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**ANALYSIS OF THE HUNGARIAN BANKS' PROFITABILITY AND EFFECTIVENESS
BETWEEN 2005 AND 2010**

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1. THE PAPER'S ANTECEDENTS AND ITS OBJECTIVES

1.1. The significance and actuality of the topic

In a bank *money* (external resources) represents raw material and *money* is also the result of the banking technology processes. While the financial and manufacturing processes are separated from each other at manufacturing companies, at banks both processes are related to money. A bank trades with trust and risks, while aiming to maximize results and it wishes to deliver the best possible results to its owners and its shareholders.

In the operation of a bank three main guiding principles must be met: *profitability, liquidity and solvency*, as shown in Figure 1.

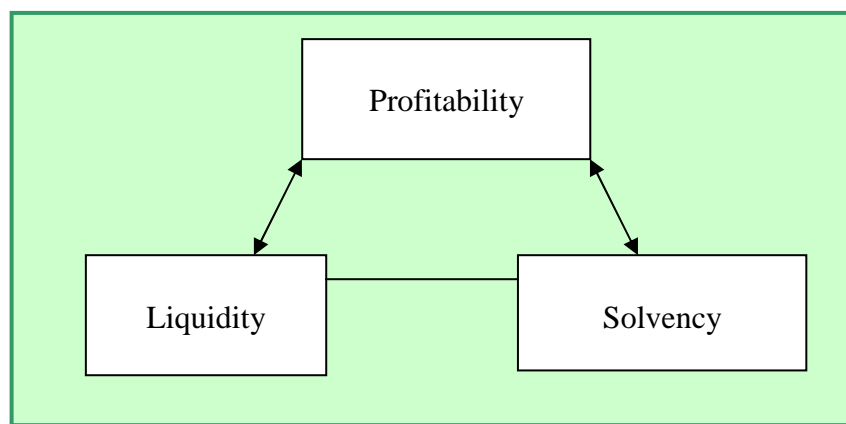


Figure 1: Banking operation principles and their relationship
Source: own figure

It is defined by the Act CXII of 1996 on Credit Institutions and Financial Enterprises (hereinafter referred to as Hpt.) as follows:

“A credit institution is required - in compliance with the prudential operation standards - to manage its own and foreign capital in a way to permanently maintain its immediate liquidity and its current solvency.”

A bank is liquid if it has sufficient financial resources to satisfy the currently arising legitimate claims, while a bank is solvent (permanently solvent) if its equity capital is positive, i.e. the market value of its assets exceeds the market value of its liabilities.

There has always been a great need for banks and this is expected to remain unchanged in the foreseeable future. Beside lending, collecting and handling household financial savings, banks have outstanding role in the functioning of capital markets as well as in financing developments and production. Their fundamental interest is to inform people about modern banking services and savings forms as well as the intermediation of market information and market value judgments.

It is essential to always have an up-to-date and reliable picture about a given country’s financial sector. Some part of the vertical and horizontal analyses cover the country’s financial intermediaries: the country’s banking system. The analyses are to primarily examine how the banking system is able to withstand external and internal shocks that in many cases can lead to financial crisis by generating unstable financial environment.

The analysis of the banking system and their lifetime is an extremely complex task since the ever-changing legal environment necessitates banks to perform tasks that have not been previously

exercised. To reduce risks arising from the changes of the regulatory environment banks should take measures that manifest both in their organizational adaptation and in the change of organizational structure following the financial market changes.

1.2. Objectives

My fundamental aim is to present the Hungarian commercial banking market, to examine profitability and effectiveness of the twenty selected commercial banks and to assess banks' competitiveness.

The research has five objectives:

1. The first objective of the research is to present the Hungarian banking sector including the establishment and the necessity of the two-tier banking system; to demonstrate economic policy and social situation of that time as well as the operation of commercial banks and the investigation and analysis of the environmental challenges faced by banks. This aim is intended to be achieved mainly by processing professional literature.
2. The second objective is to introduce the commercial banking market, to examine the profitability and effectiveness of the twenty selected commercial banks and to assess the banks' competitiveness.
3. The third objective is to examine the correlation between the size of the selected commercial banks and their profitability measured by efficiency indicators to determine the optimal size of a branch network.
4. The fourth objective is to investigate the regression relationships between the selected commercial banks' ownership structure and their efficiency measured by efficiency indicators to determine the most influencing factors of efficiency.
5. The fifth research objective is to anticipate the commercial banks' future activities with particular attention to the effects of the current global economic and financial crisis.

1.3. Hypotheses of the research

Based on the research objectives and professional literature, the following research hypotheses were formulated:

- 1) I assume that significant differences emerged between the domestic and foreign-owned commercial banks' operational efficiency for the benefit to foreign-owned banks.
- 2) Commercial banks endeavour for total territorial (countrywide) coverage to be able to serve clients with the widest range of products and services.
- 3) Hungarian owned banks play a subordinate role in the system of commercial banks.
- 4) The increase in the size of banks is associated with profitability and efficiency improvement.
- 5) The establishment of an appropriate ratio of loans and deposits play an important role in the efficiency of banks.

- 6) At the beginning of the examined period banks placed emphasis on expanding their network, however, during the last years of the investigation period they changed their strategy and rather focused on stabilization and concentration.

2. MATERIALS AND METHODS

In this chapter I present the data used in the analysis with their sources and the methods of processing them. This section shows the results of my primary research.

2.1. Databases used for the analysis

Database I.

The first database was the banks' annual reports and their websites that helped to survey the banking sector players between 2005 and 2010. Only banks were examined in the analyses excluding specialized credit institutions and other specialized financial institutions. In the analysis data of profit and loss statement and balance sheet reported by the banks to the Hungarian Financial Supervisory Authority (hereinafter referred to as HFSA) were used. Year-end data for 2005-2010 were collected for those 20 banks that operated continuously during that period. Thus, a total of 120 panel data were available. I wish to prove my hypothesis by analyzing this database.

By the use of information available at the balance sheets and profit and loss statements indicators, index numbers and complex indicators were created by using amongst others the following data: loans, deposits, general administrative expenses, balance-sheet total, net income, profit before tax, equity, interest rate spreads, interest payables and total assets.

The database used contains the following information for the selected 20 banks, which continued to operate between 2005 and 2010:

1. significant information about banks (ownership structure, credit institutions' group categories applied by HFSA, market share),
2. information related to operation (branch number, loans, deposits, general administrative expenses, balance sheet total, net income, profit before tax, capital equity, interest rate spreads, interest payables).

Explanation:

- a) *Credit institutions' group categories applied by HFSA are used with year-end data of 2010, according to which categories of small and medium-sized and large banks are distinguished in the analysis.*
- b) *Ownership structure is defined as shareholders in proportion to the subscribed capital.*

Database II.

Database II. is intended to supplement the first database. In this database I determine the banks' market shares according to ownership structure and size. The basis for determining banks' market share was their balance-sheet total and profit before tax for the period between 2005 and 2010, in addition the change in the banks' balance sheet total is also analysed.

2.2. Applied methods for data analysis

2.2.1. Processing professional literature

I wish to prove my previously stated objectives and hypotheses by processing professional literature as secondary research results. That is why processing professional literature was entirely subordinated to this aim. My research is mainly based on books, studies and articles published by prominent representatives of domestic professional literature, which provided complex and comparative perspectives. Understanding the problems and the novelty of this field I considered it important to evaluate and process the available domestic banking sector analyses, regulations, laws, statistic databases and analyses.

2.2.2. Statistic, quantitative methods, database analysis

To prove my hypotheses I conducted primary researches based on the compiled databases, in which **mathematical methods of statistics** were applied.

Data processing and statistical analysis were concluded with *MS Excel and SPSS 16.0 for Windows* statistical software package.

With respect to methodology prominent importance was attributed to:

1. *Panzar-Rosse model* (assessing the degree of competition among banks *on the basis of H-statistic*),
2. *the value of Herfindahl index* (to determine the concentration of competition among banks),
3. *calculation of complex indicators (indices)*,
4. *single factor analysis of variance (ANOVA)* (to the comparison of size and ownership structure),
5. *linear regression analysis*.

The Panzar-Rosse's H-statistic model and its application

The Panzar-Rosse (PR) model is the most commonly applied model for measuring the intensity of competition in the banking market. The model helps to determine whether the market competition on a given market is monopolistic, oligopolistic or fair.

The Panzar-Rosse model tends to determine *H-statistic* that summarizes the specific bank interest income (margin) on input price elasticity coefficients. *H* measures the degree of competition and it is the sum of the elasticity coefficients on factor prices (FP) of equilibrium interest income (Π), which can be expressed by the following formula:

$$H = \sum (\partial \Pi / \partial FP)(FP / \Pi)$$

Panzar-Rosse model states:

- if $H \leq 0$ monopoly equilibrium evolves: each bank operates independently as it would maximize its profit in a monopoly environment or in a perfect cartel (this is more likely in a multiplayer market),
- if $0 < H < 1$ there is monopolistic competition on the market with free entry (the value of *H* increases with respect to demand elasticity),
- if $H = 1$ perfect competition characterises the market.

The main advantage of H-statistic estimated with Panzar-Rosse model is that the indicator whose value lies between 0 and 1 reflects the degree of competition as a continuous variable. The closer the value is to 1, the stronger the competition is and vice versa. H-statistic's data requirement is minor, its estimation is simple.

The Herfindahl index and its application

The Herfindahl index (also known as Herfindahl-Hirschman Index) is a measure of market concentration. It is defined as the sum of the squares of the market shares expressed in percentage, a concentration index for measuring banks' size structure.

The value of HHI ranges from 0 to 1. Values close to 0 mean that there is a huge number of players in the market with low market shares, whereas values close to 1 reflect a monopolistic or at least an oligopolistic situation.

It can also be expressed as a percentage (HI); in this case the index ranges from 0 to 10.000. This is actually the sum of squares of market share percentages.

Formulating complex indicators (indices)

Formulating complex indicators enables variables of different scale types to be considered simultaneously, while the variables are combined in a single variable.

Steps of the method:

1. determination of the values of profitability and efficiency indicators in percentage,
2. projection of the values of indicators on a scale ranging from 1 to 100, which are also equal to the sub-indices as follows:

$$I_i = \frac{X_i - X_{\min}}{X_{\max} - X_{\min}} * 100$$

where X_{\max} and X_{\min} presents the two extremes of the selected indicator and X_i is the i-th profitability or efficiency indicator.

The value of the complex index can be obtained out of the sub-index indicators thus introduced by a simple arithmetic average, using the following formula:

$$\text{Index} = \frac{\text{sub-index1} + \text{sub-index2} + \text{sub-index3}}{3}$$

The interpretation of single factor analysis of variance (ANOVA) and its application

ANalysis Of VAriance - a statistical method suitable to compare the averages of several groups with equal deviation and normal distribution.

It seeks explanations for differences and changes. It compares the different mean values of the population with help of variances differently determined. It analyses the total amount of data generated during a given examination as the total deviation, that is the total variance of the

universal set to find an answer for the cause of fluctuations. It helps to clarify whether the above mentioned differences in deviation can be attributable to a random or another explanatory factor. It derives the calculation and estimation of variance on the basis of the mathematical fact that the total variance's numerator, i.e. the entire deviation of the sum of squares can be obtained as the amount of independent elements as well as the denominator, that is, the degree of freedom are to be obtained as the sum of the degrees of freedom of the given components.

Null hypothesis

- There is no difference in the mean values, the works / groups are identical by the average of the target variable in each sample / work group.
- If the empirical significance level (p-value) is ≤ 0.05 , then the null hypothesis is rejected, there are differences, the averages are not equal.
- If the significance level > 0.05 , then the null hypothesis is accepted, there is no difference, the averages are equal.

If the analyses of variance leads to the result that the averages do not differ from each other, no further action needs to be done, however, in significant case, further statistical analysis is required to refine the results.

The interpretation of linear regression analysis and its application

One of the most important practical applications of mathematical statistics is regression analysis. Its function is to model the relationship between two or more random variables, that is the search for the functional relationship between explanatory variables (also known as independent variables) and a dependent variable. Explanatory variables are denoted by X, while the dependent variable is marked by Y. It is assumed that the relationship among variables X and Y can be expressed in a function, which can be illustrated by the following formula:

$$Y = f(X), \text{ in case of more independent variables } Y = f(X_1, X_2, \dots, X_i)$$

The basic equation of multiple linear regression is as follows:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + \dots + b_iX_i + \varepsilon$$

Y: dependent variable

$X_1, X_2, X_3, \dots, X_i$: independent variables or explanatory variables

i: the number of explanatory variables

a: (with another indication α) constant with invariant value (it gives the intersection of regression line and the coordinate system's vertical (y) axis).

$b_1, b_2, b_3, \dots, b_i$: constant regression coefficients (it gives the slope of the regression line, it graphically indicates to what extent the unit change of independent variables changes the dependent variable)

ε : error factor error term, random error (the role of random is denoted by ε involved in the regression equation or e or h error term).

As the first step of model building with this method, we examine whether linear relationship exists among the variables, that is, whether the independent variables have an effect on the dependent variable. This is done by using a linear function. By marking the dependent variable on the vertical (y, ordinate), while showing the independent variable on the horizontal (x, abscissa) axis in the Cartesian coordinate system a curve is drawn. If it is similar to an elongated ellipse, linear relationship can be assumed among the variables.

The null hypothesis of the method states that there is no linear relationship between the dependent and independent variables.

The information on the strength of the relationship is shown by the coefficient of determination (r^2). The value of r^2 ranges between 0 and 1 and it describes to what extent the independent variables explain the dependent variable's sum of squares of total deviation. Its significance can be checked by the F-test that can be perceived as the generalization of t-test.

2.2.3. Analyses of balance sheet and profit and loss statement

Through the analysis of the investigated banks' balance sheets and profit and loss statements I revealed the processes of the reference period and the banks' financial performance.

The banks' profitability and efficiency were investigated on the basis of the two **indicator groups** as well as by solvency capital analysis and they were compared accordingly.

Profitability indicators

- ROA (Return on Assets)
- ROE (Return on Equity)

Efficiency indicators

- assets - liabilities relationship (the ratio of total loans and total deposits)
- ratio of loans (ratio of loans to total assets)

Analyses of solvency capital

2.2.4. Other methods

To verify the above calculations I also conducted personal consultations. I had the possibility to get acquainted with several Hungarian financial experts' opinions and thoughts in the course of interpreting and assessing the deeper and the more complex relationships of the theme. When assessing the calculations I also took into account my professional experience of more than 10 years. My additional knowledge used for the technical and professional preparation of my research was mostly acquired at domestic conferences and lectures.

3. RESULTS

3.1. The results of secondary researches

By processing professional literature my primary goal was to prove the main hypothesis by the results of the secondary research, according to which it was assumed that significant differences emerged between the domestic and foreign-owned commercial banks' operational efficiency for the benefit to foreign-owned banks. That is why, processing professional literature was entirely subordinated to this aim. As processing professional literature did not provide a reliable picture alone, I aimed to examine this hypothesis at the primary tests too.

3.2. The results of primary researches

This chapter of my thesis presents the results of my primary researches in the following four major sections:

- In the first part the Hungarian banking system was scientifically investigated, the degree of competition among banks and the concentration of the banking market were determined.
- In the second and in the third parts banks' market shares and their territorial coverage were examined.
- In the fourth part banks' profitability and efficiency were analyzed.

As a data source the supervised institutions' annual electronically submitted audited data service to HFSA was considered.

3.2.1. Banks' competitive situations, scientific analysis of the Hungarian banking competition

Two disputant views prevail in the professional literature of banking competition. The first is the projection of conventional approach (analytical framework formed to industrial organizations focusing on efficient production) on the banking market too, meaning that the stronger competition is also desirable among banks, as it allows to minimize costs, as well as to promote prices of banking services that facilitate the efficient allocation of resources. The other view is that if banks have market power they will use it to charge higher lending rates and pay lower deposit interest rates, hereby increasing transaction costs and distorting consumers' and producers' savings and investment decisions.

The competition has always existed in the banking sector.

First of all, it shall be clear what is meant by bank competitiveness at the assessment of competition among banks. Experts say, bank's performances need to be evaluated primarily from the consumers' point of view. Nowadays, when banks symbolize the economy, the wealth and the huge failures customers are particularly inspired by the price and the quality of services when choosing a bank. The condition of the banks' effective participation in the competition is thus to meet clients' (consumers') needs as widely as possible.

For measuring the degree of competition among Hungarian banks for the investigated period I also applied the determination of this field's most commonly used H-statistic based on the Panzar-Rosse model.

All commercial banks were involved in the study, which continuously operated during the investigated period (2005-2010). Banks included in the study are as follows in alphabetical order:

- 1) Banco Popolare Hungary Zrt.
- 2) Bank of China (Hungary) Close Ltd.
- 3) Budapest Hitel- és Fejlesztési Bank Rt.
- 4) CIB Közép-Európai Nemzetközi Bank Ltd.
- 5) Commerzbank Zrt.
- 6) Deutsche Bank Zrt.
- 7) Erste Bank Hungary Rt.
- 8) Gránit Bank Zrt.
- 9) Hanwha Bank Hungary Co. Ltd.
- 10) KDB Bank (Hungary) Ltd.
- 11) Kereskedelmi és Hitelbank Rt.
- 12) Magyar Takarékszövetkezeti Bank Rt.
- 13) Volksbank Hungary Ltd.
- 14) Merkantil Váltó- és Vagyonbefektető Bank Rt.
- 15) MKB Bank Nyrt.
- 16) Országos Takarékpénztár és Kereskedelmi Bank Plc.
- 17) Porsche Bank Hungária Zrt.
- 18) Raiffeisen Bank Zrt.
- 19) Sopron Bank Burgenland Zrt.
- 20) UniCredit Bank Hungary Zrt.

Table 1. shows the development of the Hungarian banking market's concentration for the investigated period.

Table 1.: The development of the Hungarian banking market's concentration

Year	Number of banks	The proportion of large banks (%)	HI - all banks	HI - large banks
a)	b)	c)	d)	e)
2005	20	91.45	1 343	1 333
2006	20	92.13	1 368	1 359
2007	20	91.81	1 352	1 342
2008	20	91.67	1 292	1 281
2009	20	92.60	1 383	1 374
2010	20	92.22	1 363	1 353

Source: Own calculation based on the banks' annual reports

Herfindahl index (hereinafter HI) in the table is determined by analysing all the examined banks' market shares, results are shown in column d). HI was further examined in relation to the large banks¹, it is included in column e).

¹ Large banks: BB, CIB, Erste, K&H, MKB, OTP, Raiffeisen, UniCredit

By determining the value of the index I examined each bank's market share separately and the percentage of their annual balance sheet total out of all banks' balance sheet total. The market shares in percentages were squared and then summed.

It can be seen that HI values have not been significantly changed between 2005 and 2010 neither in case of all banks nor in case of large banks. The concentration of the banking market slightly reduced only in 2008 during the investigated period.

In terms of market power it is important to note that the HI values of large banks are almost the same as it is for all the examined banks each year. In my opinion, this is mainly due to that - as it is shown in column c) of the table - large banks' balance sheet total exceeds 90 percent of the banking sector's balance sheet total.

In most cases, Herfindahl index below 1000 indicates an unconcentrated market, values between 1000 and 1800 indicates moderate concentration while values above 1800 indicates high market concentration. On the basis of the above, it can be concluded that the banking market in Hungary was *moderately concentrated* in the investigated period.

Following the definition of the banking market's concentration, I searched to find an answer for the intensity of competition in Hungary in a balanced market structure and how it changed between 2005 and 2010.

During my research I analysed the lending market competition. Basically, the main source of banking income is interest income which is largely dependent on what margin banks can apply between loan and deposit interest rates.

In the Panzar-Rosse model market power is measured by how a unit change in input prices is reflected in the equilibrium income of a given bank.

To determine *H-statistic* in the period of 2005-2010 altogether 120 panel data were used for the total of 20 banks. The parameters of the linear regression model were determined by SPSS 16.00 statistical software package. The model was run by the ENTER procedure, in which all independent variables are simultaneously included in the model and their combined effect is examined.

x_1 = interest payables (million HUF)

x_2 = general administrative cost (million HUF)

x_3 = income on other (non-interest rate) assets (equity capital plus interest-bearing assets (securities held for trading + securities held for investment + bank and interbank deposits + loans)) (million HUF)

x_4 = bank-specific factor affecting interest income - the ratio of loans to total assets (%)

x_5 = bank-specific factor affecting interest income - equity on assets (%)

y_1 = interest income (also called interest margin or interest spread)

While the classic Panzar-Rosse model distinguishes three factor prices: the interest expense, personnel expenses and the costs of physical capital and materials, I differentiated only two factor prices in my research as in the Hungarian banks' public profit and loss statements only the general administrative expenses summarizing other costs can be extracted besides interest payables.

On the basis of the estimated result of the interest income equation H-value is 0.221, which is highly significantly different from 0 and 1, meaning that in the period of 2005-2010 neither cartel,

nor perfect competition characterized the Hungarian banking market. *My estimation showed weak oligopolistic competition for all banks.*

Continuing the investigation I also determined the value of the H-statistic for size categories. The study resulted that the small and medium-sized banks' H-value equalled zero (neither of the two factor prices - interest payables and general administrative expenses - was significant), while large banks' H-value was 0.689. *My estimation reflected medium or slightly stronger monopolistic competition for large banks.*

The above investigations confirm that banking competition can be considered as the competition of large banks since the 8 large banks in Hungary give more than 90 percent of the banking sector's balance sheet total.

3.2.2. The analysis of commercial banks' market shares

The banking sector (the examined twenty commercial banks) closed almost every year successfully during the investigated period. Since the beginning of 2008, however, the availability of external funding sources decreased and as of the third quarter the possibilities for the banking sector has significantly narrowed due to the global financial and economic crisis.

Loans and deposits continuously grew until the crisis (Figure 2).

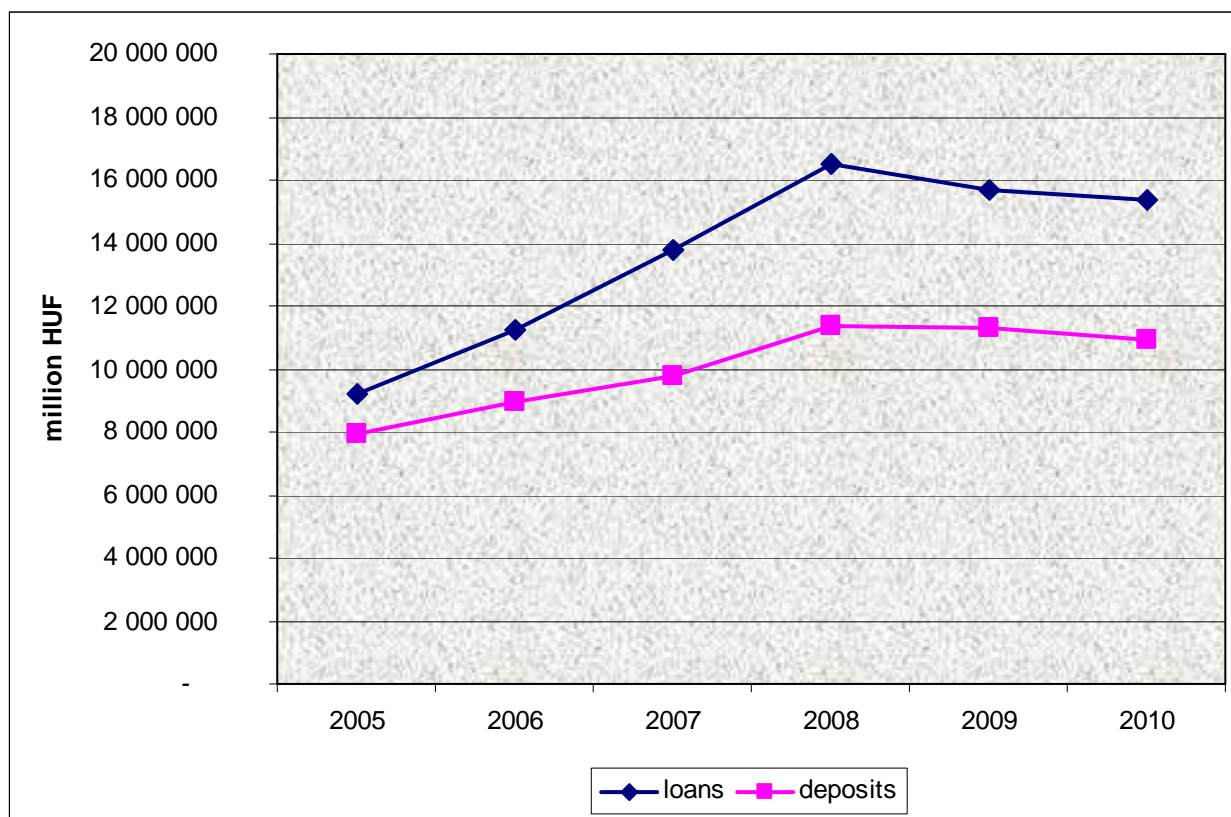


Figure 2: Loans and deposits between 2005 and 2010

Source: own figure based on HFSA data

The crisis of confidence starting at the end of 2008 has particularly made the Hungarian banking system fragile. On one hand, loans exceeded deposits and on the other hand nearly two-thirds of loans were of foreign currency. Partly for this reason and partly because of the decrease of foreign sources previously mentioned it became uncertain for most banks whether they can maintain their

main income base, i.e. their lending activity. At the end of 2008 the negative signs of the financial and economic crisis appeared in the banks' balance sheets as a significant increase in provisions and in the value of deterioration in proportion to client loans.

As of the end of 2008 banks tightened their lending criteria: interest rate risk premium were increased and the terms were shortened. This led in particular to the reduction of loans and deposits in 2009 and 2010.

The dynamics of household sector borrowing was only partially reduced resulting in an insignificant deterioration in banks' loan portfolios. The major part of the loan portfolio's deterioration was attributable to the lack of demand for loans in the manufacturing, construction and real estate sector. Due to the increasing cost of funds the interest income arising from the difference between lending and deposit interest rates also dropped.

The declining profitability is often not only expressed in lower profitability in proportion to the growing assets but it also consequences and impact on equity capital. At some banks (MKB, K&H) the previously mentioned write-offs and provisions have not only reduced profit but also capital equity. However, there were banks (e.g. Raiffeisen) where equity capital was not reduced since the owner compensated it by capital increase. In addition, my view is that the crisis has affected those banks more heavily already in 2009-2010 who offered loans in HUF or in foreign currency with weaker lending criteria in the pre-crisis years to increase market share and profits.

Banks' market shares to balance sheet total during the investigated period are shown in Figure 3.

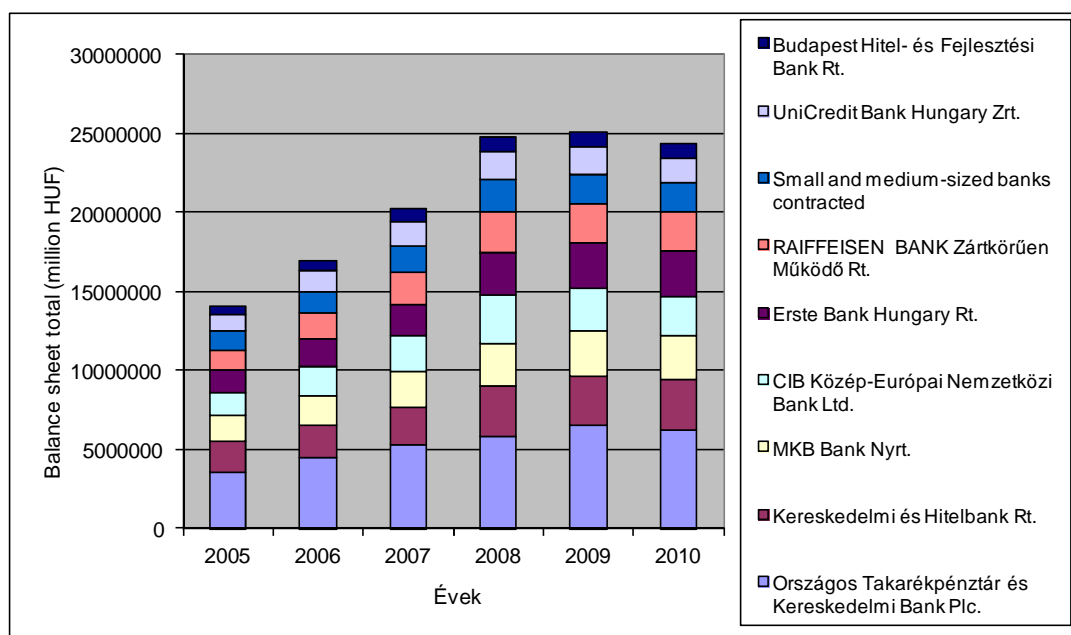


Figure 3: Banks' market shares to balance sheet total

Source: own figure based on HFSA data²

The market structure evolution resulted in 5-6 strong universal banks dominating the Hungarian banking market, while the number of medium-sized banks stabilized at around 10-12. The large commercial banks are in constant competition for client acquisition and to conquer the market but the competition to obtain places behind the domestic retail market leader OTP Bank is neither negligible.

² Comment: small and medium-sized banks are contracted in the chart for better perspicuity

OTP Bank owned the largest market share in the investigated period. In my view, it is unlikely to change in the foreseeable future. The second place was owned by Kereskedelmi és Hitelbank (K&H), while the majority of places were shared by MKB, CIB, Erste and Raiffeisen. UniCredit (HVB Bank until 2007) ranked at only the seventh place in banks' balance sheet total in spite of its dynamic development in 2005-2006.

Figure 3 illustrating the banking sector's market share clearly shows that the eight large banks constitute the banking sector's market share of over 90 percent.

3.2.3. The analysis of commercial banks' regional coverage

Prior joining the European Union on 1 May 2004 the segment of credit institutions has undergone profound changes. Financial services' ownership, institutional and product structures typical of a modern market economy were developed, therefore making the domestic financial sector able to meet the EU's single financial market's requirements. Due to the EU accession foreign-owned banks gradually took over the management of the existing banks and as a consequence, the structure of the market was rearranged and the exposure to international competition and dependence was increased. Similarly to Western Europe several bank mergers took place (ABN-Amro and K&H; BACA and Hypobank, Postabank and Erste Bank, MKB and Konzumbank, CIB and Inter-Europa Bank), resulting in the initiation of convergence in the country's "under-banked" areas.

From 2005 until 2010 the number of financial institutions (banks, specialized credit institutions, other financial institutions) in Hungary was as follows: in 2005 37, in 2006 and in 2007 40, in 2008 41, in 2009 and in 2010 40 institutions. It can be seen that the number of new players is few. This is largely due to the fact that the domestic banks' standards are appropriate and the new players entering the market are not able to provide much better services than the existing banks.

In my opinion, the development of retail business played a major role in the increase of balance sheet total between 2005 and 2008. In contrast to the stagnation in the number of banks, the networks of banks (branches) were steadily increasing up to 2008, which is presented by Table 2.

Table 2.: The development of branch numbers of commercial banks

Year	Number of branches	Change (%)
2005	1 206	
2006	1 271	5.39
2007	1 399	10.07
2008	1 568	12.08
2009	1 591	1.47
2010	1 521	-4.40

Source: own figure based on HFSA data

Most of the domestic financial institutions had branch opening fever between 2005-2008 due to retail clients' demand and a sharp increase in demand for mortgage loans. Banks running behind OTP bank intend to catch up on the retail banking market by dynamic branch expansion. Based on data of 2008 OTP Bank is the market leader, K&H bank operates the second largest network, Erste Bank is ranked third, followed by Raiffeisen and the fifth is CIB Bank. The ranking in 2009 and in

2010 has been slightly modified, the fourth and the fifth places changed between Raiffeisen and CIB Bank. It can be seen that the banks running behind OTP intend to catch up on the retail banking market by dynamic branch expansion. This sequence is expected to remain unchanged in the next few years as OTP bank owning the largest branch network is still going to possess at least twice as much branch than K&H bank on the second place.

Branch opening fever seemed unstoppable until the burst of the crisis. Retail clients' demand and a sharp increase in demand for mortgage loans encouraged financial institutions to open branches. The majority of financial institutions supported qualitative expansion so that they planned their branch openings at the busiest points of the city or its region. For this reason new branch openings were preferred primarily in Budapest and in the richer surroundings as well as in the county seats.

Bank experts say the Hungarian market was not that saturated in the period between 2005 and 2010 as the Western European ones or the American was that is why there were places for establishing new branches.

In autumn 2008, the effect of the financial crisis started from the sub-prime market of the USA in 2007 began to be felt by domestic banks. The international economic crisis made Hungarian banks more cautious and uncertain. As far as banks' organizational growth is concerned, some of them have already modified their branch opening concepts in 2008 and in 2009 due to the effects of the crisis, while others reconsidered their expansion strategies in 2010 and in 2011. This also contributed to the fact that in 2010 the number of commercial bank branches was reduced by about 4.5 percent compared to 2009.

Although the crisis slowed down branch opening plans but they did not stop completely. Even in the time of the crisis banks continuously search for potentials where such a branch can be opened that returns the invested capital in a longer term. Though, due to the temporarily decreased turnover caused by the crisis some banks (e.g.: CIB, Raiffeisen, Erste) decided to close branches in the last two years, probably they will give up their concepts of network expansion only after serious consideration.

The increasing state cuts and fewer business opportunities resulted that the number of operating branches significantly shrank since 2009 and several jobs in financial institutions were terminated due to the crisis.

This can mostly be attributed to credit institutions - not taking into account the severity and duration of the crisis - carefully considering their concepts for organizational growth in the light of the forecast of the crises in 2010 and in 2011.

Following branch closures it is rather the transformation and the appreciation of branches that can be felt as clients more often use electronic channels for routine banking transactions and branches specialize at financial advisory and selling new types of products. Although the number of clients who complete transactions in the branches decrease due to the users of electronic channels they are replaced by those who are interested in new (more often investment) products, thus a more complete national coverage of branch network is essential to be able to serve potential clients at the appropriate level.

According to the regional breakdown of branches - Figure 3 - it can be said that due to the expansion of the branch network the country's western and eastern parts are spatially equalized - 28% of the branches located in West, 32% is in East. The Central Hungarian region was able to increase its proportion within the network in the investigated period due to the strong development of branch network in Budapest.

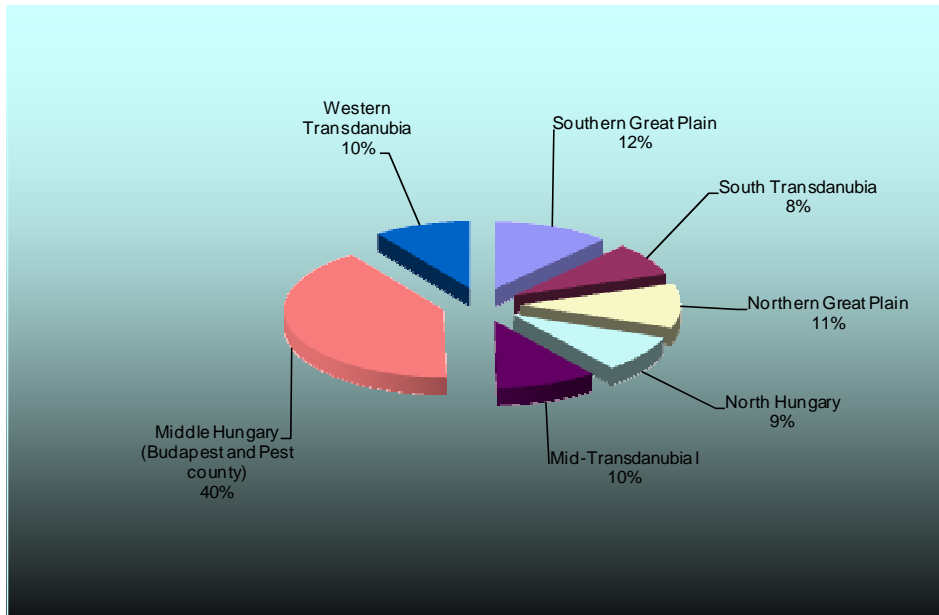


Figure 3: The national coverage of commercial banks
 Source: own figure, on the basis of data of January 2012 in POI database

3.2.4. The analysis of banks' profitability and effectiveness

During processing professional literature I reviewed the events of the past 20 years that played a major role in the development of the domestic financial sector's current situation. In these two decades many developments took place compared to the Western European countries. On the basis of the clients' needs and of the results of the available resources certain banking services are of a particularly high quality, while others are specifically undeveloped. These greatly affect the profitability and the efficiency of the banking sector.

Profitability and efficiency can mostly be analysed through information based on balance sheet data.

While the market structure analysis uses the current market share to give a picture of the quality of the relationship among banks and to indirectly show the strength of competition among banks, the analysis based on balance sheet data, in my opinion, provides more useful information. The prudentially chosen indicators and limit values give reliable results about the current state of the banking sector; moreover, the market position of competitors can also be viewed by comparing the indicators.

I collected the following information from the banks' annual reports and profit and loss statements for the period between 2005 and 2010:

- Branch number (units)
- Number of employees (persons)
- Loans (million HUF)
- Deposits (million HUF)
- General administrative expenses (million HUF)
- Balance sheet total (million HUF)
- Profit before tax (million HUF)
- Profit after tax (million HUF)
- Capital equity (million HUF)
- Interest rate spread (million HUF)

- Interest payables (million HUF)

At analysing the banking sector we can obtain more useful data if we form indicators by using the data of profit and loss statements. The choice of the appropriate indicators and their proper use might enable us to point out important relationships in connection with the management of financial institutions. The use of indicators conduces the recognition of those relationships that cannot be obtained directly from the financial statement - annual report -, and on the other hand it conduces to the comparison of financial institutions with different sizes and capabilities.

Profitability indicators measure the effectiveness of the banks' operations expressed in percentage or in Hungarian Forint. Overall, a bank is profitable if its profit before tax is positive. At profitability analysis it is observed how the achieved result is related to other resources, for example to assets, to number of employees or to equity capital. In case of banks, we can apply different types of profit categories at the calculation of indicators. We can calculate with the balance sheet total or with the profit before tax, but it is always recommended to apply a profit category that does not include profit distorting factors.

The profitability and efficiency indicators were analysed on the basis of banks' balance sheets and profit and loss statements.

Profitability indicators

- *ROA, Return on Assets*
- *ROE, Return on Equity*

Efficiency indicators

- *Assets-liabilities relationship, that is, the ratio of total loans and total deposits*
- *Ratio of loans*

After defining the indicators I analyzed the competitiveness among banks from a system approach, I made detailed calculations for each of the aforementioned four indicators. As for the operation of banks ROA (Return on Assets) and ROE (Return on Equity) analysis and assessment are the most important.

At the assessment of both ROA and ROE the single factor analysis of variance was applied, which resulted in the empirical significance level of 7.8 percent, meaning in my case that there is no significant difference in the domestic and foreign-owned banks' profitability, that is, foreign banks' ROA and ROE means are equal to the Hungarian banks' ROE and ROA means.

Despite of the high degree of foreign ownership ratio presented during the procession of professional literature the experiments supported by the indicators did not show significant difference.

After verifying that due to the strong causal relationship between banks' profitability and efficiency appropriate and acceptable statistical analyses cannot be performed with simple indicators I composed complex indicators.

I performed two researches by the analysis of complex indicators.

Analyses 1.

I selected three profitability indicators from which I composed sub-indices and from the three profitability sub-indices I compiled the complex profitability index.

The three profitability indicators are as follows:

$$\frac{\text{Profit after tax}}{\text{Total assets}} \times 100$$

$$\frac{\text{Profit after tax}}{\text{Equity capital}} \times 100$$

$$\frac{\text{Interest rate spread}}{\text{Total assets}} \times 100$$

After the composition of indicators sub-indices were formed and on the basis of the sub-indices' arithmetic means complex profitability indicator was composed.

Following the composition of complex profitability indicator a single factor analysis of variance (One-Way ANOVA) was applied to present the significant difference between the small and medium-sized and large banks' profitability.

My hypothesis proved to be correct as the empirical significance level was 1%, meaning that significant difference can be shown in profitability among the size categories of banks.

Analyses 2.

I selected three efficiency indicators from which I composed sub-indices and from the three efficiency sub-indices I compiled the complex efficiency index.

The three efficiency indicators are as follows:

$$\frac{\text{General administrative expenses}}{\text{Total assets}} \times 100$$

$$\frac{\text{Equity capital}}{\text{Total liabilities}} \times 100$$

$$\frac{\text{Deposits}}{\text{Total assets}} \times 100$$

Following the composition of complex efficiency indicator a single factor analysis of variance (One-Way ANOVA) was applied to present the significant difference between domestic and foreign-owned banks' efficiency.

The hypothesis turned out to be incorrect as the empirical significance level was 8.9%, meaning that significant difference cannot be indicated in operational efficiency among Hungarian and foreign-owned banks.

At the assessment of banks' profitability and effectiveness the investigated period can be divided into two main sections, for the period of 2005-2008 and of 2008-2010. As of 2008 banks had to record much higher deterioration than in the previous years due to the crisis and following the previous years of expansion they had to significantly reduce their activity. (Although it was not tested by statistical methods but it was mentioned at the examination of the banks' market shares.)

The crisis certainly enhanced adjustment processes and increased the risk of foreign banks leaving the country. The signs of which cannot be seen and hopefully this will not occur in the Hungarian banking sector in the future.

The domestic banking sector may experience several changes similarly to international trends. Organizational arrangements and institutional transformations (subsidiaries turning into branch offices) can be expected. Acquisitions and mergers also offer opportunities for banks. Although the probability of establishing a completely new bank is small we cannot exclude it. The development of the market's future state is highly dependent on the regulations determining market players' activities.

3.3. New and novel scientific results

Taking into account the objectives defined in the introduction and on the basis of my researches my new and novel scientific results are summarized in the following points:

1. Secondary research results obtained during processing professional literature verify that in the commercial banking market of Hungary more than 90 percent is attributable to foreign-owned banks. *Therefore, I rightly assumed that there is a significant difference in the operational efficiency of domestic and foreign-owned banks' for the benefit of foreigners.*

Despite of their high presence in the Hungarian banking market, significant difference in their operational efficiency cannot be demonstrated compared to the Hungarian banks' operational efficiency.

2. It has been statistically proved that the competition among Hungarian commercial banks is oligopolistic according to its nature, the banking market is moderately concentrated and it is unlikely to change in the coming years. The banking sector's competition is practically the competition of eight large banks since the eight large banks give the market share of over 90 percent.

My statement was proved by the analysis of market structure (by ranking banks' balance sheet total) and by models estimating banks' competitive behaviour.

3. Through the complex analysis of commercial banks' balance sheet and profit and loss statement it has been proved that commercial banks' territorial (national) coverage is adequate in Hungary as all of the eight banks are present in all regions. The majority of large

banks prefer the capital and medium-sized cities; OTP and K&H banks see potential also in smaller towns to increase income. In terms of branch network the western and the eastern part of the country are spatially equalized. *This verified my hypothesis that commercial banks endeavour for total territorial (countrywide) coverage to serve clients with the widest range of products and services possible.*

Although branch closures caused by the crisis deteriorate territorial coverage but it is unnotable in the quality of client service since banks take client service into account before deciding about branch closures.

4. It can be stated on the basis of the database compiled of banks' balance sheets and profit and loss statements data that profitability is rather related to the *size of the banks*.

With this statement, the following hypotheses have been verified:

- *Hungarian owned banks play a subordinate role in the system of commercial banks.*
- *The increase in the size of banks is associated with profitability and efficiency improvement.*
- *The establishment of an appropriate ratio of loans and deposits play an important role in the efficiency of banks.*
- *At the beginning of the examined period banks placed emphasis on expanding their network, however, during the last years of the investigation period they changed their strategy and rather focused on stabilization and concentration.*

My statements have been confirmed by compiling and analysing complex indicators.

4. CONCLUSIONS AND PROPOSALS

Today, the number of credit institutions operating as a public limited company equals thirty-five in Hungary. Most of them are foreign-owned. In terms of size large banks, small and medium-sized banks and specialized credit institutions are distinguished. The key elements of banking activities:

- business-like deposit collection,
- credit and loan contracting,
- provision of payment services.

Only banks are entitled to carry out the full range of financial service activities. Specialized credit institutions' (building societies, mortgage banks) activities are limited compared to banks they are entitled to pursue only those specific activities that are permitted by the relevant special laws.

It is not enough to analyse Hungary's banking system within the country's borders since all of the international trends - concentration, liberalization, harmonization and globalization - have significant impacts on the domestic banking world. Because of the inseparable politics among developed countries and the connections in economy, if the domestic banking system is analysed it is recommended to analyse it together with the international situation.

Commercial bank' profitability and efficiency can be improved in basically two ways:

- **First, more attention should be paid to the optimization of operating costs.** Due to the crisis this has already begun in 2009 and in 2010 and it is mainly implemented in branch closures and dismissals.
- **On the other hand, the main source of bank income, i.e. interest income** (net interest margin) **should be increased.** This can be achieved in two ways: by increasing the interest rate on loans, or reducing the interest payable on deposits. The stronger the competition among banks, the harder it is to increase the interest income with the abovementioned possibilities.

As for the future of the banking system it is likely that technology will spread even further and **higher focus will be on** the so-called "impersonal banking", i.e. on **the dominance of electronic banking.**

The recovery from the crisis that intensified in the summer of 2011 and has not been at ease ever since seems to be slow and prolonged. **The crisis' and the recent government measures'** (financial activities tax, early repayment, transaction tax) **combined effects consequence that the banking sector must fundamentally reconsider in what business model and share it continues to operate and what to focus on.**

The study reveals facts to examine what the current government proposed according to which "*the government establishes a new economic model, in which the objective is set to have fifty percent of the banking system in Hungarian hands. If it will be successful it will be unique in the whole of Central Europe*" [www.vg.hu, 2012]. Like most experts, I also think that this has no real chance. Neither the Hungarian government nor the current domestic-owned actors of the banking sector have enough free capital to purchase banks or parts of banks.

5. CURRICULUM VITAE

Margit Kerekes graduated at Esze Tamás Secondary School and Health Vocational High School of Mátészalka in 1994. She completed her university studies in Gödöllő at the University of Agricultural Sciences - the predecessor of Szent István University -, Faculty of Economics and Social Sciences, in agricultural engineering.

In 1999, she participated in the Student Research Conference of the University (SZIE GTK).

She received her university degree in June, 2000.

Following her university studies, she has been admitted to the correspondence course of PhD School of Management and Business Administration of Szent István University in 2000, where she began her doctoral studies and research.

In 2001 she obtained her MSc degree of Engineering Teacher at the Szent István University of Gödöllő (the successor institution of Gödöllő University of Agricultural Sciences), Faculty of Economics and Social Sciences, Institute of Teacher Training, full-time course.

Margit Kerekes has been employed by Citibank from July 2000 to April 2004 as junior officer, internal auditor and as deputy head of the leasing operation department. As of 3 May 2004 she has been working for Raiffeisen Bank's Accounting Department as a senior accounting manager. From 1 January 2010 she has been working as senior statistical analyst at Raiffeisen Bank.

She has English language complex (type "A" and "B") intermediate level and Italian language basic level type "C" certificates.

Regarding publications 2 foreign (English) and 2 Hungarian journal articles, 4 foreign (English) and 9 Hungarian conference papers have been prepared.

6. PUBLICATION LIST

a) Scientific journal articles

Scientific papers published in Hungarian language

1. **Kerekes M.** (2010). Dilemmas of branch opening. In Hungarian: Bank-fióknyitási dilemmák. *Valóság, Tudományos Ismeretterjesztő Társulat* LIII/11 (November), ISSN 0324-7228, 110-114. p.
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b) Presentations held at scientific conferences published in conference proceedings

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