring to the ratio of total revenue to total assets according to each bank i in the period t , while MC_{TAit} is the marginal cost of the total assets according to each bank i in the period t . The values of Lerner index is ranged from zero to one. The Lerner index gets zero when $P_{TA} = MC_{TA}$, and meaning that the firm has no market power to set the price and indicating the competitive environment. Meanwhile it converged to one indicating relatively the fragile competition through price and the firm has the market power demonstrating the monopolistic structure.

Various empirical studies used the Lerner index to assess the banking competition. Carbó, Humphrey and Rodriguez (2003) used the index Lerner to measure the competition in the regional banking market in Spain and found out the increasing market power after 1990. These results were confirmed by De Guevara and Maudos (2007) who they applied Lerner index to assess the market power in the Spanish banking sector in the mid-90s until 2002. De Guevara and Maudos (2007) applied the Lerner index according to the banking sector of 15 countries of the European Union during 1993-2002 and found out the positive relationship between the market power and the cost efficiency of banks.

Hainz et al. (2008) used the Lerner index to analyze the correlation between the competition and collateral related to 70 countries and found out that the competition reduced the requirement for collateral. Fungacova et al. (2010) analyzed the market power of the Russian banking sector applying the Lerner index during 2001-2007 and demonstrated that the competition were improving compared to the previous periods. Berger et al. (2009) investigated the correlation linking the market power and risk related to 23 developed countries during 1999-2005 through the estimation of Lerner index. They concluded that banks with the larger power market were less exposing to risk. Turk-Ariss (2010) examined the relationship among the market power and financial stability according to 60 developing countries during 1999-2005 and found out the positive correlation linking the market power and stability.

Another indicator used recently in the banking industry to assess the competition is the Bonner indicator (Boone, 2008) like the representative of the structural method relying on the efficiency hypothesis developed by Demsetz (1973). It supported the efficiency - structure hypothesis which it linked the performance with the changes of efficiency targeting the toughness of relationship among the efficiency (measured in terms of average cost) and the performance (measured in terms of profitability). Schaeck and Čihák (2010) point out that the Bonner indicator has some unique features compared with other indicators such as H statistic of PR, which it imposed the restrictive assumptions related to the banking operation in long run equilibrium, and the Lerner index, which it does not often capture the appropriate degree of product substitutability through the difference of price - marginal cost because it does not require the suchlike restrictive assumptions (Vives, 2008).

Due to the difference linking to the price - marginal cost is not the robust indicator related to the assessment of competition, various studies investigated the suchlike models which they demonstrated the higher competition converging to the larger difference between the price - marginal cost (Boone, 2008). However the Lerner index did not concentrate merely to the competition, but also towards the inducements of banks' profit maximizing which they diverged to the profit maximization particularly in developing countries due to the high inefficiency. It will be associated with the slight margin linking to the price - marginal cost indicating the impractical competition (Delis, 2010). The most important side of the Boone indicator related to demonstrate how insistent are the more efficient banks to use the advantages of their costs distributing the profits only by the efficient banks in the market. The Boone indicator indicated that the competition improved the performance of efficient firms and abated the performance of the inefficient firms concentrating on the efficiency's impact to the performance in terms of profit and firm's market shares. The model according to the assessment of the Boone indicator specified as follows:

$$\ln(MS_{ki}) = \alpha + \beta \ln(MC_{ki})$$

which MS_{ki} indicates the market share of bank i related to the output k ; MC indicates the marginal cost and β is the Boone indicator. The larger value of β according to the absolute value demonstrated the larger effect and the higher competition in the market. But β can take the positive value (Van Leuvensteijn et al 2011) and it explains if the market has the high degree of coordination or collusion, or banks are competing related to the quality of their products.

The empirical assessment of competition through the Boone indicator has the advantage due to the estimation of competition according to the particular products. Also there's no need more data related to its estimation. The assessment of banking competition through the Boone indicator applied by Van Leuvensteijn et al (2007), Maslovyh (2009), Schaeck and Cihák (2010), however there were the several sceptics according to its effectiveness to estimate the banking competition (Schiersch dhe Schmidt-Ehmcke 2010).

3 Empirical results to Albanian banking sector

The assessment of Lerner index relied on the above model where the total cost calculated on the sum of the interest's expenditures, the personnel expenditures and the operating and administrative expenditures. While the price inputs (w_{it}) was estimated by Panzar - Rosse model. Empirical results according to the model of total cost in panel data demonstrated in the table 1. Results indicated that the model and variables were significant related to the respective level of statistical significance confirming its soundness to calculate the marginal cost. Empirical results of Lerner index attained 0.408 on the average of series during 2005 -2011. These results converged to the results of Kristo (2011) according to the market power in Albanian banking sector. Dynamic of Lerner index presented in the figure 3. It demonstrated the downward trend of market power until 2009 and then showed its upward trend, which it induced the transmission of effects linking to the global financial crisis. The hypothesis $L = 0$ and $L = 1$ tested and rejected them confirming the average of the series $0 < L < 1$ referring to the table 2. The results meant that banks in Albania did not operate in the banking perfect competition and banking monopoly. Also Lerner index according to the large banks (which they consisted 18.75% of sample and held more than 10% of assets market shares) and small banks (which they consisted 81.25% of sample and held less than 10% of assets market shares) were 0.407 and 0.386 respectively. The results meant that the largest banks had more market power than small banks in the market due to the higher efficiency of large banks compared with small banks referring the Lerner index.

Table 1 Results of hypothesis test according to Lerner index

Hypothesis	t-statistic	p(value)
L = 0	17.706	0.000
L =1	-25.681	0.000
Observations	112	

Source: Authors' calculations

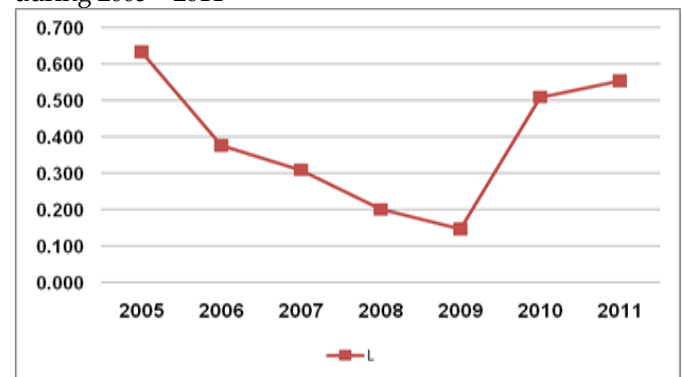
Table 2 Results of the total cost estimation
 Dependent variable: Total cost (ln C)

Variables	Coefficients	Std. Error
Lnq	0.974 *	0.063
(lnq)*(lnq)	-0.004 **	0.001
lnw ₁	0.269 **	0.118
lnw ₂	0.149 **	0.079
lnw ₃	0.309 *	0.112
lnq*lnw ₁	0.025 **	0.009
lnq*lnw ₂	-0.004 ***	0.002
lnq*lnw ₃	-0.043 *	0.007
lnw ₁ *lnw ₁	0.086 *	0.011
lnw ₁ *lnw ₂	-0.020 ***	0.01
lnw ₁ *lnw ₃	-0.124 *	0.013
C	0.718 ***	0.386
Adjusted R ²	0.999	
F-statistic	15029.42	
Prob(F-statistic)	0	
Observations	112	

*, **, *** showed the significance level respectively 1%, 5% and 10%.

Source: Authors' calculations

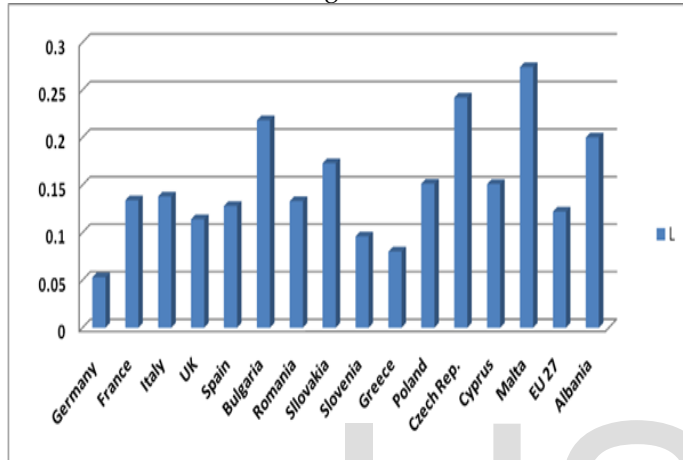
Figure 3 Lerner index linking to Albanian banking sector during 2005 - 2011



Source: Authors' calculations

The figure 4 demonstrated the comparative statics linking to Lerner index in the several European countries and 27 countries of the European Union and Albania during 2008. It indicated that the Albanian banking competition through the Lerner index was lower than the other countries excluding Bulgaria, the Czech Republic and Malta. But it confirmed that banks in Albanian banking sector did not contain comparatively the market power and operated in the competitive environment.

Figure 4 Lerner index according to several European countries and Albania during 2008



Source: Weill (2011), authors' calculation

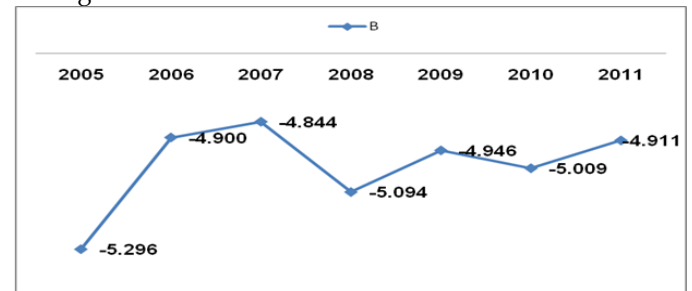
To assess the banking competition used the Boone indicator relying on the specified model according to the above theoretical analysis. Empirical results of model analyzed on the panel data and demonstrated in the table 3. It indicated that the model and variables were significant. Also it confirmed the negative relationship between the assets share of each bank and its marginal cost which it indicated by the negative value of the coefficient linking to the marginal cost, β . Results showed that the average value of Boone indicator was $\beta = -4.999$ during 2005 - 2011 demonstrating the considerable level of banking competition due to it related to the larger absolute value of β . The figure 5 demonstrated the volatility of Boone indicator during the years but no divergence linking to bank behaviour.

Table 3 Results of the Boone indicator estimation
 Dependent variable: Market shares of each bank in banking sector (LNS_i)

Variables	Coefficients	Std. Error
C	-10.851 *	1.303
LNMC	-3.481 *	0.442
Adjusted R ²	0.479	
F-statistic	5.654	
Prob(F-statistic)	0	
Observations	112	

* showed the significance level respectively 0.01%

Source: Authors' calculations
 Figure 5 Boone indicator linking to Albanian banking sector during 2005 - 2011



Source: Authors' calculations

4 Concluding remarks

The evaluation of banking competition related to particular features due to the relevant and geographic market according to the diversified banking products and services. Structural changes of Albanian banking sector over the years have reflected their effect on the banking behaviour. Banking sector demonstrated the high concentration relying on empirical estimations meanwhile it converges to the moderated concentration recently. The competitive surroundings related to banking sector was not affected by the high concentration ratios despite their downward trend due to the expansion of banking activity and spreading to banking services into the diverse regions.

The assessment of banking competition concentrated on the numerical estimation. Lerner index demonstrated no high market power by banks during 2005 -2011and it highlighted the downward trend until 2009 meaning the increasing of banking competition, but after that it demonstrated the upward trend. The behaviour of Lerner index indicated that the efficiency cost of banks has been lower due to it used to measure the efficiency. It would promote the relevant signals to banks' behaviour and their efficiency. The divergence of the upward trend related to the shock of the global financial crisis on the Albanian banking sector. Also it linked to the considerable enhancement of non - performing loans ratio which they enforced banks to increase their efficiency by attaining more market power.

This behaviour of Lerner index confirmed the efficiency - structure hypothesis, which it was associated with the decline of banking competition referring to Lerner index. The divergence amongst H statics and Lerner index indicated that the market power had not affected the banking competition and confirmed the occurrence of contestability in the banking market. Furthermore these results demonstrated that the banking competition was affecting not only by the structural and non-structural features of the banking market, but also by exogenous factors. However the comparative statics concluded that banks in Albania held the higher market power compare to European countries excluding the few countries.

Also the Boone indicator confirmed the convergence linking to the competitive behaviour of banks despite of its volatility during the period taking into consideration.

Empirical results through using Lerner index and Boone indicator demonstrated the competitive behaviour into Albanian banking sector. Results provided the robust support to assess the banking competition through the non-structural approaches.

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