International Journal of Economics and Business Administration
Vol. 1, No. 3, 2015, pp. 128-133
http://www.aiscience.org/journal/ijeba

Applied Panzar-Rosse Model to Albanian Banking Sector

Arjan Tushaj[1, *], Valentina Sinaj[2]

[1]Department of Economics, Faculty of Business Administration and Economics, University of Tirana, Tirana, Albania
[2]Department of Informatics, Math and Statistics, Faculty of Business Administration and Economics, University of Tirana, Tirana, Albania

Abstract

Structural changes of Albanian banking sector over the years have reflected their effects on the banking concentration and behaviour. The article examines the banking competition using Panzar–Rosse model to panel datasets of Albanian banking sector during 2005-2011. Applied results on the banking competition using *H statistic* of PR confirmed the monopolistic competition structure. The comparative statics demonstrated that the Albanian banking sector was lightly comparable with the EU countries and more competitive than several Balkan countries. *H statistic* confirmed the frail linkage among the banking competition and concentration meanwhile it proved the occurrence of contestability in the banking market. This article highlighted no robust support linking to the assessment of banking competition through the traditional approaches.

Keywords

Banking Competition, Market Structure, Panzar-Rosse Model

Received: August 27, 2015 / Accepted: September 22, 2015 / Published online: October 16, 2015

1. Dynamics of Structural Developments in Albanian Banking Sector

During the transition process banking sector was associated with several shortcomings and the constructive developments in spite of fragile results. The market structure of the Albanian banking sector has changed obviously through the latest years. It has practiced the deregulation, foreign bank penetration, and an accelerated process of consolidation and competition in the banking sector during 1990s. The index of banking reform scored to 3^- according to transition indicators to sector level and the banking market structure assessed to medium related to the size. Meanwhile the competition policy index scored to 2^+ which it demonstrated the large gap to the market economies parameters (EBRD, 2014). These estimations highlighted the progress of structural reforms in banking sector and made more efforts to attain the scope of standards according to the industrialised market economies.

The macroeconomic surroundings after the crisis of 1997 promoted the essential changes in Albanian banking sector which it was involved in liquidation, restructuring, privatization and acquisition activities of some banks. Albanian banking sector has been recently characterized by the important structural developments. The most important of them are: (i) the enlarged number of banks; (ii) restructuring and privatization of state-owned banks; (iii) the establishment of domestic capital banks; (iv) the entrance of powerful foreign banks through acquisitions of the existing ones. They have transformed the Albanian banking sector into the dynamic environment. Banking sector converged from state monopoly to monopolistic competition. These developments have had a major impact on market concentration and threaten domestic capital ownership. Actually, the domination of state domestic capital in banking sector was replaced by the dominance of foreign capital.

Structural changes have put out their effects at diverse stages of banking sector development affecting the banking

* Corresponding author
E-mail address: arjantushaj@feut.edu.al (A. Tushaj), sinajv@yahoo.com (V. Sinaj)

concentration and banks' behaviour. They have increased the competitive pressures in the banking environment through the expansion of banking activity. Furthermore it related to the enlarged range of banking products and services and the geographical extension of banking services due to the banking policies of diversified banking products. The banking sector has maintained consistency in terms of distribution related to the financial resources and their use, which it is emphasized by the low concentration according to assets, deposits and loans recently.

This sector is dominated by five banks, which they possessed 68.4% of the system's loan portfolio and 73.4% of deposits (Bank of Albania, 2014). The concentration ratios, CR_5, denoted 68.4% and 73.4% respectively the loans and deposits of banking sector during 2014. These results demonstrated the declining trend of them comparing to 2001, where CR_5 denoted 86% and 90% according to loans and deposits of banking sector. CR_5 linking to banking assets and treasure bills demonstrated 73% and 78% respectively during 2012. Meanwhile it illustrated 87% and 91% according to them during 2001. The high concentration was inherited due to the attribute of historical banking monopoly of state banks until 1998. The concentration related to banking assets and deposits using HHI indicated 0.14 according to them during 2014 conversely to the high levels of it before 2006. Meanwhile the banking loans' concentration using HHI reflected the moderated concentration over the years, particularly 0.12 during 2014. 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 medium–size banks and realized the several mergers of foreign banks during this period. Moreover it related to the tight lending in economy due to the transmitted effects of global financial crisis in 2008 and the non–performing loans. The non–performing loans denoted 22.8% of the loans portfolio during 2014 and they enhanced by increasing trends despite the restrictive policy of banks according to bank lending (Bank of Albania, 2014). Actually the banking sector operates to the moderated concentration.

After two decades of transition process, the Albanian financial system belongs to the kind of model: *"The financial system dominated by the bank sector*". The banking sector remains the largest and the most developed sector of Albanian financial system and it accounted for 90.4% of financial system assets during 2014. Results demonstrated the rising trend of banking sector according to the assets and loans contribution to GDP during lately years, respectively 91.6% of GDP and 42.1% of GDP during 2014.

2. Literature Review

The assessment of banking competition carried out by the diverse methods to analyze the banking behaviour through the structural and non-structural elements. Banking changes according to the banking behaviour have reflected the changes associated with theoretical and empirical analysis on the assessment of banking competition.

Bikker and Haaf (2002) analyzed the assessment of banking competition according to the theoretical literature dividing into two main streams: structural methods and non-structural methods. The structural method relied on the Structure–Conduct–Performance paradigm and the efficiency hypothesis referring to the theory of industrial organization. Models of structural method investigated if the high concentration of market caused the coordinated behaviour among the large banks and increased their market performance or the efficiency of large banks increased their performance. These structural models assessed the banking competition through the market concentration. Meanwhile the non-structural methods based on models: Iwata (1974), Bresnahan (1989), Panzar-Rosse (1987), which they were developed due to the inefficiency of applied structural models theretofore. New Empirical Industrial Organization (NEIO) framework estimated the competition and the market power analyzing the banking competitive behaviour in the lack of structural elements and market structure.

Non-structural method relied on the obtained results by the maximizing profit of oligopoly like Iwata model (1974) and Bresnahan model (1989) and Panzar-Rosse model (1987).

Iwata model (1974) takes into consideration the value of conjectural variation according to individual banks supplying the homogeneous products in an oligopolistic market. Implementation of model is difficult due to the specific necessary data for it, but it was implemented once in the banking industry by Shaffer and DiSalvo (1994). They found non-competitive behaviour in the duopoly market associated with the highest concentration.

Bresnahan model (1989) based on the model analyzed by Bresnahan (1982) and Lau (1982) who they determined empirically the market power of an average bank operating in the short run into an oligopolistic structure. Empirical application of the Bresnahan model was realized by Shaffer (1989, 1993) for the first time, respectively for the US loans market and the Canadian banking industry. While in Europe it was carried out by Suominen (1994) according to the Finnish banking sector, by Neven and Roller (1999) and Bikker and Haaf (2002) related to the various European countries, by Coccerese (1998) and Angelini and Cetorelli (2000) according to the Italian banking sector, by Toolsema

(2002) linked to the Dutch consumer loan market, by Canhoto (2004) referring to the Portuguese banking sector.

Panzar-Rosse model (PR) (1987) assessed the competitive behaviour of banks in the market through H statistic. H statistics estimated by the reduced forms of income equations and measured the sum of the elasticities according to total revenue of banks linked to the bank's input prices. The values of H statistic range between $-\infty < H \leq 1$. It indicated the monopolist behaviour or collusive oligopolist referring to $-\infty < H < 0$, the monopolistic competition referring to $0 < H < 1$ and the perfect competition referring to $H = 1$ or natural monopoly in the perfect contestable market (Shaffer, 1982).

Empirical application of PR required that banks should produce the single product. The main assumptions of PR are: at first, banks should be operated in the long run equilibrium; second, the elasticity of demand according to the input price must be greater than one; third, banks should have the homogeneous structure of cost.

PR applied to the several European countries by Molyneux et al. (1994), Bikker and Groenveld (2000), De Bandt and Davis (2000), Weill (2004), Boutillier et al. (2004), Koutsomanoli - Fillipaki and Staikouras (2004), Casu and Girardone (2006), Goddard and Wilson (2006), which they have found the monopolistic competition in banking sector. Other studies according to diverse countries carried out by Claessens and Laeven (2004), Goddard and Wilson (2009), Bikker et al. (2009) and Schaek et al. (2009) confirmed the similar results.

3. Methodology and Results

Methodology of the banking competition assessment based on Claessens and Laeven (2003) model using the panel data referring to the annual data of Albanian banking sector during 2005–2011. The banking competition through H statistic relied on the specified model:

$$\ln(P_{it}) = \alpha + \beta_1 \ln(W_{1,it}) + \beta_2 \ln(W_{2,it}) + \beta_3 \ln(W_{3,it}) + \\ + \gamma_1 \ln(Y_{1,it}) + \gamma_2 \ln(Y_{2,it}) + \gamma_3 \ln(Y_{3,it}) + \delta D + \varepsilon_{it}$$

where P_{it} is the ratio of total revenue to total assets like the approximate indicator of the output price, $W_{1,it}$ 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 labor, $W_{3,it}$ 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 model included the several control variables related to the individual banks. $Y_{1,it}$ is the ratio of total loans to total assets, $Y_{2,it}$ is the ratio of capital to total assets and $Y_{3,it}$ is the rate of treasury bills to total assets. The above model bore several proximate indicators referring to Claessens and Laeven (2003) due to the lack of detailed data according to individual bank.

It is necessary to test the soundness of H statistic prior and assess it referring to the PR assumptions. H statistic is appropriate if the banks are operating in the long run equilibrium. To test this assumption estimated the following equation:

$$\ln(1 + ROA_{it}) = \alpha + \beta_1 \ln(W_{1,it}) + \beta_2 \ln(W_{2,it}) + \beta_3 \ln(W_{3,it}) \\ + \gamma_1 \ln(Y_{1,it}) + \gamma_2 \ln(Y_{2,it}) + \gamma_3 \ln(Y_{3,it}) + \varepsilon_{it}$$

where ROA is the return on assets, and other explanatory variables are the same like the equation of P_{it}. E statistic defined as $\beta_1 + \beta_2 + \beta_3$ and used to test the long run equilibrium which it should equal zero to confirm the long run equilibrium. It meant the returns on bank assets should not be correlated with the input prices. The model is analyzed through fixed effects by banks and periods showing through *Hausman test* in table 1. Also the model and the variables are significant referring to the significance level in the table 1. *Wald test* used to test whether E statistics equal zero and the student distribution according to the average of series resulting $E = 0$. These results confirmed the long run equilibrium of banks and the soundness of H statistic according to banking competition in Albanian banking sector.

Empirical results of parameters according to H statistic showed in table 2. Results indicated that the model and variables were significant referring to *F-statistic and p(value)*. They highlighted that the output price was correlated positively with the inputs prices of deposits and labour due to the linking of increasing costs, which they generated revenues. The largest contribution to the determining of H statistic provided by the input of deposits and in cooperation to the labour input represented the principal determinants according to the "production function" of banks. While it was correlated negatively to the cost of capital, meaning that banks were well-capitalized and averse to the high revenues. But the output price was linked positively to the capital ratio, because the higher risk expected to be associated with the higher returns. Also it was the positive relationship according to the treasury bills due to creating revenues. Meanwhile the linkage between the capital

price and loan ratio was negative despite the positive expectations referring to the theoretical and empirical results. It could be related to the negative effect of higher provisions according to banks during this period due to the increasing ratios of non-performing loans after 2006.

Table 1. Results of *E statistic.*

Dependent Variable: ln(1+ ROA)				
Variables	**Coefficient**	**Std. Error**	**Fix effects by banks (B1–B16)**	**Fix effects by periods (2005–2011)**
lnw_1	0.021 ***	0.008	0.005	-0.015
lnw_2	0.036 **	0.012	0.011	0.026
lnw_3	-0.051 *	0.012	0.002	0.030
lny_1	0.027 *	0.004	0.001	-0.052
lny_2	0.004 **	0.001	-0.008	0.002
lny_3	0.009 **	0.002	0.002	-0.007
C	0.102 **	0.038	0.004	0.015
			0.006	
			-0.009	
			-0.029	
			-0.010	
			-0.004	
			0.041	
			0.009	
			-0.010	
			-0.008	
Adjusted R^2	0.612			
F-statistic	7.211			
Prob(F-statistic)	(0.000)			
Hausman test	29.237			
Chi-Sq. Statistic	(0.0001)			
H_0: E=0	1.219			
Wald F- test	(0.272)			
P(F-test)	-1.71E-14			
t-statistic	(1.000)			
Observations	112			

*, **, *** showed the significance level respectively 0.1%, 1% and 10%.
Source: Authors' calculations

Estimations of H statistic converged to $0 < H < 1$ due to the hypothesis $H = 0$ and $H = 1$ rejected through *Wald test* and confirmed through *t-stastic* that the mean of series was equal to 0.68. The average value of H statistic attained 0.663 and meant that the banking sector operated in the monopolistic competition during 2005–2011.

H statistic ranged to $(0.599,\ 0.702)$ during this period demonstrating by figure 1. These results converged to the results of Note (2006) referring to the banking competition in Albanian banking sector. Also H statistic 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 0.791 and 0.597 respectively. The results meant that the largest banks were more competitive than small banks in the market.

Table 2. Results of *H statistic.*

Dependent Variable: lnP_{it}				
Variables	**Coefficient**	**Std. Error**	**Fix effects by banks (B1–B16)**	**Fix effects by periods (2005–2011)**
lnw_1	0.540 **	0.224	0.134	0.232
lnw_2	0.199 **	0.077	-0.138	0.090
lnw_3	-0.053 *	0.016	-0.261	0.145
lny_1	-0.326 *	0.110	-0.014	-0.135
lny_2	0.358 *	0.123	-0.090	-0.209
lny_3	0.103 **	0.047	-0.238	-0.244
DM	-0.290 **	0.132	-0.107	0.122
C	-2.545 *	0.617	0.245	
			0.006	
			-0.009	
			-0.029	
			-0.010	
			-0.004	
			0.041	
			0.009	
			-0.010	
			-0.008	
Adjusted R^2	0.456			
F-statistic	4.068			
Prob(F-statistic)	(0.000)			
H = 1				
Wald F –test	56.775			
P(F-test)	(0.0000)			
H = 0				
Wald F –test	27.737			
P(F-test)	(0.000)			
H = 0.68				
t-statistic	-0.693			
p(value)	(0.4896)			
Observations	112			

*, **, *** showed the significance level respectively 1%, 5% and 10%.
Source: Authors' calculations

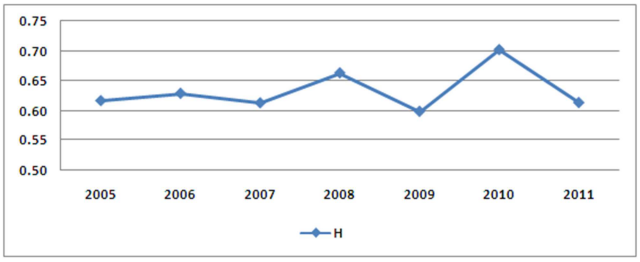

Figure 1. H statistic during 2005–2011 in Albanian banking sector.

Source: Authors' calculations

The figure 2 demonstrated the static comparative according to banking competition through H statistic to several European countries and 27 countries of European Union (EU) and Albania during 2008. The competition in Albanian banking sector was closely to 27 countries of EU, but it was low compare with Germany, France, Italy, Spain, the United Kingdom (UK). Meanwhile it found out the more competitive banking sector in Albania than the Balkan countries like Bulgaria and Slovakia.

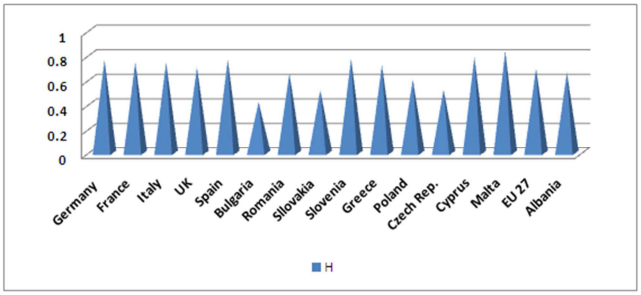

Figure 2. H statistic according to several European countries and Albania during 2008.

Source: Weill (2011), 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 behavior. Banking sector demonstrated the high concentration relying on empirical estimations meanwhile it converges to the moderated concentration recently.

The empirical results of banking competition using *H statistic* of PR confirmed the monopolistic competition according to the banking sector during 2005–2011. *H statistic* attained the lowest values during 2009 demonstrating the signals of pro-cyclical effects to banking competition due to the political elections. Also the large banks were more competitive than the small banks referring to *H statistic*. The competition level of Albanian banking sector was lightly comparable with the EU countries and more competitive than several Balkan countries referring to the comparative statics.

H statistic confirmed the frail linkage among the banking competition and concentration meanwhile it did not harm the competitive behaviour of banks in Albanian. These results proved the occurrence of contestability in the banking market. 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. This analysis highlighted that the traditional indicators of banking competition according to banking concentration did not provide the robust empirical support linking to the assessment of banking competition. They have lost their dominance related to the determining of bank behaviour until now. Traditional approaches are the necessary condition, but not the sufficient condition to assess the banking competition in Albanian.

Finally, in terms of the future research it would be appropriate to assess the competition related to the financial system. The latter investigations would be contributed to assess the bank behaviour relying to the non–structural approaches related to the particular banking products and the relevant market. They would promote the relevant signals to banks' behaviour.

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