THE IMPORTANCE OF MARKET POWER IN BANKING: THE CASE STUDY OF THE CZECH REPUBLIC

Jan Černohorský
University of Pardubice, the Czech Republic
jan.cernohorsky@upce.cz

Lucie Křičenská
University of Pardubice, the Czech Republic
lucie.kricenska@student.upce.cz

ABSTRACT
Nowadays, the banking system, as a part of the financial market, is an essential element through which financial resources are redistributed in the economy. This redistribution is affected by the degree of concentration of the banking sector, or the market power of individual banks within the banking sector. Therefore the aim of this article is to analyse the importance of the market power in the banking sector, in the case of the Czech Republic. This paper is based on the research of scientific articles on the given topic and on the measurement of the market power by means of the concentration of three or five of the largest banks. These studies do not have a definite conclusion on the relationship analysed. In addition, this paper uses a correlation analysis to compare the development of the market share and earnings before taxes of six selected banks, which represent three different sizes of banks based on the Czech National Bank's classification - large banks, medium-sized banks and small banks. First, the data are tested for their normal probability distribution. If so, Pearson's correlation coefficient is used, if not Spearman's correlation coefficient is used.(Pokud ano (if so) je tady nejasné. Můj návrh: If the test is positive, Pearson's correlation coefficient is used, if not Spearman's correlation coefficient is used. The volume of the assets is used to measure the market share. It concludes that a relationship between market share and profit development does not exist. However, this conclusion is not unambiguous because in some cases the correlation has been confirmed, both in a positive and a negative sense. The discussion then outlines factors that are likely to result in the more ambiguous conclusions.

Keywords: *banking, concentration, earnings before taxes, market power.*

1 INTRODUCTION

Banks today play an important role in the markets, or in mixed economies. Banks are an essential condition for a functioning financial redistribution in these economies. Due to the high level of globalisation, the banking sector has had a strong international overlap in recent decades, and economic and legal changes are thus being transferred through links in the banking sector among countries around the entire world, especially in the European Union, where the banking sectors of individual Member States have truly close ownership and economic relations. Studies and research in these sectors is therefore a very important part of economic science today. At the same time, the market power of each bank is important. It expresses, through the use of various indicators, the importance of the bank in the banking market. In general, this is also linked to the possibility of influencing various aspects of the banking business, which should aim to maximise profits. The aim of this article therefore, is to analyse the importance of the market power in the banking sector in the case of the Czech

Republic. In this article, we will not examine whether the banking environment of the Czech Republic complies with the monopolistic or oligopolistic theory of competition. We will deal with the relationship between the development of market power of selected banks from the segment of small, medium and large banks according to the central bank classification and their relationship to the development of their profits. We will be interested in whether small, medium or large banks have a closer link between market share and profit.

2 LITERATURE REVIEW

The paper as a whole is based on already published contributions on the given topic, both theoretically and methodically. In this section we will refer to key contributions and their conclusions. These contributions can be divided into three main groups, depending on what conclusion the authors come to; positive, negative, or no relationship between the development of market power and profit.

In the event of a positive relationship, it can be assumed from the arguments of Smirlock (1985) that larger banks are likely to have a higher degree of product and loan diversification than smaller banks, which reduces risk, and because economies of scale can arise from a larger size. Moreover, reduced risk and economies of scale lead to increased operational efficiency. Similar conclusions are reached by Beck, de Jonghe and Schepens (2013), who measured each bank's market power using the Lerner Index. They concluded that an increase in market power was associated with less volatile profits. Similarly, Berger, Klapper and Turk-Ariss (2009) concluded that banks with a higher degree of market power also have a lower risk-prone nature. This means that banks with higher market power may be more profitable in the longer term. In essence, Goldber and Rai (1996) also show a positive correlation between concentration and profit in the banking sector. However, their results are not unambiguous and they themselves state that they have not been able to sufficiently incorporate all the necessary aspects into their models which would clearly demonstrate or disprove the functionality of this correlation relationship. Short (1979) drew on the idea that a high rate of profit will attract industry to the new bank, thus reducing concentration as these banks will seek to gain a larger market share. However, in the short term (such as a three-year period), new banks are unable to acquire a sufficiently large proportion which would lead to profits for them, confirming the causal relationship between concentration and profit. However, in the long run, he confirms this interaction, and at the same time says that relatively large changes in concentration indicate that profit will grow, but at a lesser rate. Similarly, Molyneux and Thornton (1992) have a positive, statistically significant correlation between concentration and pre-tax profit per unit of assets.

Studies that demonstrate a negative relationship between the development of the market power of the bank and its profitability are based, for example, on the argument that an extremely large value might show a negative relationship between size and profitability. This is due to agency costs, the overhead of bureaucratic processes, and other costs related to managing extremely large firms (Stiroh and Rumble, 2006). The external environment, namely the financial crisis, as Dietrich and Wanzenried (2011) argue, has had an impact, as large banks in Switzerland were less profitable than small and medium-sized banks during the last 3 years of the financial crisis. The main reasons for this negative relationship between size and profitability are that larger banks in Switzerland had relatively higher loan loss provisions during the crisis and that larger banks were found to have significantly lower net interest margins in times of turmoil than smaller banks. This might also be a consequence of

some reputational issues that mainly larger banks in Switzerland faced during the recent crisis. Staikouras and Wood (2004) also conclude on a negative relationship.

A significant group is also the studies that do not make a definite conclusion on the relationship between market power and profit. Petria, Capraru and Ihnatov (2015) conclude in their calculations that the size of banks does not matter in the case of return on equity and has a small and weak significant effect in the case of return on assets. Similarly, Casu and Girardone (2006) argue that there is no clear relationship between competition (lower market power) and efficiency (profitability). They justify this by arguing that a higher level of competition and thus a lower level of market power forces banks to be more efficient and profitable. However, this increased efficiency and profitability does not lead to more competitive European banking systems. Similarly, Athanasoglu, Brissimis and Delis (2008), in their study of a number of bank-specific, sector-specific and macroeconomic determinants, found no correlation between the development of a bank's size and its profit. Gilbert (1984) describes in his article that there are only 27 out of 56 studies where the truth of the relationship was confirmed that the higher the concentration in the banking sector, the greater the profitability of the whole industry. He adds that the problems identified in previous studies are so great that this relationship cannot be unequivocally proven. In addition, there are currently a number of factors that make this relationship unclear - such as the huge growth of financial markets, globalisation, financial innovation, financial and tax optimisation, etc.

Given that the conclusions of these studies are not unambiguous, it will be interesting to analyse the relationship in the conditions of the Czech banking sector. A specific feature of the Czech banking sector, with regard to the topic of this paper, is that it is one of the most profitable in Europe, as exemplified by Černohorská (2015).

3 DATA AND METHODS

This paper is based on data from the central bank of the Czech Republic - the Czech National Bank - on the amount of earnings before taxes (EBT) and the size of assets of individual banks and the banking sector as a whole for the period of 2008-2017.

First, we calculate the concentration rate (according to the size of assets) expressing the share of a certain number of banks with the largest share in the entire industry, according to the standard formula:

$$CR_{\psi} = \frac{100}{Q} \sum_{k=1}^{\psi} q_k \qquad (1)$$

Where:

ψ … number of banks with the largest share (e.g., 3, 5,…),
Q … volume of the assets of the entire industry,
q_k … volume of assets of individual bank *k.*

Indicator values range from 0 to 100%. The higher the value, the greater share of the market is covered by the selected banks.

Then we use correlation analysis to compare the development of the market share and earnings before taxes of six selected banks, which represent three different sizes of banks according to the Czech National Bank's classification - large banks, medium-sized banks and

small banks. From the group of large banks we will analyse Česká Spořitelna and Československá Obchodní Banka. From the group of medium-sized banks we will analyse Moneta Money Bank and Raiffeisenbank. From the group of small banks we will analyse Equa bank and Sberbank. Banks with total assets greater than 10% of the total assets of the banking sector are considered to be large banks. Medium-sized banks are considered to be banks with a balance sheet total of 2 to 10% of the total assets of the banking sector. Small banks are considered to be banks with a balance sheet total of less than 2% of the banking sector.

A correlation analysis expresses whether there is a correlation between the variables. The first step is to test the data to see if it has a normal probability distribution. If so, we use the Pearson correlation coefficient (see equation 2)

$$\rho_{x,y} = \frac{cov(X,Y)}{\sigma_X \sigma_Y} \tag{2}$$

Where:
$cov(X,Y)$ … covariance of quantities X and Y,
$\sigma_X \sigma_Y$ … standard deviations of X and Y.

The Pearson correlation coefficient expresses how the exact line of the data is. If the data does not have a normal probability distribution, its value may be violated. If the data does not have a normal distribution, we then use the Spearman correlation coefficient (see equation 3).

$$r_s = 1 - \frac{6 \times \sum_{i=1}^{n} d_i^2}{n \times (n^2 - 1)} \tag{3}$$

Where:
d_i ... p_i - q_i , difference between p_i and q_i,
n ... sample size.

The Spearman coefficient monitors only the order of the values, so it is not dependent on the data distribution. Thus we test the hypothesis H_0 – data have a normal probability distribution against H_1 – data do not have a normal probability distribution at a significance level of $\alpha = 0.05$. The determination is done by using the Shapiro-Wilk test.
Whether we reject or do not reject the hypothesis H_0, is determined by the following formula:

$$|r_{Sp}| > r_{Sp(a;n)} \tag{4}$$

Where:
$|r_{Sp}|$ … absolute value of the Spearman correlation coefficient,
$r_{Sp(a;n)}$... critical value for significance level α, sample size n.

In both cases we test the hypothesis H_0, that there is no linear correlation relationship between the two quantities investigated. For the Pearson correlation coefficient, if the calculated p-value is greater than 0.05, the hypothesis H_0 is not rejected. If the absolute value of the Spearman correlation coefficient is greater than the critical value, then the hypothesis H_0 is rejected. If the absolute value of the Spearman correlation coefficient is less than the critical value, then the hypothesis H_0 is not rejected; i.e., the correlation has not been proven.

4 RESULTS

The following chart provides a better orientation regarding the concentration in the Czech banking sector. It summarises the development of the concentration rate over the period analysed for the 3 or 5 largest banks. The level of concentration is basically stable, with a very slight decline until 2013 and a subsequent very slight increase. However, the share of the three largest banks can be characterised as 50%, the share of the five largest banks slightly above 60 %.

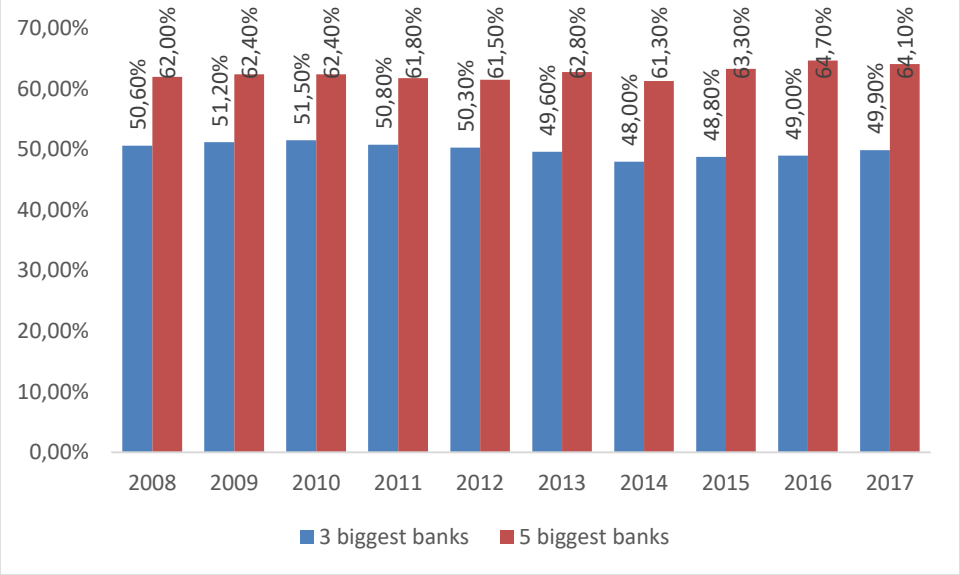

Figure 1 Concentration rate in the Czech banking sector (calculations by the authors based on data from the Czech National Bank, 2019)

The market share of the banks analysed for the period is summarised in the following table.

Tabulka 1 Vývoj tržních podílu vybraných bank dle hodnoty aktiv (calculations by the authors based on the Annual Report of each bank and Czech National Bank, 2019)

	Česká spořitelna	**ČSOB**	**MONETA Money bank**	**Raiffeisenbank**	**Equa bank**	**Sberbank CZ**
2008	18.02	17.46	2.44	4.49	0.08	1.18
2009	17.95	18.38	3.30	4.72	0.10	1.16
2010	18.43	18.60	3.33	4.43	0.11	1.18
2011	17.52	18.44	3.15	4.53	0.14	1.16
2012	17.46	17.81	2.94	4.27	0.19	1.32
2013	16.64	17.90	2.64	3.82	0.35	1.37
2014	15.91	15.87	2.72	4.26	0.52	1.26
2015	16.48	17.02	2.57	4.50	0.68	1.40
2016	16.76	17.67	2.52	5.34	0.74	1.21
2017	18.03	18.36	2.82	4.82	0.72	1.16

The figures show the decisive share of two large banks - Česká Spořitelna and ČSOB. Medium-sized banks are represented by MONETA Money Bank and Raiffeisenbank, whose share fluctuates around 3 or 5 percent. Small banks - Equa bank and Sberbank - occupy approximately 1% of the Czech banking market.

When calculating the correlation between the market share of selected banks and their profit, we first test the data for normality.

Table 2 Data normality test (authors' calculations)

	p-value	**Result of H_0**
Market share for České spořitelna	0.4439	not rejected
EBT for České spořitelna	0.0546	not rejected
Market share for ČSOB	0.1585	not rejected
EBT for ČSOB	0.0334	rejected
Market share for MONETA Money Bank	0.6333	not rejected
EBT for MONETA Money Bank	0.0741	not rejected
Market share for Raiffeisenbank	0.3448	not rejected
EBT for Raiffeisenbank	0.6532	not rejected
Market share for Equa bank	0.0365	rejected
EBT for Equa bank	0.4755	not rejected
Market share for Sberbank CZ	0.3454	not rejected
EBT for Sberbank CZ	0.2161	not rejected

The table shows that, except for the pre-tax profit of ČSOB and Equa bank's market share, all data have a normal probability distribution. For Česká Spořitelna, MONETA Money Bank, Raiffeisenbank and Sberbank, we can use the Pearson coefficient. For ČSOB and Equa bank we will use the Spearman correlation coefficient.

The following table shows the calculated correlation coefficients.

Table 3 Correlation coefficients for selected banks (authors' calculations)

	Pearson correlation coefficient	p-value	Decision of H_0
Relationship between market share and EBT – Česká spořitelna	-0.5344	0.090	not rejected
	Spearman correlation coefficient	**Critical value**	**Decision of H_0**
Relationship between market share and EBT – ČSOB	-0.136364	0.6091	not rejected
	Pearson correlation coefficient	**p-value**	**Decision of H_0**
Relationship between market share and EBT – MONETA Money Bank	-0.2192	0.517	not rejected
Relationship between market share and EBT - Raiffeisenbank	0.8010	0.003	rejected
	Spearman correlation coefficient	**Critical value**	**Decision of H_0**
Relationship between market share and EBT – Equa bank	0.054545	0.6091	not rejected
	Pearson correlation coefficient	**p-value**	**Decision of H_0**
Relationship between market share and EBT - Sberbank	-0.6492	0.031	rejected

The calculated correlation coefficients indicate that there is no linear relationship between Česká Spořitelna, ČSOB, MONETA Money Bank and Equa bank. In the case of Raiffeisenbank, we reject the null hypothesis that there is no relationship. Since Pearson's correlation coefficient was 0.8010, a strong positive correlation was confirmed. As the bank's market share grows, so does its profit. In the case of Sberbank, we also reject the null hypothesis. However, in this case, the Pearson correlation coefficient turned negative (-0.6492), indicating a strong negative correlation. As the market share of this small bank grows, its profit declines.

5 DISCUSSION OF RESULTS

The results achieved essentially correspond to the results of the research studies. Given that the results of the relationship between market power and profit are not unequivocal, it is also not possible to draw a definite conclusion on the relationship of these variables. This confirms the ambivalent results of previous studies, with some having a positive relationship, some with a negative relationship, and many studies having shown no relationship.

In our case, in four cases out of six, no relationship was found. Specifically in the group of large banks, one bank in the group of medium and small banks. In the case of Raiffeisenbank, there is a positive relationship between the development of market share and profit. In the case of Sberbank, on the other hand, there is a negative relationship between the development of market share and profit.

Therefore, the most common result is the absence of a relationship between the market share and the profit of the bank, regardless of the size and importance of the bank in the banking market. We explain this by the fact that a number of factors affect the bank's profit and the

size of its assets in reality. In the period analysed, the profits of large banks generally fluctuate around a certain value and do not evolve similarly to their market share, which declined until 2014, then rose slightly. The explanation is mainly the advent of small banks and their aggressive advertising campaign to draw customers from large banks. In recent years, the situation has relatively stabilised and large banks again have a similar market share as at the beginning of the period in question. This is due to the fact that the newly established banks have focused primarily on retail clients and for large banks, a significant part of their assets constitute business with corporate clients. At the same time, large banks have in recent years focused heavily on increasing productivity and reducing costs without striving to significantly increase market share.

Among medium-sized banks, in the case of Raiffeisenbank, we can explain the positive relationship in that it is an established bank in the market that does not need significantly higher costs to increase market share. A more detailed financial analysis shows that it is operating efficiently and therefore its market share is also reflected in the growth in profits. Another reason could be the connection with eBanka and the purchase of Citibank's retail portfolio. As a result, Raiffeisenbank gained a larger market share, including profitable products. In general, medium-sized banks are expected, due to their relative strength, to see a further slight increase in market share, which should also be reflected in an increase in profit.

Within the small bank group, Sberbank showed a negative relationship. This bank is not as well established on the market as Raiffeisenbank and therefore its market penetration has consumed considerable funds, which significantly reduces profitability. Generally, it is very costly for small banks to gain client confidence and then increase market position.

If we take the findings together, we can say that the Czech banking sector is also dominated by the absence of a relationship between the market shares and profits of individual banks. In addition to the above-mentioned factors specific to the banks analysed, this situation can be further explained by a number of bank-specific and macroeconomic factors. The former includes various approaches to risk management, high interconnection between banks and parent banks, the growing importance of financial innovation, etc. Macroeconomic factors include the rate of inflation falling to zero, leading to abnormally low interest rates, the financial crisis associated with a relatively sharp decline in economic performance and thus financial intermediation.

Of course, a factor not to be overlooked is the analysed time series of ten years. Furthermore, there may be a non-linear relationship of the given quantities. The Czech banking sector is also specific, with the vast majority of its assets being owned by foreign banks. For these reasons, it is certainly appropriate to continue to deal with these relationships and refine the current scientific knowledge in this area.

6 CONCLUSION

The results of the study on the relationship between market power and banks' profits in the Czech banking sector are ambiguous, as are the conclusions of the studies in this area. In the case of four banks (two large banks, one medium and one small bank) there was no linear relation of the variables being examined. In the case of one medium-sized bank, we have a positive relationship, in the case of one small bank, we have a negative relationship. We explain this ambiguity both by the effect of a number of factors affecting specifically the banks being analysed, and generally by factors affecting the entire banking sector, broken

down by bank-specific and macroeconomic factors. Of course, we are aware that other mathematical-statistical methods can also be used to investigate a given relationship. However, it is appropriate to continue the investigation.

7 ACKNOWLEDGMENT

This paper has been created with the financial support of the Czech Science Foundation (project GACR No. 17-02509S - Emerging financial risks during the global low interest rate environment) and the University of Pardubice (project SGS_2019_018 - Dynamics of economic aspects of public policies in the context of efficiency and sustainability).

8 BIBLIOGRAPHY

Athanasoglou, P., Brissimis, S., Delis, M. (2008). Bank-specific, industry-specific and macroeconomic determinants of bank profitability. *Journal of international financial Markets, Institutions and Money*, 18(2), 121-136.

Beck, T., De Jonghe, O., Schepens, G. (2013). Bank competition and stability: Cross-country heterogeneity. *Journal of Financial Intermediation*, 22(2), 218-244.

Berger, A., Klapper, L., Turk-Ariss, R. (2009). Bank competition and financial stability. *Journal of Financial Services Research*, 35(2), 99-118.

Casu, B., Girardone, C. (2006). Bank competition, concentration and efficiency in the single European market. *The Manchester School*, 74(4), 441-468.

Czech national bank. (2019). *Zprávy o výkonu dohledu nad finančním trhem*. Retrieved 03.07.2019 from https://www.cnb.cz/cs/dohled_financni_trh/souhrnne_informace_fin_trhy/zpravy_o_vykonu_dohledu.

Černohorská, L. (2015). Profitability Analysis of Selected Czech Banks and Their Foreign Owners. In *SGEM 2015: Political Sciences, Law, Finance, Economics and Tourism, vol II: Finance, Economics & Tourism*, Albena, 283-290.

Česká spořitelna. (2019). *Výroční zprávy.* Retrieved 09.03.2019 from https://www.csas.cz/cs/dokumenty-ke-stazeni#/17/Vyrocni-zpravy.

Československá obchodní banka. (2019). *Povinně uveřejňované informace.* Retrieved 09.03.2019 from https://www.csob.cz/portal/csob/povinne-uverejnovane-informace.

Dietrich, A., Wanzenried, G. (2011). Determinants of bank profitability before and during the crisis: Evidence from Switzerland. *Journal of International Financial Markets, Institutions and Money*, 21(3), 307-327.

Equa bank. (2019). *Povinně uveřejňované informace.* Retrieved 09.03.2019 from https://www.equabank.cz/dulezite-dokumenty/povinne-uverejnovane-informace.

Gilbert, R. A. (1984). Bank Market Structure and Competition: A Survey. *Journal of Money, Credit and Banking*, 16(4), 617-645.

Goldberg, L. G., Rai, A. (1996). The structure-performance relationship for European banking. *Journal of Banking & Finance*, 20(4), 745-771.

Moneta Money Bank. (2019). *Hospodářské výsledky.* Retrieved 09.03.2019 from https://investors.moneta.cz/financni-vysledky.

Petria, N., Capraru, B., Ihnatov, I. (2015). Determinants of banks' profitability: evidence from EU 27 banking systems. *Procedia Economics and Finance*, 20, 518-524.

Raiffeisenbank. (2019). *Výsledky hospodaření.* Retrieved 09.03.2019 from https://www.rb.cz/o-nas/kdo-jsme/vysledky-hospodareni/vyrocni-zpravy.

Sberbank. (2019). *Povinně uveřejňované informace.* Retrieved 09.03.2019 from https://www.sberbankcz.cz/vyrocni-zpravy-a-hospodarske-vysledky.

Short, B. K. (1979). The relation between commercial bank profit rates and banking concentration in Canada, Western Europe, and Japan. *Journal of Banking & Finance*, 3(3), 209-219.
Smirlock, M. (1985). Evidence on the (non) relationship between concentration and profitability in banking. *Journal of money, credit and Banking*, 17(1), 69-83.
Staikouras, Ch. K., Wood, G. E. (2004). The determinants of European bank profitability. *International Business and Economics Research Journal*, 3, 57-68.
Stiroh, K. J., Rumble, A. (2006). The dark side of diversification: The case of US financial holding companies. *Journal of banking & finance*, 30(8), 2131-2161.