RELATIONSHIP BETWEEN MARKET STRUCTURE AND STABILITY IN THE BANKING INDUSTRY

Abstract
Market concentration and competition are arguably, especially in last decade, one of “hotly debated topic” in banking and financial industry. Their importance is clearly visible on financial stability. Financial stability is important issue because of influence on the real economy and potentially large government costs. Topic importance is obviously seen in bank restructuring and consolidation, peculiarly when global financial crises begun. Explanation of these correlations and multilateral effects are resulted in the existence of numerous theories and many researches in that area. Between policy makers and academics there is still discussion about how bank competition and concentration with regulatory framework, which is given from state, influence on financial stability. This paper reviews the importance of market structure for financial stability according to competition policy, regulatory environment, “too-big-to-fail-institutions”, etc. Therefore, this paper exhaustively gives concentration and competition measures as well as causes for further investigation of financial stability. All mentioned are “conditio sine qua non” for the development of the banking industry.

Keywords
banking industry, bank concentration, bank competition, financial stability

1. Introduction

During the last decades, there is no banking industry in the world, which has not experienced a transition period as a consequence of deregulation, improvement in information technology, expansive globalization and changes in economic environment. Impacts of that changes were clearly observable in number of banks and bank branches, used technologies, quality of human resources and the scope of banking operations as well as regulatory frame and institutional structure of the banking industry. According to mentioned changes, market concentration and competition with repercussions on financial stability is one of most attractive theme for economic researchers and practioners especially when global financial crises in 2007 begun.

The shock of the global financial crises has scientifics wondering about the future of banking industry. Given the wave of consolidation witnessed over the past decades and the recent pressure to limit and penalize the size of banks tagged “too-big-to-fail”, it has never been more important than for resurrection of the age-old structure-conduct-performance. All that

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reforms aimed to enhance both the productivity and efficiency and the degree of competition of banking markets as a way of improving overall operational performance of the financial services sector specially because problems in the functioning of the banking sector can have an impact on macroeconomic (inflation and capital markets) and microeconomic effects (functioning of the payment system and development of financial markets and brokerage functions) what in overall implies on financial stability at all. Consequences of vulnerable periods are affected on all level of bank business especially on capital adequacy. Sufficient capital adequacy has allowed banks to sustain their growth and to feel practically no or little bit pressure from regulators on capital adequacy what was obvious on satisfaction of Basel III requirements. Yet the gap between banks has also been disappearing, as banks have boosted their capital positions significantly following the financial crisis. So this effects dominantly on financial stability not even on banks thus overall financial system and economy at all.

All mentioned provides an ambiguous answer to the question how bank competition, bank concentration and financial stability are related. On the one hand competition reduces the market power of banks, which reduces the discounted value of the future bank profits. This enhances the incentives for banks to take more risk, because the opportunity costs of going bankrupt are lower. On the other hand, market power in the loan market allows banks to charge higher interest rates what increases adverse selection and moral hazard. Main consequences of that is increases in the probability of banks failure what implies on financial stability and economy in whole. Many theoretical papers have attempted to explain the ambiguous consequences of concentration and competition on access to credit, cost and quality of financial services, innovation, the stability of financial systems, and thus economic development. It is well known that banking sector have to be competitive and efficient, but same importance has stability.

The paper is organized as follows. After introduction, Section 2 presents theoretical background of literature on concentration in the banking sector, and their main measures. Section 3 gives overview and measures of competition in the banking industry. Analysis of banking industries in selected countries is investigated in Section 4. Section 5 discusses on main characteristics and relations between market concentration and competition as well as financial stability. At the end, Section 6 concludes the article.

2. Significance of concentration in the banking industry

Most commonly market structure is deferred to the degree of market concentration, i.e. the number of companies and their market shares. Indicators of market concentration seek to identify how the product is allocated between the different companies. In accordance with the neoclassical theory, the greater the number of firms in the market the more likely it is that there are smaller differences in company size and a higher degree of competitiveness (Škuflić, Galetić and Gregurić, 2011). For investigation of behaviour of the banking market we can use structural and non-structural approaches. Structural approaches are mainly based on the traditional industrial organization theory which focuses on the structure-conduct performance (SCP) paradigm and on the efficient structure paradigm. Literature based on structural approaches has investigated how the market concentration weakens the
market competition by fostering collusive behaviour among firms. Conversely, non-structural approaches assume that factors other than market structure and concentration may affect competitive behaviour, such as entry/exit barriers and the general contestability of the market.

The analysis of market concentration in the banking sector typically branches off into two directions in the literature. One direction is a structural approach based on the so-called SCP paradigm, the hypothesis on market efficiency and a range of other formal approaches in the theory of industrial organization. The SCP paradigm analyses whether a higher level of market power concentration leads to tougher competition between large banks and better overall market performance for clients (primarily through lower interest rates). This paradigm highlights the theoretical relationship between the structure (concentration levels), behaviour (competition) and performance (for example, profitability of banks). The SCP theory predicts that profits and output prices would be higher the greater the level of concentration in a given market. This is due to the greater ease of collusion in a more concentrated market. When applied to the banking industry it predicts that profits, interest rates on each type of loan and services charges would be higher in a more concentrated market. On the other hand deposit rates offered would vary inversely with concentration (Gilbert 1984). Hall and Tideman (1967) argue that a good concentration index should satisfy a number of key criteria:

1. Concentration should be a one dimensional measure;
2. Concentration in an industry should be independent of the size of that industry;
3. Concentration should increase if the market share of any firm is increased at the expense of a smaller firm;
4. If each firm in a given industry is divided into two firms of equal size then the concentration index should be reduced by one-half;
5. When an industry is divided into N equal sized firms, a measure of competition should be a decreasing function of N;
6. A concentration measure should have a range of zero to one (while this property is not strictly necessary, it makes the measure easier to interpret).

Non-structural approaches have been developed in the context of the new empirical industrial organization (NEIO) literature. This study is based on structural approaches expecting to uncover the advantage of enhancing banks operational efficiency against bank concentration. The next section presents basic arguments of structure conduct performance hypothesis (SCH) and efficient structure hypothesis (ESH), application in banking industry and their findings. The SCP framework has been widely used in the literature to examine market structures. However, it does not account for other factors which influence firms’ profitability and concentrations. Further, SCP studies ignore the long-run equilibrium in the market. Therefore, the evidence from market concentration studies may be insufficient to support firm conclusions about the relationship between market behaviour and competition (Seelanatha, 2010). Market shares are the basis for determining concentration indicators, which are briefly described below.

If there are \( n \) companies in some industry whose aggregate production is \( Q \), where \( q_i \) is the amount of production of each firm \((i = 1,2,3 \ldots n)\), the following applies:
\[
Q = \sum_{i=1}^{n} q_i \quad (2.1.)
\]

The share of production of a company is obtained as
\[
s_i = \frac{q_i}{Q} \quad (2.2.)
\]

**Concentration index** is calculated as
\[
S_i = 100 \cdot s_i = 100 \cdot \frac{q_i}{Q} \quad (2.3.)
\]

Concentration index varies between 0, in case of a perfectly competitive market, and 100 in the case of monopoly (0 ≤ S_i ≤ 100). It is also the proportion of enterprises in the entire market, and thus this indicator is sometimes referred to as market share. This indicator is most often applied in a form of **concentration ratio**, which shows the percentage (share) of the four largest firms, and is calculated as:
\[
CR_4 = \sum_{i=1}^{4} S_i \quad (2.4.)
\]

The drawback of this indicator is that it only takes into account the share of the four largest firms, and will be the same for the industry where the top four companies each have a 20% share and the industry in which out of the four largest companies, one company has 65%, while the other three have 5% share, although the degree of concentration of these markets is not equal. This indicator linearly measures the proportion of each company, and makes no distinction between different sizes of firms. Likewise, criticism related to this indicator are reduced to an arbitrary choice of the number of enterprises, where according to some economists the index takes the four largest firms, according to others five, seven or eight. Uneven choice of the number of businesses will certainly give different information on concentration in particular industries.

**Herfindahl-Hirschman index** is another indicator of concentration, and is calculated as the sum of squared market shares according to the formula:
\[
HHI = \sum_{i=1}^{n} S_i^2 \quad (2.5.)
\]

Comparing to concentration index, this is a better indicator because it gives greater weight to bigger companies and smaller weight to smaller companies, so the picture of concentration of an industry is more realistic.

Although the absolute level of HHI can provide a first insight into the pressures on the market after the implementation of concentration, the change in index (called the "delta") is a useful surrogate measure of changes in concentration occurred as a direct result of concentration. In the European Regulation on the control of concentrations 139/2004 HHI is mentioned as a measure for concentration, where below a certain level there is no negative effects of mergers and strengthening of concentration. The market with HHI below 1000 is considered non-concentrated, while for the markets which have HHI between 1000 and
2000 (delta is less than 150), there is no concern that there will be adverse effects on competition (Škuflić, Galetić and Gregurić, 2011).

Tideman-Hall concentration index (HTI), in contrast to Herfindahl-Hirschman index, emphasizes the importance of the absolute number of companies when calculating concentration. Specifically, HHI is also dependent on the relative number of enterprises, and is growing very rapidly only with a change in market share, but not with the entry of new small firms in the industry (Foldvary, 2011). The advantage of the inclusion of the absolute number of firms in the calculation is that this number can express the entry of a new company in the industry, and it is assumed that the market entry is easier if there are already a number of companies operating in that market. HTI is calculated using the formula:

$$HTI = \frac{1}{2 \sum_{i=1}^{n} i \cdot s_i - 1} \quad (2.6.)$$

where the market share of each company is multiplied with the corresponding rank. HTI value ranges from $1/n$ to 1, where values close to 0 indicate perfect competition, while the other extreme, a monopoly, takes the value 1 (Foldvary, 2006).

Rosenbluth index (RI) is very similar in shape to Hall-Tideman index. They differ only by ranking companies. Specifically, the Rosenbluth index gives smaller companies higher rank, so it has more influence on the indicator itself than on the large firm. It is calculated using the formula:

$$RI = \frac{1}{2 \sum_{j=1}^{n} j \cdot s_j - 1} \quad (2.7.)$$

The assumption is that companies are sorted from the smallest to largest, in contrast to the previous indicator. From this it follows that RI gives great importance to small businesses. Similar to HHI, the value ranges from $1/n$ and 1, where 1 denotes a monopoly on the market, and value close to 0 indicates a perfectly competitive market (Moschandreas, 2000).

Comprehensive Concentration Index - CCI was designed as a combination of two types of indicators, and at the same time it shows the relative dispersion between firms, but also the absolute number of firms. It is calculated by adding the market share of the largest company to the aggregate index that covers the reminder of firms in the industry. The formula for calculating is the following:

$$CCI = s_1 + \sum_{i=1}^{n} s_i^2 (2 - s_i) \times 100 \quad (2.8.)$$

The share of the largest companies is set aside from the calculation, but is later on added to the sum which indicates concentration of the rest of the industry. CCI index ranges from 0 to 100, and gives a value of 0 for perfect competition, and 100 for monopoly (Moschandreas, 2000).
Hause index \((H)\) is an indicator of concentration dependent on the parameter which indicates the degree of collusion or agreement between the enterprises. In actual circumstances, it is difficult to prove that the companies secretly collaborate for illicit goals, but it is still necessary to choose several parameters in order to cover this case as well. The index is calculated using the formula:

\[
H = \sum_{i=1}^{n} s_i^{2-(\alpha(\mu_i - \bar{\mu}))^2} \tag{2.9.}
\]

where the parameter \(\alpha\) indicates the degree of collusion between the companies. Parameter values are inversely related to the degree of collusion, so the smallest parameter \(\alpha = 0.25\) indicates the industry with high degree of tacit bargaining. The index \(H\) is equal to 0 for perfect competition, while in the case of monopoly it is equal to 1. An important implication of involving collusion in the calculation is that in the case of tacit cooperation between firms, a new firm entering the market does not result in a significant increase in competition in the market.

Hannah and Key (1977) in their book have suggested another indicator of concentration which is very similar to HHI, but with a difference in the weights assigned to large firms.

The formula for calculating is the following:

\[
HKI = \left( \sum_{i=1}^{n} s_i^{\alpha} \right)^{\frac{1}{1-\alpha}} , \quad \alpha > 0, a \neq 1 \tag{2.10.}
\]

where a change of the parameter \(\alpha\) denotes various levels of criteria which are met by the parameter. Where \(\alpha > 0\) and \(\alpha\) is different from 1, it represents an arbitrarily set elasticity parameter. For example, lower values of \(\alpha\) emphasize the impact of small businesses, while larger values take more into account the impact of large enterprises on concentration. Most commonly used values for \(\alpha\) are: 0.005, 0.25, 5 and 10. As HKI is very sensitive to the determination of parameter \(\alpha\), the index value at low \(\alpha\) will move like the number of companies in the market, and will be approximately equal. The result of the HKI index with these parameter values should be taken with caution, as in the case of reducing the number of firms the value of the index will reduce as well, but this does not necessarily mean a decrease in concentration of the market.

Entropy is an inverse measure of concentration and it gives weights to the market shares using the logarithms and then summarizes them (Jacquenim and de Jong, 1977). The formula is:

\[
E = \sum_{i=1}^{n} s_i \ln \left( \frac{1}{s_i} \right) \tag{2.11.}
\]

This index takes the value 0 in conditions of monopoly because \(\ln n = 0\), and \(n\) is 1 for monopoly. On the other hand, its value in conditions of perfect competition is \(\ln n\). Here it is possible, instead of the natural logarithm, to use other types of logarithms, but in this case the maximum value that indicator can achieve changes as well.
While highly concentrated markets do not necessarily imply lack of competitive behavior, it is generally agreed that market concentration is one of the most important determinants of competitiveness (Nathan and Neavel, 1989). For banking sector, the relationship between market concentration and competitiveness has been examined in detail for many countries and the results indicated that a high concentration tends to reduce competitiveness (Gilbert, 1984). Sutton (2008) relates market structure to the number and size distribution of firms in a market. However, it is especially the interaction of suppliers and buyers that is important, because this interaction determines the price and quantity sold in a certain market.

3. Review of competition in the banking industry

Economists have not agreed so far about what competitiveness is and this term means different things to different people. Some may consider company competitiveness while others stress national competitiveness. Due to the different levels of definitions and different approaches to the same problem, these scientific debates have inevitably been confused so often. Sometimes competitiveness is associated with rivalry, sometimes with growth, position improvements in the business world, positive and better financial results, etc (Škuflić and Štoković, 2004). From a static view, competition is seen as an important force for firms to operate and produce at the frontier. Those firms operating within the production frontier will do their level best to be located on the frontier while those firms on the frontier will engage in more advanced innovation and technology to remain on the frontier (Berger et al. 1999). Otherwise, restructuring in the banking industry will stimulate those firms operating inefficiently to shift to the frontier. Banks that are not allocating their resources efficiently will perish unless they increase their efficiency by producing more outputs using existing inputs. On the other hand, consolidation also leads to increased concentration, which in turn leads to negative consequences on the consumer’s welfare. Therefore, it is important to develop a conceptual framework of the nexus between efficiency and competition in banking.

The intuition behind the market power (MP) theory contains two hypotheses: Under the structure conduct-performance hypothesis (SCP), more concentrated markets lead to increased interest rate spreads as a result of market collusion and other imperfections. Under the relative-market-power hypothesis (RMP), on the other hand, banks with strong market shares may capture market power from product differentiation, which allow them to set advantageous deposit and loan rates. While subtle, these theories differ in the fact that RMP hypothesis suggests that only the largest banks will benefit from increased consolidation, while the SCP hypothesis suggests that all banks will benefit–regardless of market share or size (Skorep, 2011, p. 3).

Typical empirical studies of bank concentration and competition as of the early 1990s found that U.S. banks in more concentrated local markets, as measured by HHI or CRn, charge higher rates on small and medium enterprise loans and pay lower rates on retail deposits (e.g., Berger and Hannan 1989, Hannan 1991), and that their deposit rates are slow to respond to changes in open-market interest rates (e.g., Hannan and Berger 1991, Neumark and Sharpe 1992). Both findings are consistent with the exercise of market power under the SCP hypothesis. However, another common finding in both the banking literature and the
general industrial organization literature was that these concentration measures had only very weak relationships with measures of profitability when the market share of the firm was also included in the regression equation. A debate ensued as to whether the results support the exercise of market power versus the alternative efficient structure (ES) hypothesis, in which high concentration endogenously reflects the market share gains of efficient firms (e.g., Smirlock, Gilligan, and Marshall 1984, Rhoades 1985, Smirlock 1985, Shepherd 1986). A more general problem of endogeneity in SCP tests was discussed by Bresnahan (1989) and others in which prices, profitability, and concentration are all jointly endogenous.

Competition can drive banks to reduce their lending costs to borrowers and so increase demand for bank funds to support business and growth. This view has been supported by evidence identified by Angelini et al. (1998) and D’Auria et al. (1999) in their study of Italian banks for their lending costs to Italian corporate borrowers, by Berlin and Mester (1999) that found a negative association between competition and the cost of finance, and by Beck et al (2004) for more concentration or market power in banking sectors that increases financial obstacles to smaller firms in accessing finance for their growth. Competition of the banking sector implies lower interest rates what goes to higher competition of real economy. According to that increase and decrease of interest rates is one of preconditions for financial stability.

Because of the shortcomings of profit as an indicator of competition the traditional industrial organization literature offers a broad array of indicators that measure concentration in way to explain competition. Nevertheless, the paradigm of perfect competition, with prices equalling marginal costs and zero economic profits in the long-run, is almost non-observable in reality. Instead, firms tend to have some degree of market power, i.e., they are able to set and sustain positive mark-ups. Therefore, competition measures are important policy indicators. The new competition measure suggested by Boone (2008) is particularly suited to assess competition in a context of reallocation of resources in the economy. Boone’s model is based on the notion, first, that more efficient firms (that is, firms with lower marginal costs) gain higher market shares or profits and, second, that this effect is stronger the heavier the competition in that market is. Boone develops a broad set of theoretical models (see Boone, 2000, 2001, 2004 and 2008, Boone et al., 2004, and CPB, 2000). Following Boone et al. (2004), and replacing “firms” by “banks”, they consider a banking industry where each bank produces one product $q_i$ (or portfolio of banking products). The bank faces a linear demand curve of the form:

$$ p(q_i, q_{j\neq i}) = a - b q_i - d \sum_{j \neq i} q_j $$  \hspace{1cm} (3.1.)

and has constant marginal costs $mc_i$. It maximizes profits $\pi_i = (p_i - mc_i)q_i$ by choosing the optimal output level $q_i$. Boone et al. assume that $a > mc_i$ and $0 < d \leq b$. The first-order condition for a Cournot-Nash equilibrium can then be written as:

$$ a - 2 bq_i - d \sum_{j \neq i} q_j - mc_i = 0 $$  \hspace{1cm} (3.2.)

When $N$ banks produce positive output levels, Boone et al. solve the $N$ first-order conditions (3.2.), yielding:
Boone et al. define profits $\pi_i$ as variable profits excluding entry costs $\varepsilon$. Hence, a bank enters the industry if, and only if, $\pi_i \geq \varepsilon$ in equilibrium. Note that Equation (3.3.) provides a relationship between output and marginal costs. It follows from $\pi_i = (p_i - mc_i)q_i$ that profits depend on marginal costs in a quadratic way.

In this market, competition can increase in two ways. First, competition increases when the produced (portfolios of) services of the various banks become closer substitutes, that is, $d$ increases (keeping $d$ below $b$). Second, competition increases when entry costs $\varepsilon$ decline. Boone et al. (2004) prove that market shares of more efficient banks (that is, with lower marginal costs $c$) increase both under regimes of stronger substitution and amid lower entry costs. Equation (3.3.) supports the use of the following model for market share, defined as

$$s_i = q_i / \sum_j q_j; \ln s_i = \alpha + \beta \ln mc_i \quad (3.4)$$

The market shares of banks with lower marginal costs are expected to increase, so that $\beta$ is negative. The stronger competition is, the stronger this effect will be, and the larger, in absolute terms, this (negative) value of $\beta$. The $\beta$ parameter is the Boone indicator. For empirical reasons, Equation (3.4.) has been specified in log-linear terms in order to deal with heteroskedasticity. Moreover, this specification implies that $\beta$ is an elasticity, which facilitates easy interpretation, particularly across equations. The choice of functional form is not essential, as the log-linear form is just an approximation of the pure linear form.

The Lerner index of monopoly power is a nonstructural indicator of the degree of market competition developed in the context of industrial economics. The computation of the index, which provides measures of competition at the firm level, allows the investigation of the causality between efficiency and competition at the firm level to be carried out. The Lerner index has been computed in several empirical studies on banking competition (e.g., Angelini and Cetorelli 2003; Maudos and Fernández de Guevara 2007; Fernández de Guevara et al. 2005.). It is defined as the difference between price (calculated as the ratio of total costs to total assets) and marginal cost (expressed as a percentage of prices) divided by price. The Lerner index measures the degree to which firms can mark up output prices over the marginal cost of production. It can be approximated empirically using the translog functional form with three inputs and a single bank output (Shaffer 1993; and Berg and Kim 1994). It is assumed that the flow of goods and services by banks is proportional to its assets; the price of assets is computed as total interest income divided by total assets. To derive the marginal cost, a translog cost function with one output and three input prices was estimated. Cost functions were derived based on three subperiods to allow coefficients of the cost function to evolve over these periods.

One of the most widely used techniques to study competitive conditions in the banking system is the Panzar and Rosse (1987) framework, commonly known as the PR-H statistic. The framework primarily studies the impact of changes in factor input prices (cost) on the (equilibrium) revenue of the banking system. Specifically, the PR-H statistic is the sum of factor input price elasticities of the reduced form revenue equation of a bank or the banking
system. Under perfect competition, the PR-H statistic assumes the value of 1.0, as a change of 1.0 percent in cost will lead to a 1.0 percent change in revenues. On the other hand, the PR-H statistic is zero (or less than zero) under a monopoly. In this case, an increase in input prices will increase marginal cost, reduce output and ultimately decrease revenue. The model also suggests that the value of the PR-H statistic will fall between 0 and 1 in case of monopolistic competition.

Other studies specified different models of competition, including conjectural-variations Cournot models to test for price-taking versus price-setting behavior (e.g., Berg and Kim 1998), models that test the role of sunk costs in determining concentration (e.g., Dick 2003), a model of simultaneous competitive imperfections in both output markets (loans) and input markets (deposits) (Adams, Roller, and Sickles 2002), non-structural models of competition, such as the Panzar-Rosse model (e.g., Bikker and Haaf 2002), and structural demand models based on consumer choice under product differentiation (e.g. Dick 2002).

Some of the recent research on the effects of bank competition allows for the possibility that different sizes of banks may affect competitive conditions differently. Small banks are often considered to be “community banks” with different competitive advantages than large banks. Relative to large banks, small banks in developed nations tend to serve smaller, more local customers, and to provide more retail-oriented rather than wholesale-oriented financial services (e.g., DeYoung, Hunter, and Udell 2004).

The main finding is that the degree of concentration of a banking sector is a relevant input that impacts on the level of competition of the financial system, but at the same time there are other variables that affect the way banks interact with each other and the overall competition environment in the system. Variables such as the political and cultural heritage, the contestability of the markets, the institutional and regulatory framework and the economic and business cycle, among others, may have a significant impact on the level of competition in the banking system (Zurita, 2014).

4. Interconnection among bank concentration, bank competition and financial stability

While the banking sectors in European Union is widely acknowledged for its rapid progress in last decades, debates still abound about the concentration of business and the associated impact on efficiency and the evolving market structure of the industry, especially since competition is an important dimension of efficiency. There is no banking system in the EU which did not pass through various changes. Croatian financial system, as well as financial systems in other transition economies in Europe, has in last decades been strongly influenced by the globalization process taking place under the auspices of the World Trade Organization. The basis of those changes is in the Washington Consensus from 1989. The Washington Consensus adopted for the economies in transition represents the agreement between the Governments of the debtor countries and international institutions. Core of agreement is on the implementation of neoliberal approach to administering the country, which means greater emphasis on the free functioning of markets, institutions and price without government impact, liberalization of foreign trade sector and overall reduction of government importance on the national economy. The neoliberal approach meant
liberalization and deregulation of all segments of the economy. At the outset of WTO over 70 members took on some obligations, out of which about 60 members for the liberalization of the banking sector and 10 for the insurance industry. Liberalisation of the financial sector is achieved through external and internal liberalization of capital account over time i.e. through several stages with the possibility of retaining a certain degree of restriction. For each country this process had its individual path, but the goals were, with no doubt, to reduce the restrictions in this sector, to abolish monopolies, to increase competition which consequently contributes to faster economic growth in the national economy and to ensure an efficient allocation of resources.

At the beginning of transformations of economy, financial systems in countries with similar characteristics of economy like Croatian were highly bank based financial systems with mostly state owned banks and undeveloped non-banking sector. With all general efforts what include the Washington Consensus and world globalization process there is also trends which causes changes in financial/banking sectors: the deregulation of financial services at the national level and country opening to international competition, expansion of informatization, growing disintermediation and increased emphasis on shareholder value. The banking systems in CEE countries have been transformed as a result of privatization of state-owned banks that had dominated their banking systems in the early 1990’s. The period was marked by crucial structural changes which can be described by the entry of foreign capital, the growth in credit activities in particular to households, the improvement in profitability, high and satisfactory rate of capital adequacy despite credit expansion and the growth of risk assets and the improvement of supervisory framework. According to those facts, the new international banking architecture has been affected, in first way, by financial liberalization. Indeed, the various measures of the latter have increased interbank competition what strictly influence on main goal of bank business, profit. The market structure and profitability of banks constitutes a strong element in the analysis of banking industry, especially in the countries in which the level of the banking industry represents the main component of the financial system what is clearly obvious in Central Eastern Europe (CEE) countries. That structure of financial system is known as bank-based financial system. Further, that part of Europe is synonym for changes in their banking industries which are effect of mutation at the level of the structure of shareholding as a result of bank privatization, then of the entry of foreign banks and of the increase of competition determined by the liberalization of the market and changes in supervision and regulation. The early stages of banking transition in South-eastern European countries consisted in the restructuring of state banks and in abandoning direct financing. Reconstruction leads to bank privatization and growth of financial markets. The period of transition of the banking industry included significant structural changes which had some basic features: 1. Entry of foreign capital; 2. Growth in domestic lending in particular for consumption primarily for consumption of foreign goods; 3. Increase in the exposure to foreign currency risk; 4. Increase in profitability and a satisfying rate of capital adequacy; 5. Implementation of international accounting standards; 6. Changes in the regulation and supervision; 7. Credit expansion and growth of risk assets.

The analysis of banking competition and concentration has been of great concern in the literature, especially due to its effects on the financial stability (Beck et al., 2006; Schaeck et al., 2009; Wagner, 2010). A competitive banking market may result in more benefits to the
society as a whole, such as lower prices and higher quality of financial products (Boyd and Nicol´o, 2005), but on the other hand its influence on financial stability is not conclusive according to the literature. Usually researches are based on relation between bank profitability and concentration what is one of condition for adequate investigation relation among concentration, competition and financial stability. According to that point of view here is literature review on selected topic and comparable variables and methodology.

Within the existing literature on the profit-structure relationship, most studies find empirical support for the assumed positive relationship between bank profitability and a measure of market structure, such as market share or some other measure of concentration (e.g. concentration ratios or a Herfindahl index), although this evidence is weak at times (Punt and van Rooij, 2001). There is some other benefits of high concentration and they are: 1. Banks of large size are easily diversified. This allows them to adjust in other sectors of the market when one sector takes a turn for the worse: a smaller bank that focuses on one or two sectors of the industry is highly vulnerable to fluctuations within those sectors. 2. High concentration levels will increase profits for the dominant banks within the industry: while this may lead to higher interest rates and fees it will also insulate banks from economic shocks. Also, with higher franchise values banks will have less incentive to take financial risks in pursuit of profits (Helen, Murdoch, and Stiglitz). 3. Larger banks are more easily monitored than many small banks. It is easier for a regulatory commission to look after a few large banks than many small ones. Systems within each of the large banks will be similar rather than having to learn the systems of many small banks.

On the basis of the obtained results, Erins and Erina (2013) conclude that internal and external bank performance indicators may not affect the profitability of CEE countries banks directly, except such indicators as credit risk and bank size, which influence one of the bank profitability indexes – return on average equity. Boyd, De Nicolo and Al Jalal (2006) explored relationship between concentration and banks risk of failure, using z-score as an empirical risk measure. Their results revealed a positive association between market concentration and risk of failure, driven primarily by a positive association between concentration and volatility of the rate of return on assets. Andries and Asandului (2010) analyse the impact of financial liberalization on banking performances, highlighting the determination of the impact of the presence of foreign banks on the performance of the Romanian banking system. The analysis reveals the fact that the liberalization and internationalization of the banking system had as effect the increase of competition which determined domestic banks: to reduce their operational costs concomitantly with investing some important amounts into new technologies; to increase their credit portfolio in relative terms by reducing other assets and increasing the client base, which led to the increase of the credit risk and to the increase of the bank provisions; to diminish their net interest margin by decreasing the interest rate for loans, concomitantly with increasing the interest rate for deposits.

Ramllall (2009) has discovered a positive correlation between bank size and profitability: the bigger is the bank, the more profitable it is in comparison with a smaller bank due to economies of scale. On the other hand, Hannan and Prager (2009) note that small banks can earn higher profit because they have lower expenses and better performance efficiency. Bailey (2007) examined the nature of the relationship between concentration (measured by HHI) and profitability (presented with ROA and NIM) by utilizing a dynamic VAR framework.
The results of the conducted analysis did not support the SCP hypothesis. Moreover, results showed that improvements in efficiency contributed to increased profitability for the dominant bank. Brissimis et al. (2008) examine the relationship between banking sector reform and bank performance – measured in terms of efficiency, total factor productivity growth and net interest margin – accounting for the effects through competition and bank risk-taking. The model is applied to bank panel data from ten newly acceded EU countries. The results indicate that both banking sector reform and competition exert a positive impact on the bank efficiency, while the effect of reform on total factor productivity growth is significant only by the end of the reform process. It is unavoidable to study some researches with impact of financial crisis. According to that, Andries et al. (2012) show large differences between pre-crisis period and crisis period and among the banking systems in terms of performance indicators. In average, banks from countries that are not members of European Union recorded an ample decrease of profitability and stability during current financial crisis. They observe that the best-performing banks during current financial crisis had significantly more core equity capital and are more focus on traditional banking activities.

Being exposed to advantage of the requirements of various changes on financial markets, the bank was marked by extensive restructuring, including the strategy of concentration seems the best solution for better banking performance. In this context, increasing the concentration of banking in theory allows to create value, gain market power and generate economies of scale and scope in order to seek greater efficiency. Two distinct views in the literature reflect contrast on the relationship between concentration and stability. In theoretical models, Allen and Gale (2000, 2004) exemplify that financial crises are more likely to occur in less concentrated banking systems. This is due to the absence of powerful providers of financial products that can reap benefits from high profits that serve as a cushion against asset deterioration. A similar view is taken by Boot and Greenbaum (1993) who highlight that increasing bank charter values arising from increased market power create incentives for bank management to act prudently thereby contributing to higher bank asset quality. These institutions are also considered to be easier to monitor from a regulatory perspective.

Relation between bank competition and growth cannot impact without banking stability. The financial stability of a bank constrains the capability of lending to industries, which affects growth. For instance, the higher the amount of non-performing loans in assets, the more the provision of funds is needed to put aside from the banking business in order to prevent a risk of potential defaults. The required provision restricts the lending ability of the bank, which in turn affects growth. This argument is evident by study that the effect of the financial stability constraint on growth is robust in estimation. The improvement of financial stability reduces the constraint on lending and so promotes growth. The empirical support to this expectation varies with regions. In developed economies, the constraint is significantly harder on growth; and in the emerging economies, it is soft or decoupled from the growth (Liu and Mirzaei, 2013). While some theoretical studies argue that competition erodes profits and tends to motivate banks to embark upon risky investments (Smith, 1984), others take a diametrically opposite view and argue that banks in uncompetitive, monopolistic markets with intermediate monitoring costs are prone to originate risky loans that set the stage for subsequent problems in the system (Caminal and Matures, 2002).
5. Banking industry through concentration and competition in European Union countries

Many of these changes have vast implications for competition and concentration in the banking and financial sectors. In 2013 the euro area banking sector continued its consolidation process, driven by continued pressure to achieve cost containment, deleveraging and restructuring. This process resulted in a further reduction of the total number of credit institutions in the euro area to 5,948 (down from 6,100 in 2012 and from 6,690 in 2008). Market concentration increased at the euro area level in comparison with the pre-crisis period; however, developments were quite heterogeneous across individual countries. The rationalisation and resizing process in the euro area banking system suggests that the overall efficiency of the system continues to be enhanced. Merger and acquisition activity, especially cross-border (intra-euro area) and outward transactions (with euro area banks as acquirers) were following a declining trend, both in terms of number of transactions and total value.

Since the inception of the financial crisis in 2008, the euro area banking sector has been going through a rationalisation process which has resulted in a reduction in the overall number of credit institutions. This banking sector consolidation process relates to pressures to achieve cost containment, deleveraging and restructuring, in particular in the banking sector of those euro area countries that were more severely affected by the financial crisis (ECB, 2014). At the end of 2013, the total number of credit institutions, including foreign branches, in the euro area was 5,948, down from 6,100 in 2013, if calculated on a non-consolidated basis. By comparison, at the end of 2008 there were 6,690 credit institutions, including foreign branches. Mentioned changes have significant impact on market concentration. Market concentration, as measured by the share of total assets held by the five largest credit institutions or by the Herfindahl index is shown on Chart 1. HH index has increased both at euro area and EU level since 2010 and in comparison with the pre-crisis.
period. This primarily reflects the decline in the number of credit institutions as M&A activity remained rather subdued. For both the euro area and the EU as a whole, the indicators peaked in 2011, fell slightly in 2012 and increased again in 2013, remaining well above the pre-crisis levels (ECB, 2014). The modest increase in 2013 was mostly driven by moves in the crisis countries where larger banks acted as consolidators in resolutions of non-viable entities – especially in Cyprus, Greece and Spain, what is visible in Chart 2.

With regard to cross-country comparison, concentration indices reflect a number of structural factors. Banking systems in larger countries, such as Germany and Italy, are more fragmented and include strong savings and cooperative banking sectors. Banking systems in smaller countries tend to be more concentrated, with the notable exception of Austria and Luxembourg. In the case of Austria, this is on account of a banking sector structure similar to that which characterises larger countries, and in the case of Luxembourg it is due to the presence of a large number of foreign credit institutions. At the end of 2013, market concentration (measured by the share of assets held by the five largest banks) ranged from close to 95% in Greece to just over 30% in Germany and Luxembourg (see Chart 3). Regarding developments in the period from 2008 to 2013, the banking sector structure tended to become more concentrated in a number of countries, in particular those undergoing deep banking sector restructuring processes such as Cyprus, Greece, Ireland or Spain (ECB, 2014).

In Croatia the share of total assets held by the two largest banks have cyclical trend what is obvious in data for 1996 when it was 46,3 then in 1998 40,5, in 2000 47,5 and in 2007 40,9 and in 3Q/2014 43,5. Situation with CR4 in Croatia is more stable and it is in last decade between 64,9 and 66,8 what is significantly higher than EU average. Further, although the number of small banks in Croatia has been on a continuous decline, their still relatively large number maintained moderate values of the Herfindahl-Hirschman index (HHI). HHI for assets stood at 1440 at the end of 2013, which was only 0.9% higher than at the end of 2012 but it counts positive trend from 2010 when it was 1361 but still much higher than EU average.
In Chart 4 profitability measured with ROA, showed various trend between EU countries in period 2008 – June 2014 on a year over year comparison. There is worst result in small countries like Cyprus, Ireland, Latvia and Slovenia with worst decline in ROA in 2013 of 7.99%. Altough most countries have positive result throught all analysed years. In relation with concentration and return on assets it is seen that countries with worst financial results (average measure) have HHI approximately around 1000 points. All other results among countries goes to view that there is no significant evidence about correlation between concentration and financial results of banks.

Chart 3: Share of the five largest credit institutions in total assets in EU countries (based on ECB, 2015)

Chart 4: Return on assets (ROA) for selected EU countries (based on ECB, 2015)
6. Concluding remarks

In accordance with economic theory higher level of concentration leads to higher level of profits, when on the other side, competition leads to lower profits. Banking sectors last decades, especially in emerging countries, were exposed on liberalization which outcome is lower levels of Herfindahl-Hirschman index. In that countries, banking sectors are dominantly in foreign ownership with high levels of concentration what was one of reason for increase in HHI for EU-27 countries. Also, financial crises and their effects on M&A in banking sector with bank failures across EU leads increase in HHI on EU level. This research has shown that HHI has positive correlation with level of economic development of country, it is lower in developed and higher in less developed countries. Also, there is correlation with country size where smaller countries have more concentrated banking sector. Croatia, as small transition economy, has not implemented all liberalization processes yet although Washington Consensus was fully implemented. That processes have outcome on financial stability today, but on the other side it decreases potential of development of Croatian real economy.

In this paper we discuss the existence of a relationship between market concentration and the degree of competition in the banking systems with financial stability. The main finding is that no such link can be found as a general rule, further there is presented all significant measures of concentration and competition. It is not clear whether excessive competition and concentration contributed to the recent financial crisis and financial stability. This paper after research does not support the existence of a direct relationship between concentration and market power in the banking sector.

It is necessary to sustain high stability of banking industry what implies strong supervision and regulation with all of their impacts. According to that, it is important to implement all regulatory measures relating to concentration and competition guided from central banks and official authorities. Further researchs are needed to investigate the nature essence of the dynamic relationship between concentration and competition on financial stability and stability of real economy as well as impact of financial crises on concentration. For example, an analysis of the effects of competition in the short and in the long run may cause different outcomes for financial stability. Finally, on the basis of research, future papers need to use nonstructural measures of competition for measuring the level of competition.

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