THESIS BOOKLET

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THE IMPACT OF FOREIGN CURRENCY LENDING ON THE PROFITABILITY OF COMMERCIAL BANKS IN THE VISEGRAD COUNTRIES IN THE LIGHT OF CRISES AND INSTITUTIONAL DIFFERENCES

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1. Background and objectives of the work

The international financial institution system has already reached a level of development that makes it possible and necessary to carry out methodological developments and comparative analyses. The profitability of commercial banks operating in the Visegrad Four (V4) region, which includes Poland, Hungary, Slovakia and the Czech Republic, fluctuated significantly between 2008 and 2022. This period includes critical economic events such as the global financial crisis of 2008 (during which banks around the world suffered heavy losses, and the V4 countries were no exception), the subsequent sovereign debt crisis in Europe, the prolonged low interest rate environment and the pandemic caused by the coronavirus (COVID). Each of these events posed unique challenges to the financial sector, affecting key performance indicators such as return on assets (ROA), return on capital (ROE) and cost-to-income ratio, as well as significant regulatory reforms (e.g. Basel III capital and liquidity rules) and divergent national policies (bank taxes, loan loss provisioning rules) in the post-2008 period, which have potentially affected banks' behaviour and resilience.

It is also important to note that the economic weight of the V4 countries within the European Union has increased spectacularly in recent decades. The GDP growth indicators of recent years are indeed striking, and as a result, the economic weight of the region within the European Union is much greater than it was at the beginning of the third millennium, for example.

Furthermore, this topic is also important in the light of the regional differences within the V4 region. While these countries share common historical, geographical, and economic ties, they differ in terms of their financial systems, structure, regulatory approaches, and levels of exposure to global economic shocks. An analysis of profitability trends and their determinants provides insights into how these economies have navigated under external pressures, how banks have adapted to the changing financial environment, and what lessons can be learned about future economic resilience.

The aim of the research is to analyse the changes in the operation and management of commercial banks in the V4 countries after the 2008 crisis and to evaluate them with the help of various statistical methods. In connection with this, the following goals have been formulated:

G1: Analysis of the management of banks in the V4 countries from 2008 to 2022 (examination of assets, financial and income situation, efficiency).

G2: Within the period under review, the analysis of the changes in the banking sector due to the 2008 and 2020 crises.

In the research, four main hypotheses were established:

H1: In countries where foreign currency lending was significant, it had a significant negative impact on profitability.

H1a: the increase in the ratio of non-performing loans has a negative impact on banks' profitability ratios, in particular on return on assets (ROA) and return on equity (ROE).

H2: There is a significant difference between the euro zone and the countries that do not participate in the euro zone in terms of the management of banks in the V4 countries after 2009.

H3: the financial performance and stability of the banking sector under review are significantly influenced by the degree of market concentration, accounting write-off practices and the Basel regulations.

H4: The 2020 crisis did not cause nearly the same level of low in the profitability of banks operating in the V4 countries as in 2008.

In the chapter "Material and method" the methods used to analyze the hypotheses listed above are explained, but in order to illustrate the figures below, they are summarized as follows:
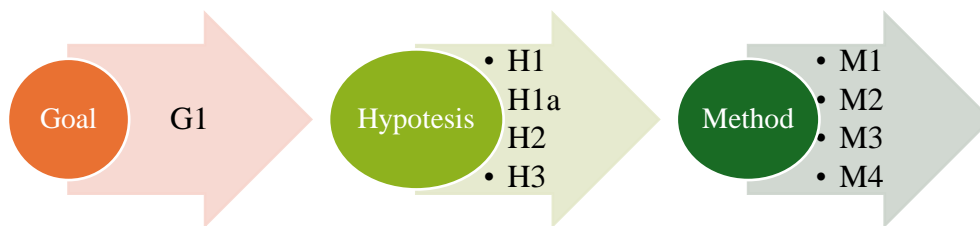
M1: descriptive statistics, analysis of variance.

M2: correlation.

M3: analysis of variance.

M4: Herfindahl–Hirschman-index (HHI), variance-analysis.

M5: analysis of variance, cluster analysis, crosstab analysis
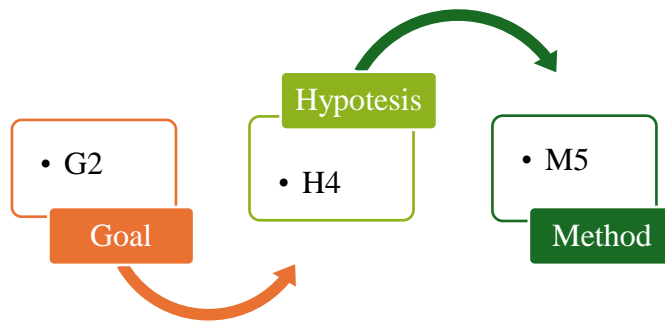
That 1. Figure illustrates the relationship between the first objective and the hypotheses and methods associated with it. As can be seen, in order to achieve the first objective, the impact of foreign currency lending, non-performing loans and euro area membership on the profitability of banks operating in the V4 countries must be examined. To support the hypotheses, I plan to use descriptive statistics, analysis of variance and correlation.

1. Figure: Flowchart of the relationship between the first objective and the first four hypotheses and methodologies

(Source: Own research, 2025)

The 2. Figure illustrates the relationship between the second objective and the related hypothesis and methodology. For the purpose of the analysis, I have narrowed down the entire period to only two years (2008, 2020) in order to determine which crisis has hit banks operating in the Visegrad Four countries more severely. To perform the analysis, I will perform a analysis of variance and a cluster and crosstab analysis.

2. Figure: Flowchart of the relationship between the second objective and the fourth hypothesis and the fifth methodology

(Source: Own research, 2025)

2. Material and method

The data to be analyzed in my dissertation were extracted from the ORBIS database for the period between 2008 and 2022. ORBIS is a commercially available database that provides comprehensive enterprise-level data and provides valuable insights into various aspects of business and economic activities. The database contains information on annual reports, financial indicators, ownership structures and other relevant data for a wide range of companies in different industries and regions. ORBIS is widely used by researchers, policymakers, and practitioners to analyze firm-level dynamics, make comparisons between countries, and gain a deeper understanding of economic phenomena.

ORBIS has been used in a number of studies to examine a wide variety of topics, including productivity growth, dynamic capabilities, investment in agility strategies, trade agreements, foreign direct investment, cultural distance, technological learning, and the impact of COVID-19 on corporate fragility. The database has played an important role in providing empirical evidence and facilitating rigorous analyses in areas such as economics, finance, management, and international business.

The database's extensive coverage with company-level data allowed researchers to delve into different dimensions of corporate behavior, economic performance, and international business activities. Using the rich and diverse data available at ORBIS, scholars can conduct in-depth analyses, develop empirical models, and gain valuable insights into the complexities of the modern business and economic environment.

As mentioned, the thesis covered the period from 2008 to 2022, as the data for 2023 were not yet fully and reliably available at the time of writing the dissertation, especially in the financial sector, where the final audited reports often only become available by the middle of the following year. However, the period 2008-2022 provided already closed, verified and comparable data, thus allowing for a comprehensive analysis of long-term trends and post-financial crisis developments, as well as the impact of COVID-19.

The database used under the NACE number 6419 (Other monetary intermediation) contains bank-specific balance sheet and profit and loss account data of the Hungarian, Slovak, Czech and Polish banking systems, expressed both in local currencies and in euros. In addition, the database contains some pre-calculated indicators, which make it easy to compare the activities of banks operating in different countries.

1. Table: Distribution of bank data in the countries examined

	Number	Percentage	Actual percentage	Cumulative percentage
CZ	21	13.4	13.4	13.4
HU	11	7.0	7.0	20.4
PL	117	74.5	74.5	94.9
CS	8	5.1	5.1	100.0
Total	157	100.0	100.0	

(Source: Own research based on ORBIS data, 2025)

As the 1. The Orbis database contains data from a total of 157 banks. Of these, 21 (13.4%) are located in the Czech Republic, 11 (7%) in Hungary, 117 (74.5%) in Poland and 8 (5.1%) in Slovakia.

2. Table: Size distribution of banks examined

	Number	Percentage	Actual percentage	Cumulative percentage
Big bank	84	53.5	53.5	53.5
Mid-size bank	3	1.9	1.9	55.4
Giant bank	70	44.6	44.6	100.0
Total	157	100.0	100.0	

(Source: Own research based on ORBIS data, 2025)

Of the 157 banks mentioned earlier, 84 (53.5%) are considered "Large banks", 3 (1.9%) are medium-sized banks and 70 (44.6%) are "Giant banks". These data are 2. table.

"Big Bank" usually refers to a financial institution that has a significant size and turnover, and that has a significant market share internationally or nationally. Given that this thesis does not cover the world, the "Big Banks" category includes financial institutions that are significant on a national level. I included, for example, Bank Spoldzielczy, Plus Bank SA and CSOB Stavebna Sporitena A.S.

Medium-sized banks included institutions that can be considered significantly smaller in all respects than the financial institutions that make up the group of "large banks".

However, the group of "Giant Banks" already includes financial institutions that are present in most of the V4 countries or are even dominant on a global level. Of course, in terms of revenue, it significantly exceeds the turnover of the "Big Banks", in some cases not only at the group level. OTP Bank, Unicredit, Raiffeisen and Erste, among others, also fell into this category, but Santander and Deutsche Bank also appear here.

Given that among the data pulled from the ORBIS database, there are banks and/or report line balances that are not available for every year and may cause significant distortions during further examinations, only a small set of them was used to write the thesis, as panel data. When preparing the panel data, the reporting lines and indicators that are available in as many years as possible were prioritized, so that statistics can be prepared for the limited data table with the highest possible accuracy. In addition, the panel data table was prepared taking into account the banking risks that will be analysed in the future, thus further reducing the possibility that the absence of certain indicators will lead to inaccuracies.

The variables you want to analyze are summarized in Table 3.

3. Table: Variables that can be used during the thesis

Variable used	Calculation of the variable
Return on equity (ROE)	ROE = (after-tax profit/average equity).
Return on Assets (ROA)	ROA = (profit after tax/average assets)
Capital Adequacy (CaR)	Ratio of own funds to risk-weighted asset value
Bank Operational Efficiency Indicator (Cost/Income Ratio)	Total expenses / Net revenues
Net Interest Margin	(Income from investments – Interest expenses) / Average of fixed assets
Indicators related to write-offs and/or impaired loans	Credit loss reserve / Net interest income (expense); Credit loss provisions / Impaired loans; Impaired loans / Gross customer loans and advances

(Source: Own research, 2025)

These metrics have been classified as risks presented earlier as follows:

1. **Business and Strategic Risk (Profitability Indicators)**
   - Return on Equity (ROE)
   - Return on Assets (ROA)
   - Capital Adequacy Ratio (CaR)
   - Indicator of banking operational efficiency
   - Net Interest Margin

4. Table: Business and Strategic Risk Panel Data Cross-Table Analysis I.

Business and Strategic Risk Panel			
	No	Yes	Total
CZ	16	5	21
EN	7	4	11
PL	108	9	117
CS	4	4	8
Total	**135**	**22**	**157**

(Source: Own research based on ORBIS data, 2025)

A 4. It is clear from the table that only 22 of the 157 banks that were previously pulled off remained, which is suitable for analysing indicators covering Business and Strategic risks over the entire time series. In numerical terms, 5 banks from the Czech Republic, 4 banks from Hungary, 9 banks from Poland and 4 banks from Slovakia. That 5. The table shows that the banks constituting business and strategic risks can be classified into medium (1) or giant banks (21) according to their size, but they do not strengthen the group of large banks in either of them.

5. Table: Business and Strategic Risk Panel Data Cross-Tabulation Analysis II.

Business and Strategic Risk Panel		No	Yes	Total
Classification by size	Big bank	84	0	84
	Mid-size bank	2	1	3
	Giant bank	49	21	70
Total		**135**	**22**	**157**

(Source: Own research based on ORBIS data, 2025)

2. Country risk
- Indicators related to write-offs and/or impaired loans
- Profit before tax
- Tax rate
- Profit after tax

6. Table: Country Risk Panel Data Cross-Table Analysis I.

Country Risk Panel	No	Yes	Total
CZ	7	14	21
HU	4	7	11
PL	107	10	117
CS	2	6	8
Total	**120**	**37**	**157**

(Source: Own research based on ORBIS data, 2025)

In terms of country risk, the 157 banks in the basic table have been narrowed down to 37 for further analysis, of which 14 are in the Czech Republic, 7 in Hungary, 10 in Poland and 6 in Slovakia. These data are 6. Table illustrates this.

7. Table: Country Risk Panel Data Cross-Table Analysis II.

Country Risk Panel		No	Yes	Total
Classification by size	Big bank	84	0	84
	Mid-size bank	2	1	3
	Giant bank	34	36	70
Total		**120**	**37**	**157**

(Source: Own research based on ORBIS data, 2025)

Banks subject to country risks are also classified into medium and giant bank categories (which can be seen in the 7. table), the data of a total of 36 giant banks and 1 Mid-size bank are analysed in more detail in the results chapter. There is no sample under this risk in the Large Bank category.

3. Residual risk
- Credit loss provisions
- Impaired / non-performing customer loans
- Net impairment of loans and advances
- Net loans / written off loans

8. Table: Residual Risk Panel Data Cross-Table Analysis I.

Residual Risk Panel			
	No	Yes	Total
CZ	15	6	21
HU	9	2	11
PL	112	5	117
CS	7	1	8
Total	**143**	**14**	**157**

(Source: Own research based on ORBIS data, 2025)

A total of 14 banks were included in the residual risk panel after narrowing down the preliminary 157 banks to the 8. of which 6 are in the Czech Republic, 2 in Hungary, 5 in Poland and 1 in Slovakia.

A 9. It can be seen from the table that in terms of size, all 14 banks are registered as giant banks.

9. Table: Residual Risk Panel Data Cross-Tabulation Analysis II.

Residual Risk Panel				
		No	Yes	Total
Classification by size	Big bank	84	0	84
	Mid-size bank	3	0	3
	Giant bank	56	14	70
Total		**143**	**14**	**157**

(Source: Own research based on ORBIS data, 2025)

The methods to be applied for each hypothesis are explained in detail below, which is shown in Table 10.

10. Table: Hypotheses, methods and their justifications

Hypothesis	Method(s) used	Justification
Hypothesis one: In countries where foreign currency lending was significant, it had a negative impact on bank profitability.	Levene Test ANOVA Mean Plot Analysis	The aim is to examine the differences in profitability between groups of countries. ANOVA allows you to compare averages, the Levene test checks for variance homogeneity, while the mean plot visually supports the interpretation of results.
Sub-hypothesis of Hypothesis One: An increase in the ratio of non-performing loans has a negative impact on ROA and ROE ratios.	Descriptive statistics Correlation analysis	The aim is to explore the relationship between two metric variables (NPL rate and profitability indicators). Descriptive statistics show the distribution of data, while correlation analysis quantitatively measures the direction and strength of the relationship.
Hypothesis two: There is a significant difference between the banking performance of eurozone and non-eurozone countries after 2009.	Levene Test ANOVA Mean Plot Analysis	To compare the profitability indicators of the two groups of countries, ANOVA is a suitable tool. The Levene test ensures that the conditions of ANOVA are met, while the average figure helps to visualize the differences.
Third hypothesis: the financial performance and stability of the banking sector under review is significantly influenced by the degree of market concentration, accounting write-off practices and the Basel regulations	Herfindahl–Hirschman index (HHI) Levene Test ANOVA	The HHI index quantifies the degree of market concentration that can affect banks' profitability. ANOVA can be used to investigate whether different accounting and regulatory environments cause significant differences in financial performance. The Levene test checks whether the variances of the compared groups are homogeneous, thus ensuring the applicability of ANOVA.
Fourth hypothesis: The 2020 crisis had a smaller impact on bank profitability than the 2008 crisis.	Descriptive statistics Analysis of variance Cluster analysis Crosstab analysis	The comparison of indicators for the two crisis years is based on descriptive statistics and analysis of variance. Cluster analysis allows you to group countries/banks with similar behavior, while crosstab analysis reveals relationships between discrete variables.

(Source: Own research, 2025)

For statistical analysis, the SPSS (Statistical Package for the Social Sciences) statistical software package (IBM SPSS Statistics 19) and the Sajtos and Mitev (2007) data analysis manual are used, and the data are processed using the Microsoft Office Excel spreadsheet application.

3. Results and discussion of them

The analysis of the impact of foreign currency lending revealed that it has a negative impact on the profitability of banks operating in the Visegrad countries overall, but the risk analyses yielded double results. The analysis of business and strategic risk showed that no significant difference can be detected between the examined variables and the fact of foreign currency lending, but the existence of a link was clear during the analysis of country risk and residual risks. In the case of country risk, the relationship was mainly due to the facilitation introduced by governments (conversion programs, special taxes), which, although it helped the lives of the population and companies, placed a heavy burden on the profitability of banks, including pre- and post-tax profits. The examination of residual risk revealed that the negative consequences of foreign currency lending typically appeared with a delay in the case of the examined variables only after 2015, which also appeared in the banks' financial statements primarily as a result of impairments due to government measures.

The results of the study of the relationship between the change in non-performing loans (NPLs) and the return on equity (ROE) showed that the loans written off as a result of the 2008 crisis had an overall negative impact on the profitability ratios of the banks examined. The results are summarized in a variable grouping of NPLs:

- Credit loss provisions / Gross customer loans and advances indicator revealed that at the regional level, there were major problems related to non-performing loans in Hungary and Poland, while in the Czech Republic and Slovakia the ratio was kept at an acceptable level. The Czech and Slovak values can be explained by the absence of foreign currency lending, the "protection" provided by the eurozone, as well as the more conservative reserve policy. The recovery from Hungarian foreign currency lending was facilitated by measures supported by the government and the MNB after 2014, but in Poland the indicator jumped only after 2019, when government intervention was also carried out under the pressure of legal disputes over foreign currency lending. Reserves around 2020 were already made in accordance with the requirements of IFRS 9 in the countries examined. The correlation between the Loan Loss Provisions / Gross Customer Loans and Advances ratio and ROA and ROE discovered a strong correlation between the two variables, as there were only a few years during the period under review where the statistical method did not find a relationship, which can be attributed to different accounting and reserve policies and more stable operation.

- Based on the analysis of the Lending Loss Reserve / Net Interest Income (Expense) indicator, the Czech Republic and Hungary performed worse during the period under review, although there were years when the indicator turned negative (reserve release occurred), but the banks operating in the two countries also generated record highs. It is true that the value of the indicator was only stable for one year (2012) in the Czech Republic, while in Hungary it was stable for eight (2008-2015) years, mainly due to the financial crisis and the difficulties caused by foreign currency lending. In Poland and Slovakia, there was no significant and lasting change in the examined indicator, but it can be said that in 2008 and 2009 both countries pursued a more conservative reserve policy and were prepared to cover possible losses. However, from 2010, both countries returned to normal. This can be explained by the fact that the two countries had a more stable banking system, were able to recover faster from the crisis, and their Swiss franc loan exposure was also lower. The correlation between variable and ROA, ROE also revealed a significant relationship, with only one year (2021) where there was no relationship with ROA. The existence of the relationship can be explained simply by the fact that during the

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crises, loan losses soared, which worsened the value of the ROE and ROA indicators, while during the boom period, falling loan losses were able to increase profitability. The absence of the relationship with ROA in 2021 was due to the loan moratoriums, as banks were unable to immediately account for the full expected loss and the loans participating in the moratorium could not be classified as problematic. This may have distorted the relationship between the two variables.

- The analysis of the Loan Loss Provisions / Impaired Loans indicator showed that there is no relationship between the development of the indicator and ROE and ROA overall. Between 2020 and 2022, banks in the Czech Republic and Hungary similarly increased their loss reserves during the period under review, following a safer reserve policy. In the Czech Republic, reserves were generally above 100% in 2020, but remained below 100% in the post-pandemic period, while in Hungary the same indicator exceeded 80% in 2017. The fluctuations can be explained by the balance sheet cleaning carried out under pressure from the Mid-size bank. In Hungary, the indicator fell to 48% in 2010, probably due to the lack of keeping pace with defaulting loans and the introduction of an extra bank tax. Banks in Poland and Slovakia reacted similarly during COVID, but they started building up higher reserves as early as 2018. In Poland, this happened because of the loan redemption program, while in Slovakia it reflects the preparedness and conservative policies of the banking system. During the period under review, there was only a correlation between the Loan Loss Provisions / Impaired Loans ratio and ROA in 2016 and 2017, but it had no positive impact on ROE. In 2016, the relationship was significant, which can be explained by the portfolio cleaning programs and the IFRS transition. In the post-crisis years and during COVID, moratoriums and credit subsidies distorted the relationship between the indicators.

- Finally , examining the Impaired Loans / Gross Customer Loans and Advances ratio, it was confirmed that Hungary's banking sector performed the weakest in the region after the 2008 crisis, as the value of the indicator was still at a normal level at the regional level in 2008, but after 2008 it was between 5% and 10%, indicating a medium-risk portfolio. However, among the V4 countries, only Hungary was permanently above 15% (between 2010 and 2015), while in the Czech Republic, Poland and Slovakia the value of the indicator was able to remain below 10%. In Hungary, the high rate can be traced back to the 2008 crisis and the burden of foreign currency lending, which was only improved by the measures taken by the government and the Mid-size bank after 2015. There was a significant relationship between the impaired loans/gross customer loans ratio and ROA, ROE in several years, except between 2016 and 2018. This can be explained by the impact of the IFRS transition, the improving economic environment and the portfolio clean-up.

Examining the fact of eurozone membership, the ANOVA test did not find any significant difference between Slovakia and the other V4 countries in the profitability indicators of banks for the three risk groups mentioned earlier. This can be explained by the integration of the economic and financial systems of the V4 countries, as well as the common EU regulatory framework and the Basel III requirements. Similar economic recovery policies after the 2008-2009 crisis and the reduction in exposure to foreign currency loans may also have contributed to this. Furthermore, since 1999, banks inside and outside the eurozone have been operating in a similar macroeconomic environment. In EU member states, even in non-eurozone countries, EU support reduces macroeconomic risks. Due to the integration of European financial markets, many banking groups apply uniform risk management policies, regardless of whether they operate inside or outside the euro area.

In the course of examining market concentration, accounting depreciation practices and the role of Basel III, I examined the banking sector of the V4 countries with the help of three sub-hypotheses.

- First, it was established that market concentration has a significant impact on the profitability and operational efficiency of banks in the banking markets of the Visegrad countries. The results of the ANOVA tests show that there is a statistically justifiable difference between the ROA and ROE indicators of banks operating at different concentration levels ($p < 0.05$), which shows a correlation with the values of the Herfindahl-Hirschman Index (HHI). Banks operating in markets with higher concentrations typically have higher profitability and lower cost-to-income ratios, suggesting better operational efficiency. The results can be interpreted in the framework of both the structural-effect hypothesis and the effective structure hypothesis, but in the examined area the latter explanation is rather confirmed: more efficient banks gain a larger market share, thereby increasing concentration. In more concentrated markets, therefore, not only market power but also operational excellence contributes to better performance. At the same time, based on the international literature, the relationship between concentration and performance is not always one-way, so it is essential to take into account the market environment and institutional characteristics.

- Continuing the analysis, it has been demonstrated that accounting write-offs, in particular impairments related to non-performing loans, significantly reduce banks' profitability ($p < 0.01$). Based on adjusted profit indicators, the performance of banks burdened with high write-downs is weaker, which can be explained by both direct and indirect effects (e.g. reputational, capital level). In addition, there is a significant correlation between the level of write-downs and market concentration ($p < 0.05$): in the post-crisis years, the decline of weaker banks and the strengthening of larger players led to market consolidation. The increase in concentration is therefore partly the result of the adjustment process triggered by losses, which has also transformed the structure of the banking system.

- Finally, it was also confirmed that the banking systems of the Visegrad countries gradually introduced the Basel III regulatory framework between 2014 and 2019, which contributed significantly to strengthening their financial stability in the long term. Based on the analyses, the increase in Tier 1 capital ratios, the improvement of liquidity positions (LCR, NSFR) and the decrease in the ratio of non-performing loans all reflect the positive effects of the regulation. Banks adjusted through profit retention, capital increases and balance sheet structure adjustments, while profitability (ROA, ROE) remained stable between 2016 and 2019. In the case of Hungary, despite the initial lower capital level and the challenges posed by the high bank tax, the banking system has caught up with its regional competitors. Regulatory incentives and the gradual reduction of the bank tax have helped to accumulate capital and improve stability. Based on the results of the stress tests, Hungarian banks had reached a level of resilience comparable to that of Czech and Polish banks by 2017.

Summing up the results of the analysis of the 2008 and 2020 crises, it can be said that the variables examined did not yield clear results in the first round, but further analysis of the data was indisputable.

- Based on the development of the capital adequacy ratio (CAR), the 2020 COVID crisis hit banks in the V4 countries less than the 2008 crisis, as the capital adequacy ratios between 2008 and 2012 were lower than those between 2020 and 2022. Before the 2008 crisis, the reports of V4 banks showed low CAR due to rapid credit growth and aggressive foreign

currency loan expansion. During the 2008 crisis, governments provided limited support, while in 2020 they received massive liquidity support. After the 2008 crisis, stricter capital regulations were introduced, which strengthened banks' capital bases, so they were better able to withstand the economic shock during the 2020 crisis.

- However, in contrast to these results, the 2020 crisis affected banks more significantly based on the evolution of ROA and ROE than the 2008 crisis. The impact of the 2008 crisis was uneven for banks, while the 2020 crisis uniformly reduced banks' profitability. The loan moratoriums introduced during the pandemic reduced interest income and IFRS 9 required an increase in provisions, which worsened profitability. In addition, Mid-size bank interest rate cuts and the digital transformation have further increased operating costs.

- In terms of efficiency indicators, there was no significant difference between the 2008 and 2020 crises. In both periods, banks managed income volatility by keeping operating costs stable. During the 2008 and 2020 crises, banks also prioritised cost management, avoiding extremely low efficiency.

- However, the cluster analysis confirmed that the pandemic had caused an economic downturn, increased credit risk and necessitated an increase in provisions. Mid-size banks maintained low interest rates, reducing net interest margins. In addition, investment in digital technologies has also increased operating costs. Competition in the banking sector has put pressure on profit margins and economic uncertainties have increased provisions, resulting in worse overall profitability indicators.

4. Conclusions and recommendations

Conclusions

In my research, I subjected the following hypotheses to further investigation:

> **H1:** In countries where foreign currency lending was significant, it had a significant negative impact on profitability.

> **H1a:** the increase in the ratio of non-performing loans has a negative impact on banks' profitability ratios, in particular on return on assets (ROA) and return on equity (ROE).

> **H2:** There is a significant difference between the euro zone and the countries that do not participate in the euro zone in terms of the management of banks in the V4 countries after 2009.

> **H3:** the financial performance and stability of the banking sector under review are significantly influenced by the degree of market concentration, accounting write-off practices and the Basel regulations.

> **H4:** The 2020 crisis did not cause nearly the same level of low in the profitability of banks operating in the V4 countries as in 2008.

Within the examination of the first hypothesis, based on the strategic and business risk analysis, it cannot be clearly stated whether foreign currency lending had a significant negative impact on the profitability and stability of banks in the V4 countries, since the years strongly affected by foreign currency lending (2009-2011) do not fall into the aggregate values of ANOVA for any of the indicators, and several questions have arisen based on the cited literature.

The country risk analysis showed that foreign currency lending had a significant impact on profit after tax, especially in 2014 when the conversion of foreign currency loans and the related losses were accounted for. After-tax profits were significantly lower in countries where foreign currency lending was high.

The analysis of residual risk showed a significant relationship between the net impairment of loans and advances and the net loan/loan ratio on the one hand, and foreign currency lending, on the other. The study also showed that losses from foreign currency lending had a significant impact on banks' profitability, especially after 2015, when foreign currency loans were converted and related losses were offset.

In summary, the first hypothesis is presented below (11. Table), I accept:

11. Table: Summary of the results of the first hypothesis

Risk	Result
Business and Strategic Risk	Declined
Country risk	Accepted
Residual risk	Accepted

(Source: Own research, 2025)

Sub-hypothesis A of the first hypothesis is that an increase in the NPL ratio has a negative impact on the profitability ratios of banking institutions, in particular in terms of return on assets (ROA) and return on equity (ROE). The results show a significant correlation between the ratio of non-

performing loans and provisions for credit losses, as well as ROA and ROE. The increase in the ratio of non-performing loans has been proven to reduce the profitability of banking institutions, especially in times of crisis and economic difficulties.

Consequently, subhypothesis a. of the first hypothesis was also accepted.

In the course of the examination of the second hypothesis, there was no significant difference between the management practices of banks in the euro area and those of non-euro area countries after 2009 in the case of the V4 countries. This finding is supported by the analysis of variance (ANOVA), which did not show any significant differences between variables in the analysis of either business and strategic risks or country risks. However, due to the lack of sufficient data, it was not possible to further investigate the residual risks, which led to the rejection of the second hypothesis.

12. Table: Summary of the results of the second hypothesis

Risk	Result
Business and Strategic Risk	Declined
Country risk	Declined
Residual risk	Not interpretable

(Source: Own research, 2025)

The examination of the third hypothesis confirmed that the data of the banking sector of the Visegrad countries show clear correlations between market concentration, accounting write-offs and bank performance. Higher market concentration is associated with significantly improved profitability and efficiency, while accounting write-offs during the crisis have reduced profitability and led to an increase in concentration. Crisis situations have led to a structural restructuring in which more efficient banks have been strengthened. The results confirm that both market structure and portfolio quality are key to the health of the banking sector. In addition, the Basel III regulations increased the stability of the banking system in the long run, while having only a minimal impact on core operations. Banks in the V4 countries are much more resilient to financial shocks today than they were during the crisis.

13. Table: Summary of the results of the third hypothesis

Subhypothesis	Result
Market concentration	Accepted
Accounting descriptions	Accepted
Basel III.	Accepted

(Source: Own research, 2025)

The fourth hypothesis states that the 2020 crisis did not cause a crisis in the profitability of banks operating in the V4 countries that was close to the level of the 2008 crisis. The analysis shows that the 2020 crisis resulted in a greater low point in banks' profitability than in 2008. While banks were better prepared for the crisis, they took a more conservative approach to provisioning in response to government measures, such as lending standards, and international regulation. Overall, these measures had a negative impact on banks' profitability. Therefore, I reject the fourth hypothesis.

The aggregate results of the hypothesis test are 14. Table shows:

14. Table: Summary table of the results of the hypotheses examined

Hypothesis	Result
First hypothesis	Accepted
Subhypothesis a. of the first hypothesis	Accepted
Second hypothesis	Declined
Third hypothesis	Accepted
Fourth hypothesis	Declined

(Source: Own research, 2025)

Suggestions

In order to prepare for future economic challenges, it is essential that financial institutions pursue a conservative reserve policy. The increase in NPL ratios has a significant impact on profitability, so it is essential that banks build up sufficient reserves to cover expected losses.

Compliance with government measures and international guidelines has been proven to be an effective tool for mitigating the effects of crises. Financial institutions, such as banks, are advised to cooperate with government agencies and comply with the latest international recommendations and regulations. This will ensure financial stability and support economic recovery.

In order to be better prepared for future economic challenges, it is essential that financial institutions, especially banks, develop and refine their crisis management strategies. The experience of the 2020 crisis provides a valuable lesson and highlights the need for more flexible and effective crisis management strategies that can minimise the impact of future crises and ensure financial stability.

Banking institutions need to further develop their risk management systems to better prepare for future financial challenges. The introduction of advanced risk management systems has been proven to help banking institutions manage financial risks more effectively and increase profitability.

Banks in the V4 countries should consider cooperating more closely with their counterparts in the region in order to jointly address financial challenges and exchange best practices. Strengthening regional cooperation can help to enhance financial stability and support economic growth.

It is also important that financial institutions and government agencies prioritise raising financial education and awareness among the population. Promoting financial literacy will help the public to better understand financial products and services and the risks associated with these assets. This, in turn, can contribute to enhancing financial stability.

Finally, financial institutions should support innovation and technological development, thereby improving the quality and efficiency of financial services. The emergence of new technologies, such as digital banking and fintech solutions, has allowed financial institutions to enhance their adaptability to the changing market environment and increase their profitability.

5. New scientific findings

During the writing of my thesis, I identified a number of new scientific results that contribute to a deeper understanding of the management of financial institutions and the operation of the banking sector in the Visegrad countries. These are explained in more detail below:

First of all, I compiled a database from the ORBIS system, which contains the data of the financial statements of 157 banks operating in the V4 countries for the period between 2008 and 2022. Since the missing information appeared in the data series hectically, I narrowed down the database to three panel data according to risk classifications: business and strategic risk, country risk and residual risk.

1. Based on the panel data tables and statistical methods (Levene statistics and ANOVA), I filtered out information that proves that, overall, foreign currency lending has a negative impact on the profitability of banks operating in the V4 countries. However, when analysing the three risk classifications, it was striking to me that I could only make a clear statement about the adverse effects with regard to two risks (country risk and residual risk), and within these risks, I also found that the increase in provisions caused by foreign currency lending losses was clear in Poland and Hungary, in particular, while the Czech Republic and Slovakia were less affected by the negative effects associated with foreign currency lending. With regard to the third risk group (business and strategic risk), I could not clearly determine whether the unfavourable circumstances associated with foreign currency lending caused the fluctuation of profitability indicators.

2. In my research, I used statistical methods (descriptive statistics and correlation) to prove that the increase in the ratio of non-performing loans has a negative impact on the profitability indicators of the banking sector of the Visegrad countries. In these analyses, I have demonstrated that loan loss provisions show a significant correlation with the ratio of non-performing loans (NPLs) and return on assets (ROA) and return on equity (ROE). These statistical results showed a significant correlation between the variables primarily in Hungary and Poland, as banks in these countries performed significantly worse during the period under review (especially after the two crises), which was mainly due to local regulations.

3. During the analysis of the relationship between euro area membership and the profitability of banks, I could not clearly determine whether banks in euro area countries have more stable profitability indicators. Although the Levene statistics indicated that the variables are generally suitable for further analysis, the ANOVA test did not show any significant difference between the examined variables in any of the examined variables. I attributed this to the fact that the economic and financial systems of the V4 countries, despite their status outside the euro area, have been significantly integrated into the European Union. Furthermore, the lack of significance observed in the ANOVA test may also indicate a convergence of banks' business models and financial indicators, driven by increasingly uniform regulatory and economic conditions. However, I also rejected the hypothesis because the residual risk analysis included only one Slovak bank variable, which made the results incomprehensible.

4. Based on the data of the banking systems of the Visegrad countries, I have formed a single, coherent picture of the relationship between market concentration, accounting write-offs and bank performance. According to my results, higher levels of market concentration are significantly associated with better profitability (ROA, ROE) and more efficient operation of banks. In addition, the accounting write-offs carried out in the wake of the crisis are clearly eroding the profitability of banks, and the concentration of the banking sector

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increases in periods of heavy losses. The two factors examined are also interrelated: crisis situations with significant write-offs led to a restructuring of the market structure, in the course of which more efficient banks became stronger. The results of this chapter contribute to the literature on the relationship between banking performance and the competitive environment by demonstrating on post-crisis data that market concentration and the quality of internal banking portfolios are both important factors in the development of the health and effectiveness of the banking sector. These links show that both the monitoring of market structure and credit quality are important for banking supervision and macroprudential policy, as the former affects competitive dynamics and efficiency, while the latter affects the stability and consolidation of the system. The results of the investigation strongly support the view that the Basel regulatory developments have strengthened the resilience of the banking systems of the V4 countries. All other things being equal, banks in these countries are much better prepared for shocks today than they were a decade ago.

5. Finally, concentrating on two key years, 2008 and 2020, I proved which crisis shook the banking sector of the V4 countries the most. To perform the analyses, I used Levene test, ANOVA and cluster analysis and cross-table analysis. My results clearly highlighted that while banks started the 2008 crisis unprepared, they operated in a much more regulated manner during the 2020 crisis. Nevertheless, in terms of their profitability, the coronavirus pandemic proved to be a more difficult obstacle to overcome in terms of certain variables (ROE, ROA, bank operational efficiency indicator), which was mainly due to the provisioning of expected credit losses in accordance with IFRS 9 accounting standards, which was mandatory even in the absence of actual defaults.

6. Publications of the author related to the topic of the dissertation

Non-IF journal article published in a foreign language:

1. Szabó, J. K., - **Jakab, T.** (2021): Account management of the local authorities: case study from Hungary. STUDIA MUNDI - ECONOMICA, 8(5), 35–46. http://doi.org/10.18531/Studia.Mundi.2021.08.05.35-46
2. Szabó, J. K., - **Jakab, T.** (2024): The Impact of Bank Reputation on Bank Choice and Loyalty in the SME Sector. CONTROLLER INFO, 12(Special Issues 1), 45–50. http://doi.org/10.24387/CI.SI.2024.1.8

Non-IF journal article in Hungarian:

1. **Jakab, T.**, Molnár, P., Hegedűs, S. (2019): A Magyar Államkincstár és az OTP Bank által nyújtott szolgáltatások összehasonlítása az önkormányzati számlavezetés tekintetében. CONTROLLER INFO, 7(3), 26–29. http://doi.org/10.24387/CI.2019.3.5
2. **Jakab, T.**, Hegedűs, S., Szabó, J. K., Bárczi, J. (2020): Takarékszövetkezeti integráció hatása az önkormányzati számlavezetésre. CONTROLLER INFO, 8(2), 22–27. http://doi.org/10.24387/CI.2020.2.4
3. **Jakab, T.** (2021): A COVID-19 hatása a magyar bankrendszerre. CONTROLLER INFO, IX. ÉVF. 2021.(3), 32–35.
4. **Jakab, T.** (2022): Az azonnali fizetési rendszer bevezetése Magyarországon. CONTROLLER INFO, X. Évf. 2022.(2), 20–25.

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2. Hegedűs, S. **- Jakab, T.** (2019): Az önkormányzati reform megítélése az önkormányzati dolgozók szemszögéből egy kérdőíves felmérés keretében. In Vállalkozásfejlesztés a XXI. században – IX/2. tanulmánykötet (pp. 26–37)
3. **Jakab, T.**, - Suhajda, Á. (2020): A HÁZTARTÁSI SZFÉRA HITELÁLLOMÁNYÁNAK ALAKULÁSA MAGYARORSZÁGON 2015 ÉS 2018 KÖZÖTT. In XVII. Nemzetközi Tudományos Napok (pp. 527–534)
4. Suhajda, Á. - **Jakab, T.** (2020): Komplex nem-lineáris problémák és mesterséges neurális hálók a fenntartható természeti erőforrás gazdálkodásért. In XVII. Nemzetközi Tudományos Napok (pp. 1028–1033)
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7. Hegedűs, S., Szabó, J. K., **Jakab, T.**, Szász, D. (2021): Az önkormányzati reformok értékelése egy kérdőíves felmérés alapján. In A VERSENYKÉPESSÉG JÖVŐJE = DIGITALIZÁCIÓ + SZAKMAI TUDÁS A PÉNZÜGY ÉS SZÁMVITEL VILÁGÁBAN (pp. 106–124)

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9. Szabó, J. K. - **Jakab, T.** (2024): Bankválasztási szokásokat befolyásoló tényezők a vállalati szegmensben – szakirodalmi összefoglalás. In Közgazdász Doktoranduszok és Kutatók X. Nemzetközi Téli Konferenciája (pp. 209–218)

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International abstract volume:

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