

# *A Literature Review on the Determinants and Measures of Competition in Banking Sector*

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## **Abstract**

*The level of competition in the banking sector is important to the performance of the sector and has different implications in other key markets in the economy. Competition in the banking sector is extremely important because of the central role that banks have in (1) welfare enhancing for consumers and businesses, (2) the transmission of monetary policy and (3) the maintenance of financial stability. The complexity of the notion of competition and its importance for the overall economic development has led to the development of different models and measures to assess its level in the banking sector. The literature offers two main approaches: (1) The Structural approach based on the Traditional Industrial Organization theory and (2) the Non-Structural approach based on the New Empirical Industrial Organization theory. The non-structural approach determines the level of competition based on the market structure; while the non-structural approach infers the competition degree based on the behavior of the banks in the market. This paper presents some of the widely-applied methods in assessing the level of competition in the banking sector, such as Lerner Index, Panzar-Rose Methodology, Boone Indicator etc, and identifies their strengths and weaknesses. Some of the common determinants of the level of competition in banking sectors across countries, such as market structure (bank consolidation and the introduction of foreign capital), contestability of the market, level of economic development and quality of institutional framework, bank specific conditions and the liquidity preferences of banks are discussed to enable a better understanding of the concept of competition in the banking sector and what affects it. The literature on the level*

*of competition in the Albanian Banking sector is focused in the last decades and mainly after 2003. Even though the concentration level in the Albanian banking sector is the highest in the region, the system is characterized by a moderate level of competition and performs better than some of the other countries in the region. This moderate level is in line with the literature on banking sector competition in developing countries.*

**Keywords:** *Banking, Competition, Concentration, Structural, Non-structural, Market structure, Contestability, Lerner, Panzar-Rose, Boone, Albania*

## Introduction

The level of competition in the banking sector affects not only the performance and efficiency of the sector itself but also other different sectors of the economy. Therefore, the competition in the banking sector is crucial for the economic growth and development of a country. Many studies have tried to explain the implications of competition on issues like access to credit, cost and quality of financial services, innovations, the stability of financial systems and economic development. The existing literature in the field finds that higher levels of competition in the banking sector lead to faster growth in other sectors of the economy that rely on external financing. (Claessens and Laeven, 2002). Moreover, studies have shown that developing countries (emerging economies) need a more competitive banking sector than developed countries in order to promote growth. (Deidda and Fattouh, 2002). However, the optimal level of competition in the banking sector of a country is difficult to determine. A higher than optimal level of competition can have a negative effect by increasing the risk-taking behavior of the banks, and the probability of default. (Vives, 2001). Therefore, the optimal level of competition in the banking sector is dependent upon the economic and institutional development of the country itself. Subsequently, measuring the level of competition in the banking sector is important in shaping the economic policies and practices of one country.

In order to measure the competition in the banking sector and find the right measures or models to assess it, it is important to discuss the concept of competition in this market of the economy. Even though, competition has been a central force of economic thinking, it has been continuously re-defined and re-interpreted. According to Smith, in "The Wealth of Nations", competition is the central force to equilibrium where prices equal the costs of productions and supply meets demand. Later on, the Standard Theory of competition describes it as a static state, as the equilibrium itself. On the other hand, the Austrian School argues that competition is not a state, it is rather a process – a process of rivalry among the players in the market which acts as a selection mechanism where less efficient players are removed from the market and are substituted with more efficient new ones.

The most widely understood form (or display) of competition is that in the goods market – the freedom of players in the market to allocate their resources according to their needs and sell the goods at their chosen price (World Development Report, 2002). Thus, competition is expected to lead to increased efficiency, improved processes with the end goal of minimizing costs and maximizing profits. The tangible character of this market makes understanding competition easier. The market for services, in which the banking sector is a part of, presents a greater challenge in understanding (and measuring) competition. The literature in this field offers different definitions of competitions in the banking sector. It can be defined as the ability to compete with the other players in the market by improving the quality of the services. On a broader level, competition is the overall management's decisions undertaken to increase efficiency and increase productivity (Alam and Riyadh, 2003). Moreover, the level of competition is viewed as an indicator of the performance of a bank which is important to the depositors, clients, investors, employees, institutional actors, management and the economy as a whole (Fraser & Fraser, 1990; McCay, Frider and Hedges, 1994; Rose, 1993). Another specific element of the banking sector is that banks compete with each-other about “inputs”, deposits as fiercely as they compete for outputs, giving loans. This happens because it is the level of deposits that determines the potential for lending.

Furthermore, the literature finds that measuring the level of competition in the banking sector in developing countries is a more difficult task than in developed ones. The banking sector in these countries can often be influenced by outside forces in the decision-making process, lending and accepting deposits; the lack of well-established legal-framework; inefficiencies in providing services; the low level of credibility in the banking sector etc. (Cassimon et al., 1997). Furthermore, these countries are facing the globalization pressure that is present on all other sectors of the economy as well. However, studies have shown that a quick, not-thoroughly planned liberalization in the banking sector can lead to very negative consequences because the services market is today only as much regulated as the good's market 10 – 15 years ago (World Development Report).

The complexity of the notion of competition and its importance for the overall economic development has led to the development of different models and measures to assess its level in the banking sector. The literature offers two main approaches to this issue: (1) The Structural approach based on the Traditional Industrial Organization theory and (2) the Non-Structural approach based on the New Empirical Industrial Organization theory. The Structural approach infers the level of competition in the system through the structural organization of the market and claim that the likelihood for collusion is higher at a higher market concentration. The Non-Structural

approach does not rely on the market structure but tries to directly measure the competitive conduct of the firm. The first methodologies used under the Non-structural Approach were the construction of the Lerner Index and the Panzar-Rosse methodology, which were mainly based on the case of oligopoly and offered a static analysis. The more recent method under this approach is the Boone Indicator, which aims at assessing competition at a dynamic market, rather than a static one. Despite the fact that different researchers choose one methodology over the other, there is no clear answer to which is the most accurate measure of competition.

This paper aims at presenting some of the widely-applied methods in assessing the level of competition in the banking sector by also presenting their strengths and weaknesses. The rest of this paper is structured as follows: Section II will present some of the most important determinants of competition in the banking sector and its implications in the economy. The following section reviews the methodologies used to assess competition in the banking sector and highlights their strengths and weaknesses. The fourth section, presents some general remarks on the use of these methodologies. The final section presents a brief review of few studies conducted on the Albanian's Banking Sector.

## **Determinants and Implications of Competition**

In the last decades, the literature on competition in the banking sector has been focused on identifying the determinants of competition in countries with a developing banking system. Many of these studies have been conducted in the post 1990s Eastern European countries, Latin America and East African countries. Similar patterns and determinants have been identified in the development and competition of these countries' banking system. For instance, the introduction of foreign capital in the banking system, bank consolidation, changes in the regulatory framework and the emergence of native banks are among the common factors of the banking sector development in these countries. The wake and the aftermath of the 2008 financial crises in Europe uncovered some other determinants of competition that were not identified before. Furthermore, the implications of the banking sector's competition level in welfare enhancing, transmission of Monetary Policy and financial stability are of crucial importance in the economic development of the country.

These determinants can be classified and analyzed in four main categories (Gaertner et al. (2012): market structure, contestability, level of economic development and quality of institutional framework, bank specific conditions and the liquidity preference of banks.

## *Market Structure*

Some of the proxies used to assess the role of market structure in the competitiveness of the banking sector are banks size, banking consolidation and foreign capital penetration in the system. The measure of bank size is found to a positive but statistically not significant relation with the competition in the banking sector in East African Countries. This means that the presence of large banks may reduce the competition in the sector. These large banks are more profitable because they allow for high margins between the price and marginal cost which damages competition in the system.

## *Bank Consolidation*

It is generally believed that bank consolidation leads to a higher concentrated banking system and consequently a less competitive one. However, the existing literature does not provide clear evidence that bank consolidation leads to a less competitive market. Vives (1999) argues that a merger among banks that operate in overlapping or identical markets (segments) reduces competition but increases efficiency because it eliminates duplication of activities. Moreover, the elimination of branches restrictions and the widespread use of ATMs reduce the geographical barriers and leads to a higher banking competition despite the fact that it includes consolidation as a result of narrower margins (Yeyatier. et. al., 2003).

If based on the efficiency measures, the results are still ambiguous. In the case of mergers, competitive pressures can be reduced and managers can be less persistent in maximizing operating efficiency (Yeyatier. et. al., 2003). On the other hand, as mentioned above if mergers happen among banks that operate in overlapping market and at a small scale, competition can be boosted. Studies in US and European countries have found that mergers and acquisitions do not significantly improve profitability even when costs have been reduced (Shaffer, 1993). Additionally, several studies have found that cost scale economies, used to justify the existence of big banks and consolidation, are exhausted at relatively small size (bellow US \$10 billion in assets) (Sheldon 2001).

As in other markets, competition is expected to increase the quantity and quality of services offered by the banks and make credit available to more segments of businesses and households. Empirical studies in the US argue that the higher the degree of concentration, the larger seems to be the flow of credit to new enterprises and sectors that rely more on external financing. This fact was attributed mainly to a free riding problem in monitoring which emerges in competition and to the impossibility for a competitive bank to extract future rents from potentially successful new companies.

Two major periods of mergers and acquisitions have taken place in the EU banking sector in the last two decades for two different reasons, the fall of the communist regimes in Eastern European Countries and the financial crises in 2008. Paelowska (2014) argues that the consolidation in the 90's increased the concentration in the banking sector of these countries but did not lead to decreasing competition in the system because its effect was offset by the entry of foreign banks. This study also argues that the transfer of ownership from the public to the private sector positively impacted the competition in the sector because banks were no longer following a political agenda but were acting as independent entities in the system. On the other hand, mergers and acquisitions in the banking sector triggered by the financial crises in 2008 led to an increased role of state in the sector and several bail-outs. As a consequence, the second wave of consolidation does not offer good bases to analyze the relation between consolidation and market competition.

There is no clear answer to the relation between consolidation, concentration and competition. Additionally, the above mentioned results cannot be generalized for different countries due to the different degree of institutionalization, advancements in technology, deregulation and other country specific factors that can change the relation between these variables.

#### *Foreign capital in the banking system*

Differently from the above mentioned issues where US and European markets were the bases of many empirical studies, the banking sector in Latin America, East African Countries and Eastern European Countries provide a good bases for the studies analyzing the impact of foreign capital in competition levels. This is the case because the development of the banking sector in these countries has been based on the acquisition of local banks by foreign institutions. The underlying reason behind these acquisitions is the high credibility that the big foreign names brought to these developing countries, the lower perceived vulnerability to financial shocks, the perceived liquidity insurance from their parent banks and solid lenders of last resorts (central banks) in parent countries. All these reasons are in the context of financial crises and instability.

Claessens et al. (1998) analyzed the banking sector of 80 countries for the period 1988- 1995 and found that in developing countries, the presence of foreign banks is associated with higher net interest margins and higher profitability than domestic banks. Furthermore, foreign banks face higher overhead costs than domestic ones making them less efficient. As a result, their high margins cannot be justified by their efficiency in these markets (as it has been argued until recently). Cull et al. found that in Argentina the entry of foreign banks in the system damages the profitability of domestic banks.



Several studies in the field of banking competitiveness find that the presence of foreign banks has a negative impact in developing countries. This is mainly because these banks serve only a small sector of the economy, big corporations, while forcing SMEs into credit availability issues. World Bank (2007) argues that the presence of foreign banks has not led to a substantial improvement in access to financial services in African countries despite foreign bank presence being beneficial along other dimensions such as increasing cross-border capital flows and risk diversification. Poghosyan (2010) shows that foreign bank presence does not improve competition in emerging economies, while, Jeon et al. (2011) were only able to find a positive influence of foreign bank presence and competition in less concentrated financial systems.

### *Contestability*

A contestable market is one in which entry and exit barriers are very low and do not affect a company's decision to enter or leave the market. (Sanya et al., 2012) found that the entrance of new foreign banks did not affect competition significantly. Another approach to analyze market contestability is to look at the regulatory framework of the market. As expected more contestable markets are characterized by higher levels of competition, however it is difficult to identify the link between the regulatory barriers and competition due to other barriers. Population size and volatile macroeconomic conditions—can also be important determinants of competitive pressures in the banking system even when regulatory barriers have been eliminated (Bikker and Spierdijk, 2009).

### *Level of economic development and quality of institutional framework*

The level of economic development and quality of institutional framework has been shown to be important for the banking sector competitiveness. The measures used are the per capita income, inflation levels and property right index (used in the study for East African Countries). The per capita level of per capita income means more credit in the private sector's hands, it can be translated to higher savings in the banks which in turn increases the bank's lending capacity. Additionally, high inflation is found to decrease the competitiveness of banks because interest rates become unreliable to price financial services. Lastly, the indicator for institutional development – the property rights enforcement is positively linked to the degree of competition in the banking sector.

### **Bank specific conditions and the liquidity preference of banks**

One of the proxies for bank specific conditions, the bank lending ratio (loan-to-assets ratio), is positively linked with the competitiveness in the banking sector. A high bank lending increases competition because banks compete with one

another to offer the best rates to the most credit worthy clients (Boyd et al. 2009). However, as bank compete to attract the most creditworthy clients; their lending is only focused in a small market segment, crowding out the lower-income segments and small business. This leads to a low availability of credit to the smaller business and households which in turns damages the competitiveness of the banking sector.

As a measure for liquidity preferences of the banks, the t-bill rates are used. In line with other studies in the literature, Sanya et al., 2012 finds a negative relation between t-bill rates and competition in the banking sector which may be a result of high t-bill rates, on both lending rates and the liquidity preference of banks which consequently affects competition amongst banks.

### Implications

Competition in the banking sector is extremely important because of the central role that banks have in(1) welfare enhancing for consumers and businesses, (2) the transmission of monetary policy and (3)the maintenance of financial stability. A higher level of competition enables higher quality at lower costs which boosts welfare. Also, competition in the banking sector is important because it ensures adequate transmission of monetary policy - the speed at which policy interest rates set by central banks pass through to bank interest rates. Competition also affects financial innovations, banks' financial health, and theaccessibility of credit to which small andmedium-sized businesses and clients. For all these three factors, the relation tocompetition is represented by an inverse U-shape. Promoting competition enhances these factors up to an optimum but higher competition than the optimum level can have a counterproductive effect on these factors. For instance, if competition is very strong and excess profits start to decrease, banks will find it always harder to find buffers to protect themselves. Thus, a continuous increase in competition beyond the optimum level can be very harmful not only for the bank's financial health but for the stability of the financial system too.

**TABLE 1:** Importance of competition

Importance of Competition
Welfare enhancing
Transmission of Monetary Policy
Financial Stability



**TABLE 2:** Implications of competition

Implications
Innovation
Bank's Financial Health
Accessibility to credit

## Methodologies to measure competition

The existing literature on banking competition has developed many measurements of competitiveness that can broadly be categorized in three groups (Sanya, 2012).

1. Market Structure and Performance Indicators
2. Regulatory Indicators of formal barriers to enter the system and the formal restrictions on banks' activity.
3. Empirical measures of competition that assess the response of output to changes in input prices

As mentioned before, the second category, regulatory indicators, cannot be directly and independently assessed for their impact on competition because their implications can sometimes be compromised by other barriers like the size of the population. The following sections will focus on the mostly used market and empirical measures.

### *Structural Approach*

Structural Models have been widely used to analyze data and draw conclusions on market competition since 1930s. The Structure-Conduct- Performance paradigm, initially developed by Mason (1939) and improved by Bain (1956) explains the conduct and performance of firms in the market as a function of the structural characteristics of the market. These characteristics include variables like: the number of the companies in the market, the absolute size of these companies, their relative size, product differentiation and entry and exit barriers. These characteristics are expected to be the determinants of the firm's conduct in the market and their performance. The conduct variables that can be observed are: the pricing strategy, and strategic decision making (such as price-fixing, expenditures, decision to expand the market segments etc.). The null hypothesis of this theory

is that the higher the degree of concentration the easier it is for firms to increase their profit margins and conduct in an uncompetitive manner, like create alliances and fix prices. (Tirole 1988). The most widely used measures of concentration in the literature are the number of the firms, the concentration ratios and the Herfindahl-Hirschman index (HHI).

The first measure, the number of firms, is the easier to use because it does not require very detailed data and these data are available even in the least developed countries. However, this is a very broadly measure because the number of firms in different industries cannot indicate the same level of competition because of the industry specifics.

The second measure, the concentration ratios are also widely used because of the easily accessible data that they require. Differently from the first measures, the concentration measures include the market share of the leading firms and the overall number of firms in the market.

$$CR_m = \sum_{i=1}^m s_i$$

$s_i$  is the market share of the  $i$ -th firm, if firms are ranked in a decreasing order based on their market share. The concentration ratio  $CR_m$  approaches to 0 if the market shares are small, meaning there are a lot of equally-sized market share firms in the market, and approaches 1 if the firms taken in consideration make up almost the entire market. The most used concentration ratios are  $CR_3$ ,  $CR_5$  and  $CR_{10}$ . One of the weaknesses of these measures is that they focus only on the top big firms, undermining the distribution of the small firm and the potential event of a merger of these small firms.

The Herfindahl-Hirschman index (HHI) is the most accurate of these three concentration measures and involves more detailed and inclusive data on the market. The computation of the HHI includes the company's size distribution in the market for all of the existing companies.

$$HHI = \sum_{i=1}^N s_i^2 \quad \text{where } N \text{ is the total number of the firms in the market.}$$

The values of the HHI index range from  $1/N$  for the perfect competition case to 1 for the monopoly market. The readings of the HHI are as follows (Cetorelli, 1999):

- HHI < 0.10 → competitive market
- 0.10 < HHI < 0.18 → relatively concentrated market
- HHI > 0.18 → very concentrated market

The advantage of the HHI to the concentration ratios and firms number is that it identifies the importance of the big firms in the market through a greater weight.

Few other measures are used in the SCP theory like the bank spreads ratio and profitability ratios. Bank spreads ratio is the difference between lending and deposits rate. High levels of banks spreads usually indicate high level of inefficiencies in the system and low levels of competition. The bank profitability ratios are used to assess the market power of individual banks. High level of this ratio is an indicator of high profitability for the banks which in turns indicates a low competition level.

### *Advantages and Limitations*

The major (if not the only) advantage of these concentration measures and the indicators used in the SCP theory is the easily accessible data and the minimal level of detail that these data have. Even in the least developed countries, data like the number of banks and their market share should be easy to acquire in the national level.

However, the SCP theory and its concentration measures are limited by some theoretical and practical shortcomings. Many studies in the existing literature have questioned some of the main underlining concepts and links of this theory.

1. The SCP theory argues that a rise in concentration would lead to a fall in the level of competition through increases in prices and profitability.

Baumol et al. 1982, through the theory of contestability argues that even a concentrated market can behave in a competitive way if the market is contestable (the entry and exit barriers) because the existing firms in the market can feel the “threat” from the potential new firms.

Other theories argue that the presence of many firms does not exclude collusive actions (Berneheim and Whinston, 1990).

2. The linkage between concentration and competition, under the SCP theory runs from the “level of concentration” to “level of competitiveness”. Thus, the concentration variable is an exogenous one while the level of competition is an endogenous one.

The Efficiency Structure Hypothesis advocates the view that the structure of the market itself can be a result of differences in efficiency. (Demsetz, 1973).

Under this hypothesis, the productive efficient firms can gain more market share and lead to an increase in the level of market concentration. Thus the concentration variable becomes an endogenous one.

3. Under the SCP theory, different levels of concentration indicate different levels of competition.

However, it is not clear what these different levels of competition indicate about the conduct of the firms. As it was previously stated, the conduct

variables include: the pricing strategy, and strategic decision making (such as price-fixing, expenditures, decision to expand the market segments etc.) and it is not possible to determine how these variables vary based on the level of competition in the market.

4. The practical approach of the SCP theory is problematic because it does not provide clear bases for market identification. And even if it did, the market identification would still remain as an issue.

Shaffer (2004) argues that geographical and product market can be very difficult to determine. The geographical market can differ depending on the bank activities, the number of firms the bank works with, the segment differentiation, whether they operate in international markets or not, etc. As a result, different banks can be overlapping in some markets but can be absent in some others. With regard to developing countries, concentration indicators can only be calculated in the national level which might compromise on the relevance on the indicators' readings.

## Regulations in Banking Sector

The SCP theory and the concentration indicators are the most widely used method of assessing market concentration mainly due to the easily accessible data and the ease of calculation. However, as the banking sector is increasingly more regulated than before, a new series of studies have focused their attention on the implications of increasing regulations in the sector. Undoubt, the banking sector is the most regulated one. The theory of contestable markets is developed on the hypothesis that the entry and exit barriers of the market have a significant effect on the competition level. A level of contestability is linked with a high level of competition in the market. This theory is the first one in the field that includes not only the existing players but also the other potential firms or banks that might potentially enter the market in the future as well as taking in consideration potential exits.

The entry and exit barriers include formal and informal barriers. Among the formal ones, the financial regulations are the most significant. A series of studies (Claessens, 2009; Demirgüç-Kunt and Peria, 2010) suggest that banking regulations should be included in the assessment of market contestability in the case of the banking sector. Other studies, suggest that entry requirements for domestic and foreign banks, capital requirements and other regulations affecting the bank activity should be considered in the assessment.

Some shortcomings to this approach are: the omission of non-regulatory barriers such as technical and information barriers, the omission of sunk costs, the

disregard of the presence or absence of economies of scale, the presence or absence of networks (Dietsch, 1992).

### *Non – Structural Approach*

The structural models were widely used until the emergence of a new approach to assessing competition, the non-structural models. These models avoid many of the shortcomings of the structural models because they assess the competition in the market through observing the conduct itself, without considering the market structure or the market concentration. Another advantage of these models is that they are not only limited at identifying the nature of competition in the market but they measure it and offer benchmarks to enable comparison. The most widely used measures of competition under the non-structural models approach are the Lerner Index, the Panzar – Rose Methodology and the Boone Indicator.

### *Lerner Index*

The Lerner Index (LI) is widely used in empirical research as a measure of market power. LI measures the bank's market power by assessing the pricing power of the bank. If the price margins, which is the difference between the price and the marginal cost, the market power is deemed to be high. If the price margin is approximately 0, the price meets the marginal cost, the market power is low and the market is competitive. The index calculation is as follows:

$$\text{Lerner}_{it} = (P_{it} - MC_{it})/P_{it}$$

where the index  $i$  denotes the bank, index  $t$  denotes the year, price  $P_{it}$  denotes the ratio of the total revenues to total costs of the bank and  $MC_{it}$  denotes the marginal cost of the bank  $i$  at time  $t$ . The values of the index vary from 0 to 1, where the higher the value the higher the market power of the bank.

### *Advantages and Limitations*

The Lerner Index is the most used measure to assess the competitive behavior of the banks (companies) in the market due to some advantages that it offers. The first advantage of the Lerner Index is that it is simple and straight-forward to interpret. Secondly, it is a yearly measure of the competitiveness of the bank based on the pricing behavior and it enables yearly comparisons for the market analysts and the bank itself. Thirdly, the indicator is very flexible because it does not depend on defining a relevant market and keeping it as a constant variable. Thus, it allows the separate measures of market power both regionally or product wise.

However, the Lerner Index suffers from both theoretical and practical shortcomings. The Lerner Index is in itself a pricing market power not a measure for competition. The main assumption of the interpretation of the index's values is that as the price margins increase the competition in the market decreases. Some recent studies (Bulow and Klemperer, 2002) in the literature show that there might be cases in which price margins increase with increasing competition in the market. Also, other studies (Boone 2008, Boone et.al 2013) show that Lerner Index values might move in the opposite direction that they are expected to due to the effect of allocation in the market. In terms of practical considerations, Oliver et al. (2006) argues that if the Lerner Index does not account for the bank's risk taking behavior it can overestimate market power because the risk-taking banks tend to have higher price-cost margins. Additionally, Koetter et al. (2012) states that Lerner Index assumes perfect technical and allocative efficiency which leads to constant or predictable operating costs and efficiency. However, this is not the case because the operating expenses and allocation efficiency vary on the banking environment.

### *Panzar-Rose Methodology*

The Panzar- Rose Model (PR model) is the most used assessment of competition in the banking sector, overruling also the structural models. This indicator captures the link between the input prices and the company's revenue. Lower values of the indicator denote low levels of competition and high market power, while high levels of the indicator denote high levels of competition and low market power. The rationale of this model is based on the reaction of a change in price following an increase in cost depending on the elasticity of demand. For instance, in the case of a monopoly, the marginal cost equals marginal revenue, thus an increase in marginal cost would require an increase in marginal revenue. This increase in marginal revenue can be achieved by decreasing the quantity of the production. If the price-elasticity of demand is higher than one, the price increase does not compensate for the loss incurred by the down-sizing of production. In case of a perfect competition, a 1percent change in costs should be translated to a 1 percent change in price. The higher the rate of transmission of changes in costs to the changes in price, the more competitive the market is.

The PR model indicator (H) assesses the competitive nature of the market by calculating the sum of the elasticities of revenue with respect to input prices. With regard to the banking sector, the PR methodology assesses the link between the revenues and the related costs. The simplified revenue function that can be used is:

$$R_{it} = F(W_{it}, O_{it})$$



$i$ : denotes the bank,  $t$ : denotes time (year),  $R_{it}$ : denotes the bank revenues at time  $t$ .  $W_{it}$ : denotes cost variables at time  $t$ ,  $O_{it}$ : denotes other specific factors for the bank at time  $t$ . The respective mathematical representation of the revenue equation using the logarithmic levels is:

$$\ln R_{it} = a + \sum_{m=1}^M b_m \ln W_{itm} + \sum_{n=1}^N c_n \ln O_{in} + e_{it}$$

$i$ ,  $t$ : denotes the bank and time;  $M, N$ : the number of input prices and other variables;  $m, n$ : denote  $M, N$ ;  $a$ : constant,  $b_m$ : the coefficient of the input price;  $c_n$ : coefficient of the “the other” variable;  $e_{it}$ : error term. The mathematical representation of the  $H$ - statistics:

$$H = \sum_{m=1}^M b_m$$

$H=1$  indicates that the market is in a perfect competition. This represents the long –term equilibrium for the banking sector, where an increase in the input prices leads to an increase in marginal and average costs and the demand adjusts in the long term so that the revenue change by the same amount.  $H \leq 0$  indicates a monopoly in the market. The change in input prices is not transmitted accordingly (if at all) to the revenues.  $0 < H < 1$  indicates a competitive monopoly market. Input prices and revenue change is in the same direction but at a ratio lower than 1.

### *Advantages and Limitations*

The PR model is one of the most successful and widely used measures of competition in the market because of the simplicity of interpretation, the easily accessible data requirement, the independency from the market (because it only focuses in the company itself) and can be used in both developing and developed markets (Claessens and Laeven, 2004). Independently from the success of this methodology, the PR methodology suffers from some limitations, mainly regarding the interpretation of the  $H$  statistic. According to the methodology, a value of  $H=1$  indicates a perfect competition, while a value of  $H=0$  indicates a monopoly. Nonetheless, several studies have shown that a negative  $H$ -statistics can be obtained even in a highly competitive market (Shaffer, 1983), or in the case of constant cost (Bikker et al., 2010). The existing literature also points out some other limitations of the usage of the  $H$ -statistics because of its mathematical derivation (Shaffer, 1983).

### *Boone Indicator*

In a recent study, Boone (2008) has introduced a new measure of competition based on assessing the conduct of the firm itself. The main hypothesis is that in

a more competitive market, firms incur higher losses if they are inefficient. The efficiency hypothesis (Demsetz 1973) argues that more efficient firms perform better and achieve higher profits at the expense of the less efficient companies. This reallocation effect is assessed by the Boone Indicator. Boone (2008) argues that in extreme cases the re-allocation is also combined with a selection process where less efficient firms are forced to exit the market.

As the level of competition increases, the output of the companies decreases. However, the output of more efficient firms decreases less than the output of less efficient ones. An increasing level of competition leads to increasing market share and profits for the efficient firms and decreasing profits for the inefficient ones. Thus, the profit difference between the efficient and inefficient firms can be an indicator of competition according to Bone (2008). The more negative the Boone Indicator is the more competitive the market is. The mathematical representation of the Boone Indicator is:

$$\ln \pi_i = \sum_{k=0}^n \alpha + \beta \ln c_i + \varepsilon_i$$

$\pi_i$  denotes the profit;  $c_i$  denotes the costs;  $\beta$  denotes the profit elasticity, which is the percentage change in profits for the bank given a percentage change in the costs of the bank.

### *Advantages and Limitations*

Although a recently introduced measure of competitiveness, the Boone Indicator has been used in several studies. Its main advantage is the assessment of the continuous and monotonic relation between cost and profit. This makes the measure easier to read than the H-statistics from the PR model.

One of the main limitations of the Boone Indicator is that it only takes into consideration the relation between the cost and profit and disregards other conditions than can affect the relation and yield not-expected values of Boone Indicator.

### **General Remarks**

The competition in the banking sector is crucial for the economic growth and development of a country. For this reason, the assessment of competition in the banking sector has attracted always more interest and the existing literature is continuously enriched with new studies and finds in the field. There are two main

approaches to measuring the competition in the market: the structural approach and the non-structural approach.

The structural approach aims to determine the level of competition in the market by looking at the market structure and through indicators like: number of firms, concentration ratios and the Herfindahl-Hirschman index (HHI). According to this approach a higher level of concentration indicates a low level of competition in the market.

On the other hand, the non-structural approach aims to assess the competition in the market through observing the conduct of the firms in the market. Three of the most used measures of competition under the non-structural approach are: The Lerner Index, the Panzar-Rosse Methodology and the Boone Indicator. They offer three different ways to measure the competition in the market by observing the firms' behavior in three different areas. The Lerner index more than an indicator for the level of competition, is an indicator for the firm's pricing power. The Panzar-Rosse model analyzes the transmission of a change in input prices to bank revenue. The Boone Indicator is developed upon the assumption that at an increasing level of competition the more efficient firms will increase their revenues while the less efficient ones will incur some losses. This relative profit is the measure of the Boone Indicator for assessing the competition in the market.

All of the above mentioned methods and indicators have their advantages and suffer from theoretical and practical shortcomings. Thus, no perfect measure of competition has been established.

## **Competition in the Albanian Banking system**

Similar to other post-communist countries, the Albanian banking market changed significantly after the fall of communism in 1991. Independently from the problems encountered during the first period of transition, the CEE countries were determined to develop competitive and efficient financial systems based on the market forces. In 1992, the Albanian banking system was split in two levels: The Central Bank of Albania (the first level) and the commercial banks would constitute the second level of the system. The Albanian banking market opened up to private investors within the first years after the fall of communism. On the hand, the privatization of the market was a long process that lasted until 2003, when the market was 100% privately owned. The development of the banking sector was also strongly signald by the presence of internationally-recognized banks like Raiffeisen Bank, Intesa Sanpaolo Bank. Piraeus Bank etc. Furthermore, the banking market growth led to new products, new local bank branches and an improved service quality. In 2009, the foreign capital of the Albanian banking

system was 93% of the total and was the second highest (after Estonia) in the CEE countries. Initially, the entrance of new international banks in the system might have had a positive impact on competition however this effect has not been proportional in the following years (Kraft 2004).

The literature on the competition in the Albanian Banking sector is focused in the last decades and mainly after 2003. In line with the methodologies presented in the previous section Note (2006) presents an analysis and outlook on the level of competition in the Albanian banking system for the period 1999-2006, using both structural and non-structural methodology. Note (2006) employs the competition measures to study the competition in the system as a whole and separately in assets, loans and deposits. According to this study, the Albanian banking system is a highly concentrated one both in terms of assets and deposits. (Note 2006) uses three structural indicators to measure the level of competition: CR3, CR5 and HHI.

**FIGURE 1:** Concentration Measures for the Albanian Banking Sector for the period 1999-2006

Concentration Indexes		1999	2000	2001	2002	2003	2004	2005	2006
Assets	CR3	86	80	75	72	70	69	64	62
	CR5	92	89	87	86	85	83	78	76
	HHI	4795	4382	3757	3226	3016	2736	2110	1949
Loans	CR3	90	78	69	62	54	46	43	43
	CR5	95	91	86	83	79	69	63	64
	HHI	3316	2727	2011	1729	1459	1150	1035	1035
Deposits	CR3	89	84	80	77	75	73	68	65
	CR5	95	92	90	88	87	85	81	79
	HHI	5719	4966	4282	3676	3487	3107	2391	2105

The concentration level as indicated by these measures shows a decreasing trend for the period 1999-2006. The US Department of Justice has established the benchmarks for the interpretation of the HHI index:

HHI < 1'000 → competitive

1'000 < HHI < 1'800 → moderately concentrated

HHI > 1'800 → highly concentrated

Based on these readings, the assets and deposits in the Albanian banking system appear to be highly concentrated, while lending is at a moderately concentrated level, which means almost fair competition. Furthermore, these concentration

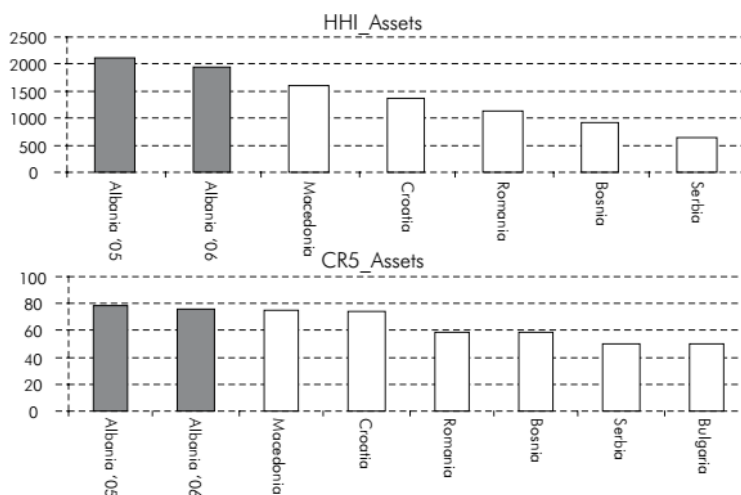
measures indicate that the high concentration in deposits and assets is not associated with high concentration in lending, in other word, the banks that own the largest share of deposits and assets in the market are not the ones that are mostly engaged in the lending activity. This means that banks have not used all their deposits' lending capacity but have created extra cushions in case of a bad scenario for the system and other banks with low levels of deposits have funded the lending activity by their capital. However, the concentration in the lending section cannot improve significantly if the concentration level in the deposits segment does not decrease. Banks cannot fund lending with capital indefinitely, thus deposits play a crucial role in this. However, it is important to note that these readings of the indexes might be arbitrarily because a many studies have questioned the negative link between competition and concentration in the market. Thus, the inferred information needs to be supported by another methodology, the non-structural approach to measuring competition.

The PR methodology, also presented above, is used (Note, 2006) to measure the level of competition through the h-statistics.<sup>1</sup> The Albanian banking market is characterized by an average H-statistic of 0.5442, which indicates a monopolistic market. "This implies that banks in Albania are differentiating; they focus on different market segments and/or provide products with different characteristics. Based on these results, the competition in the Albanian banking system is at average levels, acceptable for the development stage of Albania, and not low, as implied by the market concentration indices" (Note 2006). Thus, it is important to note that the level of competition of the Albanian Banking market is higher according to the PR methodology than to the structural one (CR3, CR5 and HHI indicators). This suggests that the relation between the level of concentration and competition in the market is not that significant or straightforward.

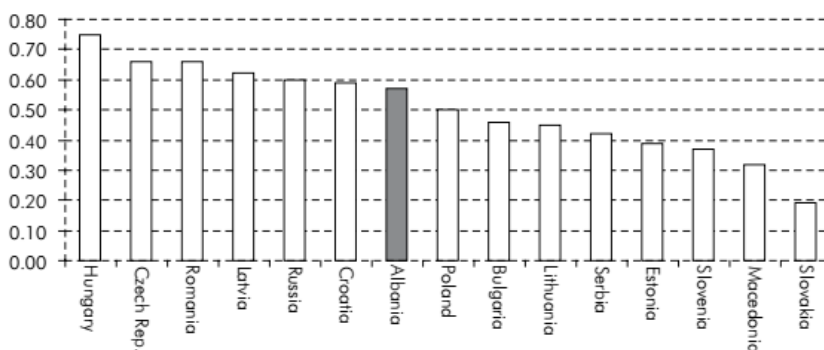
In comparison with the level of competition in the banking market of other countries, Albania is more concentrated than most of the others but it is characterized by a higher level of competition than many of them. The high concentration in the system can be attributed to the short development period of the banking sector in Albania, similar to the concentration level of other East-European Countries. Based on the CR5 and HHI indicators, Albanian banking system has the highest concentration level in the region (considering Macedonia, Croatia, Romania, Bosnia and Serbia. According to the CR5 indicator, the level of concentration was only lower than Finland, Netherlands and Belgium. However, based on the H-statistics values, Albania performs better than most of them (with the exception of USA, Japan, Denmark and Spain). This suggests that even though the market is concentrated it is characterized by a high level of competition. Furthermore, as argued above the optimal level of competition in the banking sector differs for

<sup>1</sup>  $H_0$ :  $H=0$  indicates a monopoly market,  $H1$ :  $H=1$  indicates perfect competition.

**FIGURE 2:** Comparison of HHI and CR5 on assets for Albania and other SEE countries



**FIGURE 3:** H-statistics for Albania and some of the CEE and SEE countries



different countries based on its economic development and other country specific factors. A high level of concentration can be beneficial for a country with a short banking system development period like Albania as long as it increases efficiency and stability but does not negatively affect the competition among banks.

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