



## IMPACT OF MARKET CONCENTRATION ON THE PROFITABILITY OF LITHUANIAN BANKING SECTOR

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**Abstract.** The performance of the bank can be measured in many different ways. However, profitability is the primary instrument depending on various factors one of which is market structure having the most significant indicator – industry concentration that can be defined as the number and distribution of competitors with reference to a simple index. The conducted research is based on the most frequently used concentration measures: the Herfindahl-Hirschman index, the  $k$  bank concentration ratio and profitability indicators such as return on assets and return on equity. The analysis of the results of changes in the ratios of banking sector concentration and profitability has disclosed no direct connection between these indexes.

**Keywords:** concentration, profitability, return on equity, return on assets, banking sector.

**JEL Classification:** G1, G21.

## RINKOS KONCENTRACIJOS ĮTAKA LIETUVOS BANKŲ SEKTORIAUS PELNINGUMUI

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**Santrauka.** Banko veiklos efektyvumas gali būti vertinamas skirtingais būdais. Tačiau pelningumas yra pagrindinis įvertis, rodantis veiklos efektyvumą. Pelningumas priklauso nuo daugelio veiksnių poveikio. Vienas svarbiausių veiksnių yra rinkos struktūra ir svarbus jos rodiklis – sektoriaus koncentracija. Šis dydis gali būti apibrėžtas kaip konkurentų skaičiaus ir pasiskirstymo indeksas. Straipsnyje atliktas tyrimas grindžiamas dažniausiai naudojamu koncentracijos rodikliu – Herfindahl-Hirschman rodikliu – analize bei  $k$  bankų koncentracijos rodikliu ir pagrindiniais pelningumo rodikliais, tokiais kaip turto grąža ir kapitalo grąža. Išanalizavus bankų sektoriaus pelningumo ir koncentracijos rodiklių pokyčius, buvo prieita prie išvados, kad koncentracija neturi tiesioginės įtakos rinkos pelningumui.

**Reikšminiai žodžiai:** koncentracija, pelningumas, kapitalo grąža, turto grąža, bankų sektorius.

## Introduction

Profitability refers to the ability to earn profit. It is the primary measure of the overall success of business reflecting the final result of business operations. Profit affects the operating efficiency of a firm and shareholder return (Aggarwal 2013). Thus, the task of management is to maximize profit, as this makes business to be efficient and profitable.

The profitability of a bank depends on various factors, including both the operational and balance sheet items of the bank. There are also various outer factors that can influence the performance of a bank. Concentration – the degree of competition or monopoly – is one of those. Concentration ratios are used primarily for indicating monopoly power in affecting price-output strategy to maximize profit. Concentration ratios can also capture the structural features of the market, and therefore are often used in structural models explaining competitive performance in banking industry as a result of the market structure.

Lithuanian financial sector is integrated into the financial system of the European Union. According to the Central Bank of Lithuania, the share of foreign-owned banks increased to 90% in terms of total assets following the bankruptcy of the largest domestic bank “Snoras” in late 2011. At the moment, the banking sector is quite concentrated, with the five largest institutions accounting for almost 90% of its total assets.

The purpose of research is to estimate the influence of market concentration on the profitability of Lithuanian banking sector for the period 2007–2013. Hence, the following points will be discussed:

1. The theoretical background of bank profitability and market concentration.
2. The ratios of profitability and the level of industry concentration of Lithuanian financial sector for the period 2007–2013.
3. The influence of concentration on the performance of banks in Lithuania.

**Research methodology.** Research on concentration in Lithuanian banking sector is based on the most frequently used concentration measures: the Herfindahl-Hirschman index and the k bank concentration ratio. The analysis of the profitability of the banking sector refers to two used profitability indicators: return on assets (ROA) and return on equity (ROE).

### 1. Profitability in the banking sector

One of the major economic considerations of the 21<sup>st</sup> century are the maintenance of a profitable banking system. The main sources of bank profit originate from transaction fees on financial services and interest spread on resources that are held in trust for clients who, in turn, pay interest on the asset (Petersen, Schoeman 2008).

Profitability is one of the major criteria for evaluating the performance of a bank (Alrabei 2013). The profitability of the bank is influenced by its environment. Different factors make an impact on the bank internally and externally.

The determinants of bank profitability are usually divided into internal and external factors. The made studies demonstrate that some part was specific while another had a considered panel of countries for reviewing the determinants of profitability. Overall, these studies propose that the determinants of profitability for a bank can be divided into two groups: internal and external factors (Gul *et al.* 2011).

The economics of banking literature acknowledges various determinants of bank profitability. These include the size of the bank the extent to which the bank is diversified, the attitude of the bank owners and managers towards risk, the characteristics of the bank ownership and the level of external competition the bank encounters (Goddard *et al.* 2004). Liquidity, bank size or capital adequacy could be named as the examples of internal factors. However, external factors such as competition in the country, inflation or government regulation influence bank profitability almost equally as inside variables.

Bank profitability is expected to increase, as its portfolio of loans grows in relation to other more secure assets (such as government securities) thus taking into account the known relationship between risk and return. Despite the higher operating costs of holding a large portfolio of loans, bank profitability should increase with a higher ratio of loans to assets as long as interest rates on loans are liberalized and the bank applies mark-up pricing. This greater relative proportion of loans in the portfolio of the bank is usually coupled with greater liquidity risk arising from the inability of banks to accommodate a decrease in liability or to fund an increase in the asset side of the balance sheet; consequently, a bank holding a low proportion of liquid assets is more likely to earn high profits (Trujillo-Ponce 2012).

Profitability ratios provide a concise and systematic way to organize the enormous quantity of data contained in financial statements into a framework that creates meaningful information. Financial managers use ratios to benchmark the performance of their firms against that of their competitors and set goals for future performance. Financial advisers use ratios to identify underpriced or overpriced stocks and make recommendations to investors (Burns *et al.* 2008).

As a measure of profitability in the banking sector it has become standard practice that the ratios of return on assets (ROA) and return on equity (ROE) are used (Davcev, Hourvoulides 2009). Financial ratios are employed for several important purposes. Two basic application forms of financial ratios, including normative and positive, are accepted. Normative uses include measuring the ratios of a firm to a standard such as another company or to an

industry average. Positive uses include the estimation of financial variables such as profit margins, returns, leverage and stock prices (Berrios 2013).

Ratios generally involve a mathematical proportion of X/Y that allows control established by analysts in two ways. First of all, this is ratio control over the size of financial information. Because of this characteristic, the current ratios of different firms can be compared even if the current assets and/or current liabilities of these firms are not comparable. The second way is ratio control over industry factors. Industries often have unique characteristics that are seen if the financial ratios of the firm are compared to the industry average (Jewell, Mankin 2011).

**Return on equity.** Return on equity (ROE) is total accounting net income after taxes/average common equity (Daruvala *et al.* 2012) not only determines profitability but also reflects the extent of the effectiveness of the management use of shareholders' investments (Muda *et al.* 2013). ROE is calculated by dividing net profit by owner's equity (using data obtained from the financial statements of entities). These returns are then ranked in two clusters. In spite of imperfections such as the failure of this indicator to consider the cost of capital this is a commonly used indicator of returns to stockholders. It allows for a reasonable approximation of the return potential created in a limited time period. It also allows for comparisons that are harder to make with other indicators of return (Frezatti 2007).

Although ROA provides useful information about bank profitability, this is not what the owners of the bank take care of in the majority of cases. They are more concerned about how much the bank earns on their equity investment measured by return on equity – ROE showing how much the bank has earned in comparison with the capital of shareholders (Davcev, Hourvouliades 2009). Investors can compare the ROA and ROE of the bank to those of other banks to see how it performed relatively to other banks. (Boshkoska 2013).

**Return on assets.** Return on assets (ROA) is a ratio between net profit and total assets. This ratio is also known as return on total assets or return on investment and measures the profitability of the invested capital in the bank or the efficiency of asset management (Monea 2011). ROA measures the ability of the firm's management to generate profits on its portfolio of assets (Lee 2012).

ROA is a broad measure that indicates how efficiently a bank uses its resources by specifying profit generated per unit of assets. ROE may be decomposed into ROA multiplied by the leverage (total assets/total equity) of the bank. Therefore, ROA captures profitability before leverage, and as we use core capital, this measure also has a risk-adjustment factor. However, the use of ROA is impaired by the increasing importance of derivatives and other off-balance-sheet items that have reduced the relevance of total assets

(Rumler, Waschiczek 2012). ROA indicates how much net income is generated per monetary unit of assets. The higher is this ratio, the more profitable is the bank (Monea 2011).

Profitability seems to have been positively affected by bank size, operating efficiency and asset management. Return on assets and return on equity are named as dependent variables, and, considering internal and external factors, as independent variables. A significant positive association has been found with return on equity and the level of bank concentration, interest rates and government ownership (Gul *et al.* 2011).

Increasing concentration in banking markets should not be restricted by antitrust or regulatory measures. There is a positive relationship between size and profitability – higher funds can easily meet their rigid capitals so that they can have extra funds for giving loans to borrowers and thereby increase their profits and earning levels. There is also a positive and direct relationship between capital and the profit of banks. It implies that a more efficient bank should have higher profits since it is able to maximize on its net interest income. Negative relationship can be found between credit risk and profitability – greater risk is linked with loans. Higher level of loan loss supplies creates a trouble at the profit-maximizing strength of a bank. There is also a negative relationship between stock market capitalization and bank profitability, which means that equity and bank financing act as substitutes rather than complements. In case of industry-specific factors, the structure-conduct-performance premise point out that growing market power enhances the profitability (income) of banks (Gul *et al.* 2011).

The relationship between market structure and bank profitability could have policy implications relevant to the current crisis in the subsequent period. If the evidence suggests it is a concentrated structure that raises bank profitability, as opposed to higher profitability being the result of efficiency or scale effects, then, this might be interpreted as pointing to a greater focus on competition policy and other regulatory interventions to reduce bank concentration (Tregenna 2009).

If this relationship exists, it would be clearer what measures should be taken and what conditions should be tied to public assistance in order to restore the profitability of the financial sector.

## 2. Concentration in the banking sector

Each market is made of three elements like performance, conduct and structure. Interaction manners between these elements determine market structure that is important to the relationship between producers and consumers and determines pricing nature and competition in the market. Structural variables are differential products, concentration and entry conditions. Producer concentration is

determined in terms of sale, value added, assets and employment. The degree of differential products of rival firms influences producers' competition and their performance. Economic performance is a collection of results and impacts that come from economic activities. The purchase and sale of the good and service market and the distance between price and marginal cost are certain dimensions of the performance of the firms. If the distance between the price and marginal cost is huge, economic activity will be more profitable (Behname 2012).

Concentration in banking industry means the concentration of funds in a small number of large and major banks. Being developed by the same laws as the concentration of industry, it inevitably leads to monopoly (Staroselskaja 2011). It is a situation when major banks, which play a decisive role, in one or another way, prevail in smaller banks. During competition, many smaller banks go bankrupt and simply cease to exist. Other smaller banks formally retain their independence, in fact, obeying the power of the larger ones (Bikker, Haaf 2002).

The concentration of bank capital is primarily based on the centralization of production: large industrial companies usually put and keep their available cash capitals in large banks, which strengthens their positions and contributes to the displacement of small banks. The concentration of bank capital leads to the competition in banking industry where large banks have a decisive advantage over smaller ones (Staroselskaja 2011) the majority of which are included in the sphere of influence of big banks and eventually lose its independence thus becoming the prime offices or branches of the larger ones. Ideally, the evaluation of competitive conditions and the degree of concentration in banking industry should begin by rigorously defining the market under consideration. The relevant market consists of all suppliers of a particular banking service, including actual or potential competitors, and has product dimension and a geographical dimension. The product definition of a market is based on the equality of products as regards their ability to fulfil specific consumer needs (Bikker, Haaf 2002).

First of all, investors prefer putting their money into larger, more solid and stable rather than into smaller banks that often fail. Second, large banks, in comparison with smaller ones, serve their customers in a wide branch network attracting contributions from various localities. Third, large banks are far superior in organizational and technical terms (Staroselskaja 2011).

Some studies have also examined the effects of bank concentration and competition on the stability of the national financial system. These studies often involve international comparisons and go beyond the implications for risks as concerns individual banks discussed above. Predictions about the economic theory for the role of bank size and national concentration are mixed. According to

the “concentration-stability” view, a concentrated banking system with a few large institutions is more stable because the banks may be more profitable, better diversified and easier to monitor, and therefore more resilient to shocks. In contrast, the “concentration-fragility” view predicts less stability from high concentration and a few large institutions because these institutions may be likely to take on more risk due to implicit “too big to fail” policies or preferences with regard to the risk-expected return trade-off discussed above (Berger *et al.* 2004).

**Concentration ratios.** The concept of industrial concentration has been extensively treated and lively debated in economic literature. Despite many different approaches to its measurement, a general agreement on the constituting elements of concentration measures, i.e. the number of banks and the distribution of bank sizes in a given market, prevails (see Table 1) (Bikker, Groeneveld 2000).

Simplicity and limited data requirements make the k bank concentration ratio one of the most frequently used measures for concentration in empirical literature, which is

Table 1. Concentration ratios (Source: Bikker, Groeneveld 2000)

Ratio	Ratio range	Ratio form
The <i>k</i> bank concentration ratio	$0 < CR_k = 1$	$CR_k = \sum_{i=1}^k S_i$
The Herfindahl-Hirschman Index	$\frac{1}{n} = HHI = 1$	$HHI = C_H = \sum_{i=1}^n S_i^2$
The Hall-Tide-man Index	$0 < HTI = 1$	$HTI = 1 / (2 \sum_{i=1}^n i * s_i - 1)$
The Rosenbluth Index	$0 < RI = 1$	$RI = 1 / (2C)$
The comprehensive industrial concentration index	$0 < CCI = 1$	$CCI = S_i + \sum_{i=2}^n S_i^2 * (1 + (1 - S_i))$
The Hannah and Kay Index	$\frac{1}{S_1} = HKI = n$	$HKI = \left( \sum_{i=1}^n S_i^a \right)^{\frac{1}{1-a}}, a > 0, a \neq 1$
The U Index	$\frac{1}{n} = U = 8$	$U = \left( \sum_{i=1}^n S_i * \left( S_i * n^{\frac{a-1}{a}} \right) \right)^a$
The Hause Indices	$0 < H_m = 1$	$H_m(a, \{S_i\}) = \sum_{i=1}^n S_i^{2-(S_i * (HHI - S_i^2))^a}$
Entropy Measure	$0 = E = \log n$	$E = - \sum_{i=1}^n S_i * \log_2 S_i$

summing only over the market shares of the largest banks in the market and giving equal emphasis to  $k$  leading banks but neglecting many small banks in the market. There is no rule for determining the value of  $k$ , so that the number of the banks included in the concentration index is a rather arbitrary decision.

The concentration ratio may be considered as one point on the concentration curve and is a one-dimensional measure ranging between zero and unity. The index approaches zero for an infinite number of equally sized banks (given that  $k$  chosen for calculating the concentration ratio is relatively small as compared to the total number of banks) and equals unity if the banks included in the calculation of the concentration ratio make up the entire industry (Bikker, Haaf 2002).

The Herfindahl-Hirschman Index (HHI) is the most widely used summary measure for concentration in theoretical literature and often serves as a benchmark for evaluating other concentration indices. In the United States, the HHI plays a significant role in the enforcement process of antitrust laws in banking. An application for the merger of two banks will be approved without further investigation if the basic guidelines for the evaluation of concentration in deposit markets are satisfied. Those guidelines imply that the post-merger market HHI does not exceed 0.18, and that an increase in the index from the pre-merger situation is less than 0.02. It is also often called the full-information index because it captures the features of the entire distribution of bank sizes. The Herfindahl-Hirschman Index shows the importance of larger banks by assigning them a greater weight than smaller banks and incorporates each bank individually, so that arbitrary cut-offs and insensitivity to share distribution are avoided. The HHI index ranges between  $1/n$  and 1 and reaches its lowest value, the reciprocal of the number of banks, when all banks in the market are of equal size and reach unity in the case of monopoly (Bikker, Haaf 2002).

### 3. Measurement of concentration in Lithuanian banking sector

Research on concentration in Lithuanian banking sector is based on the most frequently used concentration measures – the Herfindahl-Hirschman index and the  $k$  bank concentration ratio. To compute the ratio of three leading banks in Lithuanian financial sector, criteria for total assets were used.

Research data on this analysis have been taken from the annual reports made by the Central Bank of Lithuania and

with reference to statistics suggested by the Association of Lithuanian Banks.

As shown in Table 2, return on assets and return on equity ratios decreased significantly in 2009 due to a financial crisis. In 2010, an increase started, and in 2011, the ratios were positive again. A change in the return on equity of the banking sector in 2012 was negative, as the reflecting ROE indicator nearly halved to 8.7 percent. According to the Financial Stability Review of the Central Bank of Lithuania, the greatest contributor to this negative change in return on equity was a decline of profit margin; also, the decreased ratio of bank assets to shareholders' equity (financial leverage) was quite detrimental. This ratio was falling due to both a moderate decrease in bank assets and a tangible increase in shareholders' equity. The ratio of the level is rather low for the banking sector; therefore, in the long run, banks will likely have to look for additional sources of profit enhancement.

Figure 1 shows that concentration in Lithuanian banking sector increased in 2011–2012. At the end of 2011, the bankruptcy case of bank "Snoras" was started, and one of three largest banks in Lithuania banks increased its assets significantly, as it had to pay out deposits using the infrastructure of "Snoras". Three largest banks (CR3) had around 69% of the market. Increased concentration is also shown by the HHI index (Figure 2). The same reason influenced an increase in concentration in 2013, because another Lithuanian bank, which is "Ukio bankas", bankrupted. The market part of three largest banks increased to 72%; however, the last bankruptcy had a much less significant impact than the first one. CR1 ratio shows the part of Lithuanian banking industry the largest bank has in terms of total assets.

Within the past two years, these two developments have counterweighted the expansion of smaller banks and branches of foreign banks in Lithuania and caused a relatively significant increase in concentration. In 2013, the Herfindahl-Hirschman index reached 2.08 points.

The pictures above also show the relationship between concentration and profitability in Lithuanian finance sector. Although it seems that whenever concentration decreases and return on assets as well as return on equity go down, we are not able to state this dependence exists. In 2009, concentration in the banking sector remained almost the same as the year before; however, profitability dropped down dramatically due to the financial crisis. In 2010, profitability increased by almost 50%, and concentration even decreased by 0.1 point. This shows that a higher degree of concentration does not cause higher profitability.

Table 2. Profitability indicators of Lithuanian banking sector (Source: Central Bank of Lithuania)

	2007	2008	2009	2010	2011	2012	2013
ROE	25.93	13.54	-48.42	-4.72	15.23	8.71	11.01
ROA	1.71	1.01	-4.23	-0.34	1.38	0.99	1.02

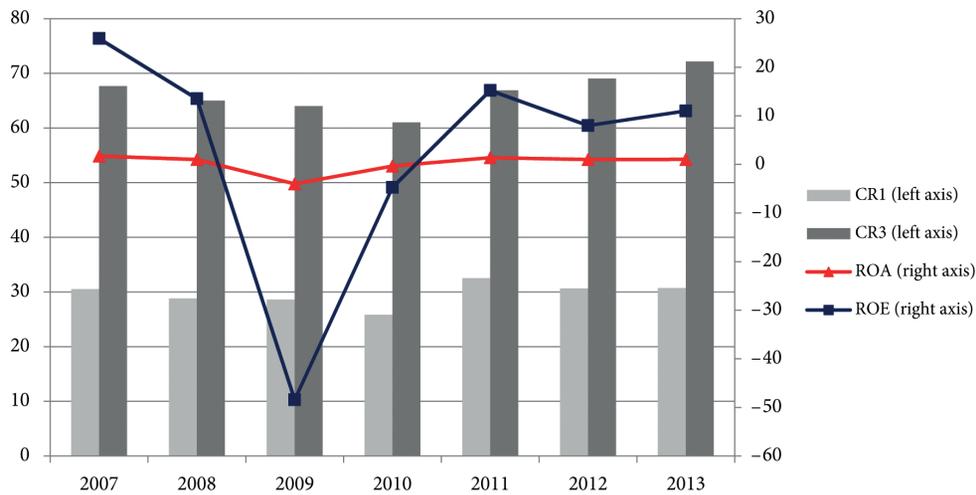


Fig. 1. Profitability and concentration ratio (Source: created by the authors)

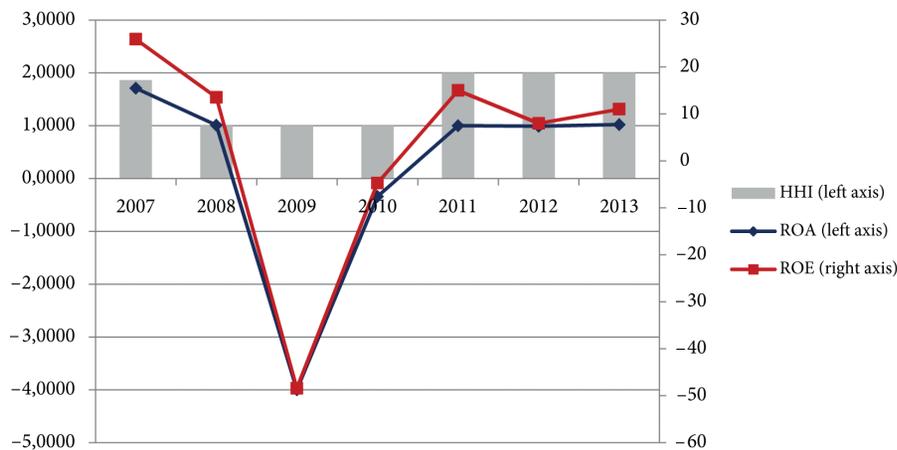


Fig. 2. Profitability and the Herfindahl-Hirschman Index (Source: created by the authors)

### Conclusions

According to analysed literature, the ratios of return on assets (ROA) and return on equity (ROE) are used as a measure for profitability in the banking sector for several reasons. First of all, ratios control the size of financial information. Therefore, the current ratios of different firms can be compared even if the current assets or liabilities of the firms are not comparable. The second reason is ratios control over industry factors. Industries often have unique characteristics that are seen if the financial ratios of the firms are compared in the context of specific industry. In order to estimate the existence or nonexistence of the relationship between profitability and market concentration, these variables have to be quantified. ROE and ROA have been used as the indicators of profitability while the above mentioned ratios of concentration in Lithuanian banking sector has been measured on the basis of total assets.

Concentration in banking industry means the concentration of funds in a small number of large and major banks. The concentration of bank capital leads to competition in

banking industry where large banks have a decisive advantage over smaller ones. The most common concentration ratios are the k bank concentration ratio and the Herfindahl-Hirschman Index that captures the features of the entire distribution of bank sizes.

In 2007–2013, the performance of banks in Lithuania was not stable. Although in 2007 efficiency results were very high (ROE reached more than 25%, ROA – around 1.7%), the financial crisis caused a significant decrease in these results in 2009 (ROE – less than –48%). In 2011–2013, profitability ratios increased slightly and showed the recovery of economy. In 2013, the Herfindahl-Hirschman Index as well as the CR3 ratio showing the part of industry lead by three largest banks in terms of total assets was the highest. However, the CR1 ratio was of the highest value in 2010.

After comparing measures for profitability and concentration in Lithuanian banking system, a conclusion that concentration does not have a significant impact on profitability has been reached considering the fact that fluctuations in

concentration were quite different from those of profitability in 2007–2013. ROA and concentration, however, are linked by more significant relation comparing with ROE influenced by other changes in industry and therefore fluctuating more dramatically.

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