An analysis of concentration, competition, and financial stability in the South-East Europe banking context

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Introduction (I)

- Banking industries in the SEE region are the main channel throughout financial resources are allocated across the region
- Despite the importance of the SEE banking industries in the context of their domestic economies, only a handful of studies have tried to share more light on them so far.
- Thereby, the goal of this paper is to contribute to the debate concerning the evolution of SEE banking industries by focusing on the nexus among competition, concentration, and financial stability

Introduction (II)

- The debate focusing on the relationship between market power and financial stability is based on the existence of two alternative views, that is the competition-fragility and the competition stability views
- In accordance with the competition-fragility view, a high level of market competition results in lower profits for banking firms, therefore banks have an incentive to take excessive risk in order to increase their returns (Berger et al, 2015).
- Conversely, the competition stability views, is based on the assumption that the lower is the level of competition the higher are the loan rates banking firms charge their customers. This in turn allows banks to earn high profits that are then used to create a buffer against unexpected shocks and then ensuring the stability of the financial system (Matutes and Vives, 2000; Bretschger et al, 2012; Forssbaeck et al, 2014).

Therefore the specific goal of this paper is to investigate which one of the mentioned views prevails in the case of the SEE banking industry

Literature review (II)

- A first attempt of comparing competition and concentration among EU countries and newly EU member states banking system is presented in Staikouras and Koutsomanoli (2006). Their result show that banking industries of EU-14 countries are less concentrated than ones in the new EU Member states. Further, monopolistic competition is the prevailing market structure in both EU-14 and new EU member states banking industries.
- More recently Mamatzakis et al (2005) investigated the degree of concentration and competition in the banking industry of a sample of South Eastern European countries over the period 1998-2002. Using non-parametric measures of concentration such as Concentration Ratios (CRk) and Herfindhal Hirscshman Index (HHI hereafter), these authors find that the level of concentration in SEE banking industry has declined over the period under study. However, there are still differences across the countries and highest level of concentration are found whereas privatisation processes of large state-owned banks are still far from being completed.

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Literature Review (III)

- One of the reasons behind the analysis of market power at banking level concerns the stability of the overall financial system
- In particular, the debate focusing on the relationship between market power and financial stability is based on the existence of two alternative views, that which are the competition-fragility and the competition stability views (Berger et al., 2015)
- In accordance with the former, a high level of market competition results in lower profits for banking firms, therefore banks have an incentive to take excessive risk in order to increase their returns (Berger et al, 2015)
- the competition stability views, is based on the assumption that the lower is the level of competition the higher are the loan rates banking firms charge their customers. This in turn allows banks to earn high profits that are then used to create a buffer against unexpected shocks and then ensuring the stability of the financial system (Matutes and Vives, 2000; Bretschger et al, 2012; Forssbaeck et al, 2014)

Literature review (IV)

- The relationship between competition and stability in the case of banking firms operating in developed economies has been investigated in a large number of papers (see for instance, JimÃ©nez et al., 2013; Fiordelisi and Mare, 2014; Schaeck and CihÃ¡k, 2014).
- Only few of studies have focused their attention on emerging economies and results are often mixed. For instance, Bretschger et al. (2012) investigate both the concentration-stability as well as concentration-fragility the hypotheses by considering banking firms in both developing and developed countries. They found that the concentration-stability hypothesis is more likely to hold in the case of banking firms located in developing economies.
- Liu et al. (2012) investigate the relationship between competition and bank risk in four South East Asian banking systems between 1998 and 2004. Their findings lend evidence to the competition-stability hypothesises. In other words, high level of competition does not increase bank risk-taking behaviours.

Methodology (I)

We use a complementary approach in order to measure market concentration and competition at bank-year level:

- Concentration measures
- Competition measures
- Financial stability measures

Methodology (II)

A very popular measure of banking concentration is the CRk which sums the market shares of the k largest banks in the market. Therefore, the CRk ratio is computed as

$$CR\text{k} = \Sigma_{i=1}^{k} \tag{1}$$

where s_i is the market share of bank i and k represents the leading banks operating in the market under analysis whose number is a rather arbitrary decision. It has been pointed out that one of the main drawbacks of the CRk ratio is given by its focus on the leading banks. Therefore, given the different size of banking firms, the CRk ratio does not consider the smaller banks. In order to overcome that problem, a valid alternative to the CRk ratio is the Herfindahl-Hirschman Index (HHI).

Methodology: (III)

The HHI which is one of the main most commonly measures employed in accordance with the Structure-Conduct-Performance (SCP) paradigm as measure of market concentration. The HHI is calculated by adding up the squared market share of each bank competing in a specific market, that is

$$HHI = \Sigma_{i=1}^{n} s_i^2 \tag{2}$$

The range of any HHI value is from zero to 10,000. If the resulting HHI takes a value less than 1000 then the banking industry is regarded to operate in a competitive market. Values ranging from 1000 to 1800 indicate a concentrated market whilst a value of HHI higher than 1800 is clear evidence of a very concentrated market (Rhodes, 1993; Federal Reserve Bank, 1998).

Methodology: (IV)

Critics made to the SCP approach have lead some researchers belonging to the New Empirical Industrial Organization (NEIO) to develop alternative measures of market power by using models of profit-maximizing firm behaviour. One of the most popular methods developed within the NEIO is the Panzar and Rosse (1987) model which has been used in a very large number of studies. The Panzar-Rosse method measures competition for a panel data set of banks by using a log-linear revenue equation which is specified as follows:

$$ln(R_{i,t}) = c + \Sigma_{i=1}^{n} \alpha_i ln(W_{i,t}) + \Sigma_{i=1}^{n} \beta_i ln(\Upsilon_{i,t}) + \Sigma_{i=1}^{n} \gamma_i ln(\Omega_{k,t}) \qquad (3)$$

where $R_{i,t}$ is the total revenue of bank i at time t, $W_{i,t}$ is the price of n inputs, Υ represents bank-specific variables, whilst the term $\Omega_{k,t}$ represents macroeconomics variables of country j at time t where

Methodology: (V)

The degree of competition is then assessed via the H-statistic which is calculated by adding up the coefficient estimates of the input prices, that is

$$H = \Sigma_{i=1}^{n} \alpha_i \tag{4}$$

The H-statistics is then interpreted as follows: $H \leq 0$ implies a monopoly market structure; $0 < H \leq 1$ implies monopolistic competition; $H = 1$ is associated with perfect competition. The conclusion drawn from the H-statistic does hold if the banking market is a long-run equilibrium. In accordance with Matthews et al. (2006) the banking market is considered to be in equilibrium if the following equation equals 0

$$H = \alpha_1' + \alpha_2' + \alpha_3' \tag{5}$$

The condition above is verified by replacing the dependent variable in Eq.3 with a profit rate (usually the ln of ROA + 1) and then performing a Wald test. where

Methodology (VI)

An additional measure of market power is the Lerner index which represents the mark-up over marginal cost. As such the Lerner index is a direct indicator of the degree of market power. The Lerner Index at bank level is calculated as follows:

$$L_{it} = \frac{p_{it} - mc_{it}}{p_{it}} \tag{6}$$

where p_{it} is the price of total asset proxied by the ratio of total revenue to total assets for bank i at time t, while mc_{it} is the marginal cost for bank i at time t derived from the translog cost function. The Lerner index ranges between a minimum value of zero and a maximum value of one. Lerner index as measure of competition in banking has been widely used in the recent empirical literature (see, for instance, De Guevara et al., 2007; Berger et al., 2009; Buch et al., 2013; Beck et al., 2013; Kick and Prieto, 2015; Fernandez et al., 2016).

Methodology (VII)

In order to calculate marginal costs to be used in calculating Lerner index, we follow Coccorese (2009) and derive marginal cost from a translog cost function modelled as follows:

$$\begin{aligned} lnTC_{it} = \alpha_0 + \alpha_1 lnQ_{it} + \frac{1}{2}\alpha_2 (lnQ_{it})^2 + \Sigma_{k=1}^{3} \gamma_{kt} lnW_{k,it} + \\ \Sigma_{k=1}^{3} \theta_k lnQ_{it} lnW_{k,it} + \frac{1}{2}\Sigma_{k=1}^{3} \phi_k (lnW_{it})^2 + \\ \beta_1 ln\omega_{1it} ln\omega_{2it} + \beta_2 ln\omega_{1it} ln\omega_{3it} + \\ \beta_3 ln\omega_{2it} ln\omega_{3it} + \varepsilon \end{aligned} \tag{7}$$

where TC_{it} represents total costs of bank i at time t, Q_{it} represents bank output which is representated by total asset for bank i at time t. $W_{k,it}$ are the three input prices, that is $W_{1,it}$ $W_{2,it}$ $W_{3,it}$ indicate the input prices of labor, funds, and fixed capital, respectively. and are calculated as the ratios of personnel expenses to total assets, interest expenses to total deposits and other operating and administrative expenses to total assets, respectively.

Methodology (VIII)

Eq.(7) is estimated separately for each bank i in the sample to reflect potentially different technologies. Marginal cost is then calculated as:

$$MC_{it} = \frac{\partial lnTC_{it}}{\partial lnQ_{it}} = \frac{TC_{it}}{Q_{it}}[\alpha_1 + \frac{1}{2}\alpha_2 lnQ_{it} + \Sigma_{k=1}^{3}\theta_k lnW_{k,it}] \quad (8)$$

Methodology (IX)

In this paper we used two accounting based measures of financial stability that is the *Z-score* and the *Non-Performing Loans ratio*. The former is used to evaluate the probability of insolvency at bank level and is calculated as follows:

$$Z_{it} = \frac{ROA_{it} + CAR_{it}}{St.DevROA_{it}} \tag{9}$$

where ROA_{it} are the returns on assets for each bank i at time t, CAR_{it} is the ratio of total equity over total assets of bank i in t, and $StDevROA_{it}$ is the standard deviation of returns on assets. In accordance with Fu et al. (2014) there is an inverse relationship between *Z-score* and the probability of insolvency. Therefore low (high) *Z-score* levels implies a higher (lower) probability of insolvency. Eq. 9 is used to calculate the *Z-score* for each bank i at time t. The *Z-score* has been widely used to measure banking risk by, for example, Boyed et al. (2006), Uhde and Heimeshoff (2009), Houston et al. (2010) Beck et al (2012), Liu et al (2012), Schaeck and Cihak, (2013), Fernandez et al. (2016), and Fu et al. (2014).

Methodology (XI)

The nexus among market structure and financial stability is analysed by following similar empirical studies (see, for instance, Berger et al., 2013; Schaeck and CihÃ¡k, 2013; Kasman and Carvallo, 2014; Kasman and Kasman, 2015), we model this relationship as follows:

$$FinStability_{i,t} = \alpha_0 + \alpha_1 FinStability_{i,t-1} + \alpha_2 MS + \Gamma X_{i,t} + \Theta Y_{k,t} + \mu \quad (10)$$

where subscript i and k refer to bank and country, respectively. As a proxy of financial stability we use alternative indicators, that is Z-score and Non-Performing Loans to total loan ration (NPL ratio hereafter). MS represents the market power that we approximated by using two alternative measures such as HHI and Lerner index indicators. The vectors X_{it} and Y_{ct} are explanatory variables at bank- and country-level, respectively. In the former case, we used a number of bank-based control variables such as Loans and Total Assets, as proxies of lending activities and bank size. Further, we use a number of country-level variables in order to investigate their effect on banking financial stability.For instance,, we use GDP growth to investigate to wheter its effect can ether increase or decrease financial stability.

Methodology (XII)

The previous model is estimated by using both system and difference GMM

- The process may be dynamic, with current realizations of the dependent variable influenced by past ones.
- Some regressors may be endogenous.
- The idiosyncratic disturbances (those apart from the fixed effects) may have individual-specific patterns of heteroskedasticity and serial correlation

Data (I)

- The geographical coverage of this study is as follow: Albania, Bosnia-Herzegovina, Bulgaria, Croatia, FYROM, Romania and Serbia.
- The time span considered is from the year 2003 to 2012. and a sample commercial banks was drawn from BankScope database.
- Bank balance sheet data for banking firms located in the above mentioned countries were collected from unconsolidated balance sheet and income statement reports as provided by Bankscope. In the construction of our data set we considered only commercial banks with at least three years of continuous data. In accordance with this criterion, we ended up with a data set of 172 commercial banks.
- We complemented Bankscope data with information about domestic and foreign ownership of banking firms by using Claessens and Van Horen database.

Data (II)

The data collected from BankScope is, in most cases, in domestic currency. This was then converted into U.S. dollars by using spot exchange rate among each domestic currency and U.S. dollar. Further,After converting the data into this common currency, the effects of inflation were then removed by using the US GDP deflator from the U.S. National Bureau of Economic Analysis with all values expressed in 2009 price. We complemented the bank-level data with macroeconomic data at country level taken from the World Bank - World Development Indicator database..

Thank you for your attention

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