COMPETITION IN ROMANIAN BANKING SECTOR

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Recent turmoil in the global financial system has impacted severely on the banking sector with many banks suffering large losses and necessitating the need to raise additional capital privately or through their respective national governments. In our study we investigate the impact of structural reforms performed throughout the European Union (EU) accession process on competition and contestability of banking systems in Romania.

The literature of the measurement of competition can be divided into two major approaches: structural and non-structural. The structural approach to the assessment of competition embraces the „Structure-Conduct-Performance Hypothesis" (SCP) and the „Efficient Structure Hypothesis" (ESH). The structural approach, as the name suggests, assesses bank competition by examining measures of market structure such as concentration ratios (the share of assets held by the top 3 or 5 institutions) or indices (e.g., the Herfindhal-Hirschman index) and supposes that higher concentration in the banking market causes less competitive bank conduct and leads to higher bank profitability. The SCP model is originally developed by Bain (1956). The second approach, ESH, developed by Demsetz (1973) and Peltzmann (1977) suggests that the superior performance of the market leaders determines the market structure, implying that higher efficiency produces both higher concentration and greater profitability. The non-structural indicators of competition are mainly based on the measures of monopoly power developed by Lerner (1934). The Lerner Index suggests the mark-up of price over marginal cost. An alternative non-structural indicator of the degree of market competition is the Panzar and Rosse (1987) H-statistic. The H-statistic measures the extent to which changes in banking costs are reflected in changes in banking revenues.

In order to examine the level of competition and market power of banks in Romania for period 2003 – 2009, we estimate the non-structural indicators and compare it with the structural indicators of competition.

In particular, we measure competition using Lerner index and the H-statistic, indicators what are estimated using bank-level data and are compared with a standard market structure measure of concentration like HHI and CR5. There are no other studies that measure both structural and non-structural competition indicators for Romanian banking sector. Also, our assessment contains a period of seven years including the begging of the implications of the present international financial crises on Romanian banking sector.

The structural indicators show continuous increase of competition in the Romanian banking system. Lerner index and H statistic demonstrate that Romanian banking system is characterized by monopolistic competition and relatively competitive practices. Personnel cost, operational cost and financial cost are statistically significant at conventional levels, which imply good fit of the revenue equations. The results also demonstrate that excess fixed assets do not generate abnormal revenue.

1. Introduction

In recent years due to reform process, what involved an ample process of liberalization, privatization and recapitalization of the banking sector, the analysis of the competition of banking sectors in transition countries from Central and Eastern European countries has received much consideration. In our study we investigate the impact of structural reforms performed throughout the European Union (EU) accession process on competition and contestability of banking systems in Romania. Recent turmoil in the global financial system has impacted severely on the banking sector with many banks suffering large losses and necessitating the need to raise additional capital privately or through their respective national governments. The failure of investors, depositors, and supervisors to appropriately discipline banks have led academics and policy-makers to re-consider the links between bank performance, risk and changes in the competitive environment. Moreover, in recent years, indicators of banking competition had been used by researchers to explain performance and risk differentials across banks.

2. Literature review

The literature of the measurement of competition can be divided into two major approaches: structural and non-structural. The structural approach to the assessment of competition embraces the „Structure-Conduct-Performance Hypothesis" (SCP) and the „Efficient Structure Hypothesis" (ESH). The structural approach, as the name suggests, assesses bank competition by examining measures of market structure such as concentration ratios (the share of assets held by the top 3 or 5 institutions) or indices (e.g., the Herfindhal-Hirschman index) and supposes that higher concentration in the banking market causes less competitive bank conduct and leads to higher bank profitability. The SCP model is originally developed by Bain (1956).

The second approach, ESH, developed by Demsetz (1973) and Peltzmann (1977) suggests that the superior performance of the market leaders determines the market structure, implying that higher efficiency produces both higher concentration and greater profitability. "Non-structural models" do not infer the competitive conduct of banks through the analysis of market structure. The New Empirical Industrial Organization approach rather recognizes that banks behave differently depending on the market structure in which they operate. The non-structural indicators of competition are mainly based on the measures of monopoly power developed by Lerner (1934). The Lerner Index suggests the mark-up of price over marginal cost. The higher the mark-up, the greater is the realized market power. There are a broad range of studies that use the Lerner index like Angelini. and Cetorelli (1999), Padoa-Schioppa (2001), Carbo et al., 2003, Maudos and Perez (2003), Toolsema (2003), Fernandez de Guevara and Maudos (2004), Carbo et al. (2005), Carbo´ et al. (2006); Humphrey et al. (2006), Fernandez de Guevara et al. (2007); Carbo and Rodriguez (2007), Maudos and Fernandez de Guevara (2007), Carbó et al. (2009). A number of studies have used the Lerner index to try to determine the trend in competitive behavior over time.

An alternative non-structural indicator of the degree of market competition is the Panzar and Rosse (1987) H-statistic. The H-statistic measures the extent to which changes in banking costs are reflected in changes in banking revenues. It is calculated as the sum of the ratios of the percentage change in total revenue (from all sources) to the percentage change in the three input prices (funding, labour and capital costs), holding constant total banking output (total assets), leverage, and two balance sheet composition variables (loans to assets and deposits to total liabilities). There are a various studies using H-statistic measures. Some of them examine competition on European countries like those of Shaffer (1993), Molyneux et al. (1994), Bikker and Groeneveld (2000), De Bandt and Davis (2000), Weill (2003), Boutillier et al. (2004), and Koutsomanoli-Fillipaki and Staikouras (2004), Carbó et al. (2009). Claessens and Laeven (2004), Bikker and Haaf (2002) assessed competition using H-statistic for a sample of different countries,

including European ones. There are also individual country studies: for Germany – Hempell (2002), Gischer and Stiele (2008), for Italy – Coccorese (2004), for Greece – Hondroyiannis et al. (1999), Coccorese (2005), for Spain – Maudos and Perez (2003), Carbo et al. (2003), for Finland – Vesala (1995), for Canada – Nathan and Neave (1989), for Japan – Molyneux et al (1996).

3. Methodology and data used

The purpose of this study is to analyze the competitive conditions in the banking sector of Romania, in light of the reforms implemented in this country and the immense changes in Romanian banking system using bank-level data. There are no other studies that measure both structural and non-structural indicators for Romanian banking competition.

In order to examine the level of competition and market power of banks in Romania for period 2003 – 2009, we estimate the non-structural indicators and compare it with the structural indicators of competition. In particular, we measure competition using Lerner index and the H-statistic, indicators what are estimated using bank-level data and are compared with a standard market structure measure of concentration like HHI and CR5.

We estimate the degree of bank market power using bank-level data, the approach followed is similar to that of Maudos and de Guevara (2007) and Delis and Tsionas (2009) who defined the Lerner index as:

$$L_{it} = (p_{it} - mc_{it})/p_{it} \qquad (1)$$

where p is the price of total assets computed as the ratio of total revenue to total assets; mc is the marginal cost of total assets. In particular, we opt for a modeling framework that allows mc to differ across banks and time, using a non-parametric technique to estimate observation-specific marginal costs from a cost function. In particular, here we resort to the estimation of the following Cobb-Douglas cost function:

$$\ln c_{it} = a_0 + a_1 \ln q_{it} + a_2 \ln d_{it} + a_3 \ln w_{it} + \varepsilon_{it} \qquad (2)$$

where c is the total cost of bank i at time t, q is bank output (measured by total assets), d is the value of bank deposits, w are the prices of inputs and e is a stochastic disturbance. This cost function assumes that banks use inputs and deposits to produce output q (for a similar implementation, see e.g. Uchida and Tsutsui: 2005; Brissimis et al.: 2008). The marginal cost of bank output is simply a_1.

In the case of perfect competition, L=0; under pure monopoly, L = 1; for monopolistic competition L ranges between 0 and 1; and L < 0, implies pricing below marginal cost and could result, for example, from a non-optimizing behavior of banks.

In our application of the Panzar–Rosse approach, the following equation is estimated to assess the H statistic from a panel dataset of banks from Romania for period 2003 – 2009:

$$\log\left(\frac{R_{it}}{TA_{it}}\right) = \alpha_0 + \sum_{k=1}^{K} \alpha_k \log \omega_{it}^k + x_{it}\beta + \varepsilon_{it} \quad (3)$$

where R is the revenue; TA is the total assets; w_k is the unit price of input k; x is a vector of control variables; ε is the disturbance term; i and t denote bank and time respectively. The H statistic is the sum of α_1 to α_k in this specification.

Panzar and Rosse (1987) showed that the H statistic indicates the nature of market structure under following assumptions: a) banks are profit maximizing; b) banks produce revenue using labour, capital and intermediated funds as inputs; c) higher input prices are not associated with higher quality services that generate higher revenue.

For accurate identification of the H-statistic using an estimated revenue equation based on a static equilibrium model, it is necessary to assume that markets are in long-run equilibrium at each point in time when the data are observed. Accordingly, the equilibrium profit rate should be uncorrelated with the factor input prices. To test of the market equilibrium assumption we estimated in addition following equation:

$$\log\left(1 + R_{it}\right) = \alpha_0 + \sum_{k=1}^{K} \alpha_k \log \omega_{it}^k + \beta x_{it} + \beta_{TA} \log TA_{it} + \varepsilon_{it} \qquad (4)$$

with the variable TA controlled as an explanatory variable.

The estimated value of H statistic ranges between -∞ and 1. H statistic is smaller than 0 if the underlying market is monopoly, it ranges between 0 and 1 for monopolistic competition and an H statistic of unity indicates perfect competition.

In order to estimate the non-structural indicators of competition we used the following set of data: a) inputs: personnel expenses, fixed assets and financial capital (sum of total deposits, total money market funding, total other funding and equity); input prices: total personnel expenses over total assets, other operating expenses over fixed assets and interest expenses over financial capital; control microeconomic variables: total capital ratio, equity to total assets ratio, credit risk measured as ratio of loan-loss provisions to total loans (LLR_GL), liquidity risk measured as ratio of liquid assets to total deposits and borrowing funds (LA_TD); and control macroeconomic variables: GDP growth rate – Growth in real GDP in per cent (GDP_G), Inflation rate - change in annual average retail/consumer price level in per cent (IR), Level of financial intermediation – domestic credit provided by banking sector percentage of GDP (FIN_INT).

The empirical model specified in equation is estimated using the panel least square fixed effects methodology. A second set of models is estimated, GMM data models, to allow comparison of results, and as a robustness check. The models are estimated on a panel of 24 commercial banks from Romania for 2003 – 2009 period.

4. The results of the research

The most common structural measures of competition and concentration are the Herfindahl-Hirschman Index (HHI) and the n-bank concentration ratio (CRn). The HHI is defined as the sum of squared market share of the banks in the market. The upper bound of the HHI is 10.000, which indicates a monopoly, and the lower bound is 0 in the situation of an infinite number of banks. A market with a result of less than 1.000 is a competitive marketplace, a result of 1.000 – 1.800 indicates a moderately concentrated marketplace and a result of 1.800 or greater indicates a concentrated marketplace. The n-bank concentration ratio (CRn) is calculated as the percentage of the market controlled by the top n banks in the market, usually the first three or five banks, and the measure takes the share of deposit, loans or assets.

Table 1 Structural indicators of competition in the Romanian banking system for 2003 – 2009 period by year

Year	Herfindahl Index for credit institutions	Share of total assets of the five largest credit institutions	Number of credit institutions	Number of local units (branches)	Number of branches of credit institutions from EU countries
2003	1251	55.2	39	3387	7
2004	1111	59.5	40	3031	6
2005	1115	59.4	40	3533	5
2006	1165	60.1	39	4470	6
2007	1041	56.3	42	6340	10
2008	922	54	43	7375	10
2009	857	52.4	42	6425	10

As we can see in the Table 1, the concentration of the Romanian banking system has been decreasing continuously from 2003 to 2009. This means that the competition in the Romanian

banking system has increased yearly, especially due to diminishing of the state capital and entering of foreign capital.

Table 2 Non - structural indicators of competition in the Romanian banking system for 2003 – 2009

Model	OLS	GMM
Lerner index		
Lerner index	**0.908022***** (0.044363)	**0.842283***** (0.078149)
H statistic		
Personnel cost	0.357857*** (0.020786)	0.455813*** (0.107588)
Operational cost	0.033020*** (0.011901)	0.038437 (0.074553)
Financial cost	0.313549*** (0.019461)	0.445536*** (0.087971)
H statistic	**0.704426**	**0.939786**

Note: Standard deviations are presented between brackets.
*, **, *** indicates significance levels at 10%, 5% and 1%

Table 2 reports the estimates obtained from applying the methodology described above to the Romanian banking sector. Most of the input prices reported in Table 2 are statistically significant at conventional levels, which imply good fit of the revenue equations.

The both results, Lerner index and H statistic, show that Romanian banking system is characterized by monopolistic competition and relatively competitive practices.

The price of fixed assets contributes less to the equation for the H-statistic than the rest of the input prices, result in line with the literature (see Molyneux et al. 1994 and Bikker and Haaf 2002) and it means that excess fixed assets does not generate abnormal revenue.

Finally, we test for long-run equilibrium using ROA as the dependent variable as discussed above. The result (i.e. Hn=0) suggests that the hypothesis of equilibrium is confirmed for Romanian banking systems.

5. Conclusion

As the structural indicators show, the concentration of the Romanian banking system has been decreasing continuously from 2003 to 2009. This means that the competition in the Romanian banking system has increased yearly, especially due to diminishing of the state capital and entering of foreign capital. The Romania' accession to European Union had an active effect on these trends. The both results, Lerner index and H statistic, show that Romanian banking system is characterized by monopolistic competition and relatively competitive practices. Personnel cost, operational cost and financial cost are statistically significant at conventional levels, which imply good fit of the revenue equations. The results also demonstrate that excess fixed assets do not generate abnormal revenue. Even if some banks have extended their network aggressively for a bigger share of market, they do not account larger revenues yet. Personnel cost and financial cost higher contributions to the equation for the H-statistic comparative with operational costs could be explained by a intense competition in recruiting and maintaining the personnel (due to head hunting and personnel migration) and a high cost of financial resources, due to high cost with the minimum reserve requirements and the using of parental undertakings financing as a form of profits repatriation.

6. Acknowledgement

7. References

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