

## Do Non-Performing Loans Influence the Profitability of Banks? Evidence from a European Banking Group

Adela Socol  
Nina Sinitin

“1<sup>st</sup> of December 1918” University of Alba Iulia, Romania

[adelasocol@yahoo.com](mailto:adelasocol@yahoo.com)

[ninasinitin@yahoo.ro](mailto:ninasinitin@yahoo.ro)

### Abstract

*Banking system in the time of the COVID-19 pandemic is likely to be particularly affected especially in terms of profitability. The crisis has revealed various economic and even psychological mechanisms which can contribute to the increase of Non-Performing Loans (NPL). This paper intends to find if there is any significant relationship between Return on allocated capital, as a marker for banking profitability and NPL coverage ratio. We include in the model developed on the basis OLS method (with robust standard errors, consistent with panel-specific autocorrelation and heteroskedasticity), a few other explanatory variables. Our research is based on the Erste Group database 2016-2021. The empirical results reveal that there is a negative and a significant relationship between Return on allocated capital and first two variables - NPL coverage ratio and Cost to income ratio - while GDP growth have a positive impact on Return on allocated capital.*

**Key words:** banks, profitability, COVID-19, loans, capital  
**J.E.L. classification:** C23, G21, F62

### 1. Introduction

The new COVID-19 pandemic that affected the entire world since March 2020 led to the worsening of macroeconomic variables and conditions – the economic decline, the increase in unemployment, the deficit increase, the exacerbation of public spending to improve the capacity of the health systems and provide assistance to severely affected people and sectors etc. These are just some of the manifestations of the mentioned crises, which has affected all branches of the economic and social life. The channels of contagion of the COVID-19 pandemic towards the economy are diverse and they are mainly based on the loss of an impressive number of jobs, restrictions on the mobility of the population, many physical businesses closed or the interruption of supply chains.

The crisis has only exacerbated and revealed existing vulnerabilities in the banking sector, whose individual consumers have adopted a more cautious behavior and whose institutional customers drastically reduced their business or even closed their activities. New risks and vulnerabilities showed so for the banking system, taking into account that many companies that have stopped working miss out on revenues, thus they are not be able to pay the loans, while employees who have lost their jobs have less income and also they can't pay current debts arising from loans. Another area that negatively affects the banks stems from the financial instruments held by the banks that were reduced in value, predominant on the basis of market volatility. All these conditions especially affect banking short and long-term profitability, which is influenced both by the decrease of the operational revenues, but also by possible non-performing loans.

The psychological components of the action of bank customers, whose risk appetite and interaction with the banks decreased considerably during the pandemic period, should not be neglected either, in this context the bank profitability is also dependent on the number of clients and the volume of operations.

Such a context necessitated a response both of the governments, supervision authorities, banks, central banks and other institutions in order to mitigate the effects of the COVID-19 crisis on banking systems and their customers. Among the measures taken by the supervisory banking authorities are the reducing certain capital buffers, the encouraging of the banks do not offer dividends and the establishing of the new lending rules, more permissive for customers and which have the potential to negatively affect bank profitability. The European Parliament has adopted in June 2020 new rules “to temporary ensure favorable conditions for banks in order to support credit flows to companies and households and absorb losses, mitigating the severe economic consequences of the COVID-19 pandemic and the enforced confinement” (European Parliament, 2020). The Capital Requirement Regulation (Regulation EU CRR, 2013/575) has been changed the application of the Leverage ratio buffer (a ratio between the capital of a bank and its exposures), which was postponed by one year to January 2023 in order to permit banks to increase the total loans. Also, the regulation allows banks to grant loans to employees, pensioners or SME under more favorable prudential conditions for borrowers. In addition to the international mentioned norms, some national governments have provided facilities for banking customers to defer due rates to banks, as is the case in Romania. Legislative support measures adopted in earlier 2020, through the Government Emergency Ordinances no. 37/2020 and 227/2020, provide some facilities for loans granted by credit institutions to debtors that can benefit of the suspension of the payment obligations – principal, interest and fees associated to the loan – until 15 March 2021.

In this way, banks are more exposed to the credit risk and if the borrowers do not pay back the loans, the premises for the increase of non-performing loans are created. We find at the level of the European Banking Authority some technical standards which explain the non-performing exposures (EBA, 2013), based on the sense of impairment and default according to International Financial Reporting Standards IFRS. We observe that the non-performing definition is larger than these two mentioned accounting notions and implies that the banks have to set the criteria regarding the common identification and discontinuation (90 days past-due).

Figure no. 1. Criteria for Non-Performing Loans

| Performing  | Non-performing   |
|---|--|
| <p><b>Fully performing</b></p> <p>Loans and debt securities that are not past-due and without risk of non-repayment and performing off-balance sheet items</p>  | <p><b>Generic criteria:</b> past due more than 90 days and / or unlikely to pay</p> <p>All other non-defaulted and non-impaired loans and debt securities and off-balance sheet exposures meeting the generic criteria</p>   |
| <p><b>Performing assets past due below 90 days</b></p> <p>Loans and debt securities between 1-30 days past due</p> <p>Loans and debt securities between 31-60 days past due</p> <p>Loans and debt securities between 61-90 days past due</p> <p><b>Performing assets that have been renegotiated</b></p> <p>Loans and debt securities which renegotiation or refinancing did not qualify as forbearance</p> | <p><b>Forbearance</b> (Forborne loans and debt securities (and eligible off-balance sheet commitments))</p> <p><b>Defaulted</b> (Fair value option)</p> <p><b>Impaired</b> (Fair value through other comprehensive income)</p> <p><b>Other off-balance sheet items:</b> Amortised cost, Loan commitments given, Financial guarantees given (except derivatives), Other commitments given</p> <p>Refinancing, Modifications of terms and conditions</p> |

Source: (EBA - European Banking Authority, 2013, 7)

Each bank has to prepare for the eventuality of losses related to the loans it grants. In order to offset this credit risk, a bank has to estimate the expected future credit loss and to establish an adequate provision, which represents the recognition in advance of a loss related to a loan. Bank’s capital is used to absorb the losses from loans and by setting up a provision, the bank records a loss

and therefore reduces its capital by the amount it will not be able to recover from the customer. Because the customers may still return a part or entire loan, bank should not make provisions for the full amount of a non-performing loan. Also a bank could recover part of the value of the loan by selling the assets or real estate that the customers have set up as collateral. Only the expected net loss should be covered and the part of non-performing loans that is covered by provisions is considered to be the coverage of non-performing loans. In our paper, attention was paid to Non-performing loan coverage ratio, as a variable that indicates the extent to which the bank has already recognized the expected losses on non-performing loans. We find at EU level a minimum coverage ratio that banks are required to maintain and if they have not set up a sufficient amount of provisions to cover new non-performing loans, then they have to remedy this shortcoming by deducting the amount missing from their capital (Regulation EU, 2019/630).

The following situation regarding the total loss provisions for loans (as percent of total doubtful and non-performing loans in Q2 2020 in comparison with Q2 2019 in European Union) denotes significant differences between Member States on the background of the decrease of the non-performing loans, whose volume has decelerated or has stopped, in the COVID-19 context.

Figure no. 2. Non-performing loans in the European Union, 2019Q2-2020Q2

|                       | Gross NPLs and advances (% of total gross loans and advances) |            | Private sector NPLs (% of private-sector loans) |          | Total loss provisions (loans) (% of total doubtful and non-performing loans) |             |
|-----------------------|---|------------|---|----------|--|-------------|
|                       | 2020Q2  | 2019Q2     | 2020Q2  | 2019Q2   | 2020Q2   | 2019Q2      |
| Austria               | 2.0   | 2.3        | 2.8   | 3.1      | 76.5   | 69.6        |
| Belgium               | 2.1   | 2.0        | 2.8   | 2.7      | 58.4   | 53.7        |
| Bulgaria              | 6.7   | 6.9        | 10.0  | 10.5     | 60.6   | 61.2        |
| Croatia               | 5.3   | 6.9        | 8.3   | 10.3     | 86.7   | 74.2        |
| Cyprus                | 14.5  | 19.5       | 23.3  | 33.5     | 55.4   | 53.2        |
| Czech Republic        | 1.6   | 1.8        | 3.0   | 3.4      | 82.2   | 69.0        |
| Denmark               | 2.0   | 1.9        | 2.4   | 2.2      | 45.4   | 42.1        |
| Estonia               | 2.1   | 1.8        | 2.1   | 2.3      | 55.7   | 42.4        |
| Finland               | 1.5   | 1.4        | -   | -        | 42.6   | 34.0        |
| France                | 2.3   | 2.6        | 3.4   | 3.6      | 66.2   | 64.8        |
| Germany               | 1.2   | 1.3        | 2.0   | 2.0      | 89.0   | 85.3        |
| Greece                | 30.9  | 39.6       | 37.0  | 43.8     | 47.8   | 49.7        |
| Hungary               | 4.0   | 5.0        | 5.6   | 6.5      | -  | 84.1        |
| Ireland               | 3.5   | 4.2        | 6.0   | 6.8      | 54.9   | 37.0        |
| Italy                 | 6.3   | 8.1        | 8.2   | 10.6     | 59.8   | 58.5        |
| Latvia                | 5.3   | 5.4        | 5.6   | 7.5      | 41.0   | 38.8        |
| Lithuania             | 2.7   | 2.2        | 2.8   | 3.0      | 47.3   | 36.4        |
| Luxembourg            | 0.6   | 0.7        | 1.8   | 2.0      | 55.8   | 52.0        |
| Malta                 | 3.4   | 3.1        | -   | -        | 50.5   | 49.3        |
| Netherlands           | 1.9   | 1.8        | 2.8   | 2.4      | 40.1   | 31.6        |
| Poland                | 6.2   | 6.2        | 6.7   | 6.7      | 74.0   | 70.4        |
| Portugal              | 5.5   | 8.3        | 6.6   | 9.2      | 66.4   | 59.2        |
| Romania               | 4.4   | 4.8        | 5.9   | 6.5      | 93.0   | 83.6        |
| Slovakia              | 2.9   | 3.1        | 3.2   | 3.4      | 92.9   | 89.0        |
| Slovenia              | 3.2   | 4.5        | 4.5   | 5.9      | 80.1   | 74.6        |
| Spain                 | 2.9   | 3.4        | 4.0   | 4.4      | 69.4   | 63.8        |
| Sweden                | 1.0   | 1.1        | 1.3   | -        | 32.2   | -           |
| <b>European Union</b> | <b>2.8</b>  | <b>2.9</b> | <b>-</b>  | <b>-</b> | <b>63.4</b>  | <b>58.9</b> |

Source: (European Commission, 2020, 6)

Non-performing loans in the European Union have experienced some reversal due to the impact of the COVID-19 pandemic, after an improvement in recent years. Banks have to identify and set up provisions for potential-non-performing loans, the faster and easier non-performing loans resolution and disposal process will be, avoiding the harmful effects in the future and not repeating the mistakes of the 2007 crisis.

Numerous international institutions are concerned about the issue of non-banking loans. In subsidiary, these influence the banking profitability. The actual pandemic crisis suggests declining long-term profitability prospects for banks and from around 6% in February 2020, the average profitability of euro area banks was 2% in June 2020. The decrease in profitability is mainly due to higher provision for loan losses and weaker revenue generation capacity, linked to the continued compression of interest margins (De Guindos, 2020). A study issued by the International Monetary Fund approach the impact of the COVID-19 pandemic on the corporate and banking sectors in Latin America. It presents a significant increase in non-performing loans and a decline in banks'

profitability (International Monetary Fund, 2020).

The COVID-19 crisis has increased the risk of a future accumulation of non-performing loans resulted from a deterioration in the asset quality of banks' balance sheets. The high aggregate level of non-performing loans in the euro area had already been identified as a matter of supervisory concern going into 2020, so before the COVID-19 crisis, and there is now an added risk of severe cliff effects when public support measures start to expire (European Central Bank, 2020).

The paper is organized as follows. First, we present the empirical literature on banking profitability and the research methodology. Next sections present and discuss results and conclusions on the impact on the studied variables (Non-performing loans coverage ratio, Cost to income ratio and GDP growth) on the Return on allocated capital at the level of a European banking group – Erste Group - from second quarter of 2018 to first quarter of 2021.

## **2. Literature review**

This paper relates closely to a quickly growing literature on the dynamics of banking profitability, non-performing loans, and economic growth. Important contributions belong to Thornton and Di Tommaso (Thornton and Di Tommaso C, 2020, pp. 1-18), which examine if the effect of non-performing loans depends on the level of bank capital and profitability. The authors developed a panel of up to 521 banks from 21 European countries for the period 2007-2017 and their findings suggest an important effect of non-performing loans on capital and profitability, based on the unbalanced panel regressions.

The quoted banks in the European Union were studied for 2007-2019 (Ercegovac et al., 2020, pp. 89-102) based on the relationship between bank's efficiency (measured by cost to income ratio and non-performing ratio) and profitability (ROA, ROE). The authors developed the models that show the strong significant negative influence of the non-performing assets on the analysed profitability indicators.

The global pandemic generated by COVID-19 emphasizes even more acutely the critical role of banks in the economy. The resilience of commercial banks that operate in Poland has been studied from the potential impact of the COVID-19 pandemic point of view (Korzeb Z., Niedziółka P, 2020, p. 205-234). Banks' diagnostic was developed through the application of a few features, among which one can mention profitability, share of exposures with recognized impairment and resilience of the bank's credit portfolio to the risk resulting from involvement in the sectors most threatened by the effects of the COVID-19 crisis. The results showed that the largest banks are most resilient. Year 2020 has been labeled as a year that turned any predictions upside down (Gabeshi, 2020, pp. 38-43). This author considered that in the pandemic period the Central and Eastern Europe countries have to limit their credit risk.

Various variables were used by empirical literature to explain the evolution of banking profitability ratio, especially return on equity and return on assets. The growth rate of non-performing loans, the growth rate of profit / loan, the growth rate of the Gross Domestic Product, the loan – deposit ratio, the cost to income ratio and the capital ratio represent the variables which explain ROE and ROE evolution for Bosnia and Herzegovina between 2017 and 2019 (Alihodzic, 2020, pp. 182-202). Based on the assumption that the profitability is the most appropriate indicator to assess the performance of a bank and that ROE and ROE measure the profitability, some authors contribute to the literature with a panel data regression model for Indonesia, 2011-2014 (Wulandari et al., 2016, pp. 109-119). Non-performing loans are considered to be an internal factor that influences the profitability of banks, while GDP growth is an external factor which contributes to the evolution of the profitability.

## **3. Research methodology**

Our study presents an empirical analysis of the profitability at the level of a European banking group – Erste Group - presented by country, focusing on relationships between Return on allocated capital and Non-performing loans (NPL) coverage ratio, Cost to income ratio and GDP Growth.

We started with a sample which contains Key financial data & ratios for Erste Group presented for each country in which the banking group has subsidiaries (Austria, Croatia, Czech Republic, Hungary, Romania, Serbia, Slovakia) for the last three years shown quarterly from the second quarter of 2018 to the first quarter of 2021. The key financial data & ratios for Erste Group have been extracted from <https://www.erstegroup.com/en/investors/reports/financial-reports>. The obtained sample has been extended with a macroeconomic variable - GDP Growth by country, extracted from Eurostat <https://appsso.eurostat.ec.europa.eu/nui/show.do>.

The dependent variable Return on allocated capital was used. Return on allocated capital is defined as a net result of the period before minorities in relation to the allocated capital of the respective segment. This ratio gives a sense of how well a company is using its capital to generate profits. It is always calculated as a percentage and is usually expressed as an annualized or trailing 12-month value.

The regressors of the model, the explanatory variables used in our analysis are:

- Cost to income ratio (%) [estimated effect: -]. Cost to income ratio is an important financial metric in determining the profitability of banks. It is usually expressed as a percentage. This measure presents the operating expenses of a bank as to a bank’s operating income. Lower ratios mean that a bank is running more profitably while a higher cost to income ratio indicates that the banks operating expenses are too high. There is an indirect relationship between the cost to income ratio and the bank’s profitability

- Non-performing loans (NPL) coverage ratio (%) [estimated effect: -]. Non-performing loans (NPL) coverage ratio represents risk provisions for loans and advances to customers as a percentage of non-performing loans and advances to customers. The non-performing loan coverage ratio looks at a bank’s ability to absorb future losses. Banks understand not every loan that they lend will be paid in full, so by predicting the rate of non-performing loans, banks can be prepared to cover these future losses. It is also expressed as a percentage.

- GDP growth (%) [estimated effect: +]. It is a macroeconomic indicator which compares the most recent quarter of the country’s economic output to the previous quarter. The gross domestic product (GDP) growth rate measures how fast the economy is growing. GDP growth data is seasonally and calendar adjusted data.

Table no. 1 Descriptive statistics for Return on allocated Capital model Q2.2018-Q1.2021

| Variable          | Obs | Mean   | Std. Dev. | Min     | Max    |
|-------------------|-----|--------|-----------|---------|--------|
| Return on capital | 84  | 13.517 | 8.716     | -19.433 | 28.407 |
| Cost to income    | 84  | 55.091 | 9.838     | 43.98   | 86.731 |
| ln NPL coverage   | 84  | 4.537  | .292      | 4.081   | 5.354  |
| GDP growth        | 84  | .226   | 4.325     | -14.9   | 11.8   |

Source: Authors’ calculations, based on data available at <https://www.erstegroup.com/en/investors/reports/financial-reports> and <https://appsso.eurostat.ec.europa.eu/nui/show.do>

Return on allocated capital model is

$$Return\_on\_capital = \beta_0 + \beta_1 \times Cost\_to\_income_{i,t} + \beta_2 \times ln\_NPL\_Coverage_{i,t} + \beta_3 \times GDP\_Growth_{i,t} + \varepsilon_{i,t} \quad (1)$$

where,  $Cost\_to\_income_{i,t}$  denotes Cost to income ratio (%),  $ln\_NPL\_Coverage_{i,t}$  represents the natural logarithm of Non-performing loans (NPL) coverage ratio (%) and  $GDP\_growth_{i,t}$  is GDP growth (%) (for country  $i$  in quarter  $t$ ),  $\varepsilon_{ij,t}$  is an iid error term specific to country  $i$  in quarter  $t$ .

We have performed the regression based on sample of 7 countries and 12 quarters (Q2.2018-Q1.2021) included into the model and we have examined the results. In the result model, the sample is comprised of 84 observations which is a representative one, due include data for the same banking group – Erste Group - from 7 different countries and the data are current. The independent variables explains 37,5% of the variation of Return on allocated capital.

Table no. 2 Empirical results for Return on capital model Q2.2018-Q1.2021

| <b>Linear regression</b> |        |         |                      |         |           |           |     |
|--------------------------|--------|---------|----------------------|---------|-----------|-----------|-----|
| Return on capital        | Coef.  | St.Err. | t-value              | p-value | [95% Conf | Interval] | Sig |
| Cost_to_income           | -.301  | .076    | -3.95                | 0       | -.452     | -.149     | *** |
| ln_NPL_coverage          | -9.361 | 2.25    | -4.16                | 0       | -13.84    | -4.883    | *** |
| GDP_growth               | .599   | .145    | 4.13                 | 0       | .31       | .888      | *** |
| Constant                 | 72.409 | 10.038  | 7.21                 | 0       | 52.432    | 92.386    | *** |
| Mean dependent var       |        | 13.517  | SD dependent var     |         |           | 8.716     |     |
| R-squared                |        | 0.375   | Number of obs        |         |           | 84.000    |     |
| F-test                   |        | 21.659  | Prob > F             |         |           | 0.000     |     |
| Akaike crit. (AIC)       |        | 569.683 | Bayesian crit. (BIC) |         |           | 579.407   |     |

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Source: Authors' calculations, based on data available at  
<https://www.erstegroup.com/en/investors/reports/financial-reports> and  
<https://appsso.eurostat.ec.europa.eu/nui/show.do>

To confirm that obtained model is relevant, we decide to extend the sample period from Q2.2018-Q1.2021 to Q1.2016-Q1.2021. For extended periods of time the result model explaining only 28% of the variation of Return on allocated capital.

Table no. 3 Descriptive statistics for Return on allocated Capital model Q1.2016-Q1.2021

| Variable          | Obs | Mean   | Std. Dev. | Min     | Max    |
|-------------------|-----|--------|-----------|---------|--------|
| Return on capital | 147 | 16.647 | 11.91     | -19.433 | 86.827 |
| Cost to income    | 147 | 55.374 | 9.11      | 43.98   | 86.731 |
| ln NPL coverage   | 147 | 4.428  | .275      | 4.019   | 5.354  |
| GDP growth        | 147 | .578   | 3.34      | -15.1   | 11.6   |

Source: Authors' calculations, based on data available at  
<https://www.erstegroup.com/en/investors/reports/financial-reports> and  
<https://appsso.eurostat.ec.europa.eu/nui/show.do>

Table no. 4 Empirical results for Return on capital model Q1.2016-Q1.2021

| <b>Linear regression</b> |         |          |                      |         |           |           |     |
|--------------------------|---------|----------|----------------------|---------|-----------|-----------|-----|
| Return on capital        | Coef.   | St.Err.  | t-value              | p-value | [95% Conf | Interval] | Sig |
| Cost_to_income           | -.438   | .07      | -6.28                | 0       | -.576     | -.3       | *** |
| ln_NPL_coverage          | -13.055 | 3.204    | -4.07                | 0       | -19.388   | -6.721    | *** |
| GDP_growth               | .626    | .176     | 3.57                 | 0       | .279      | .973      | *** |
| Constant                 | 98.35   | 14.823   | 6.64                 | 0       | 69.05     | 127.65    | *** |
| Mean dependent var       |         | 16.647   | SD dependent var     |         |           | 11.910    |     |
| R-squared                |         | 0.280    | Number of obs        |         |           | 147.000   |     |
| F-test                   |         | 23.872   | Prob > F             |         |           | 0.000     |     |
| Akaike crit. (AIC)       |         | 1104.158 | Bayesian crit. (BIC) |         |           | 1116.120  |     |

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Source: Authors' calculations, based on data available at  
<https://www.erstegroup.com/en/investors/reports/financial-reports> and  
<https://appsso.eurostat.ec.europa.eu/nui/show.do>

In the Tables no. 5 and 6 the correlation matrix for the variables is being presented. There are no correlations bigger than 0.5 between regressors and all used variables and this means that our independent variables are not correlated.

Table no. 5 Correlation matrix Return on capital model Q2.2018-Q1.2021

| Variables             | (1)               | (2)            | (3)             | (4)           |
|-----------------------|-------------------|----------------|-----------------|---------------|
|                       | Return_on_capital | Cost_to_income | ln_NPL_coverage | GDPgdp_growth |
| (1) Return_on_capital | 1.000             |                |                 |               |
| (2) Cost_to_income    | -0.451            | 1.000          |                 |               |
| (3) ln_NPL_coverage   | -0.410            | 0.297          | 1.000           |               |
| (4) GDP_growth        | 0.314             | -0.062         | 0.015           | 1.000         |

Source: Authors' calculations, based on data available at  
<https://www.erstegroup.com/en/investors/reports/financial-reports> and  
<https://appsso.eurostat.ec.europa.eu/nui/show.do>

Table no. 6 Correlation matrix Return on capital model Q1.2016-Q1.2021

| Variables             | (1)               | (2)            | (3)             | (4)        |
|-----------------------|-------------------|----------------|-----------------|------------|
|                       | Return_on_capital | Cost_to_income | ln_NPL_coverage | GDP_growth |
| (1) Return_on_capital | 1.000             |                |                 |            |
| (2) Cost_to_income    | -0.404            | 1.000          |                 |            |
| (3) ln_NPL_coverage   | -0.369            | 0.202          | 1.000           |            |
| (4) GDP_growth        | 0.192             | -0.048         | 0.001           | 1.000      |

Source: Authors' calculations, based on data available at  
<https://www.erstegroup.com/en/investors/reports/financial-reports> and  
<https://appsso.eurostat.ec.europa.eu/nui/show.do>

One important step in the methodology of this study was to check the stationarity of the variables in the Panel Regression Model with Fisher Test. The estimates are run through OLS panel data method with robust standard errors, consistent with panel-specific autocorrelation and heteroskedasticity. All variables used in our analysis are stationary.

Table no. 7 Fisher-ADF unit root tests – Return on capital model Q2.2018-Q1.2021

| Fisher-ADF        |                      |                     |                      |                     |
|-------------------|----------------------|---------------------|----------------------|---------------------|
|                   | Inv. chi-squared     | Inv.N               | Inv.L                | M.Inv chi-squared   |
| Return on capital | 63.3746<br>[0.0000]  | -5.6836<br>[0.0000] | -6.5738<br>[0.0000]  | 9.3309<br>[0.0000]  |
| Cost to income    | 66.1393<br>[0.0000]  | -5.5829<br>[0.0000] | -6.8692<br>[0.0000]  | 9.8534<br>[0.0000]  |
| ln NPL coverage   | 29.3342<br>[0.0094]  | -2.4387<br>[0.0074] | -2.6200<br>[0.0062]  | 2.8979<br>[0.0019]  |
| GDP growth        | 123.4607<br>[0.0000] | -8.5248<br>[0.0000] | -12.9943<br>[0.0000] | 20.6861<br>[0.0000] |

Source: Authors' calculations, based on data available at  
<https://www.erstegroup.com/en/investors/reports/financial-reports> and  
<https://appsso.eurostat.ec.europa.eu/nui/show.do>

Table no. 8 Fisher-ADF unit root tests – Return on capital model Q1.2016-Q1.2021

| Fisher-ADF        |                      |                     |                      |                     |
|-------------------|----------------------|---------------------|----------------------|---------------------|
|                   | Inv. chi-squared     | Inv.N               | Inv.L                | M.Inv chi-squared   |
| Return on capital | 122.6046<br>[0.0000] | -8.7706<br>[0.0000] | -12.9324<br>[0.0000] | 20.5243<br>[0.0000] |
| Cost to income    | 94.0890<br>[0.0000]  | -7.5148<br>[0.0000] | -9.8798<br>[0.0000]  | 15.1354<br>[0.0000] |
| ln NPL coverage   | 26.9308<br>[0.0197]  | -2.5909<br>[0.0048] | -2.4983<br>[0.0084]  | 2.4437<br>[0.0073]  |
| GDP growth        | 126.2195<br>[0.0000] | -9.1195<br>[0.0000] | -13.3091<br>[0.0000] | 21.2075<br>[0.0000] |

Source: Authors' calculations, based on data available at  
<https://www.erstegroup.com/en/investors/reports/financial-reports> and

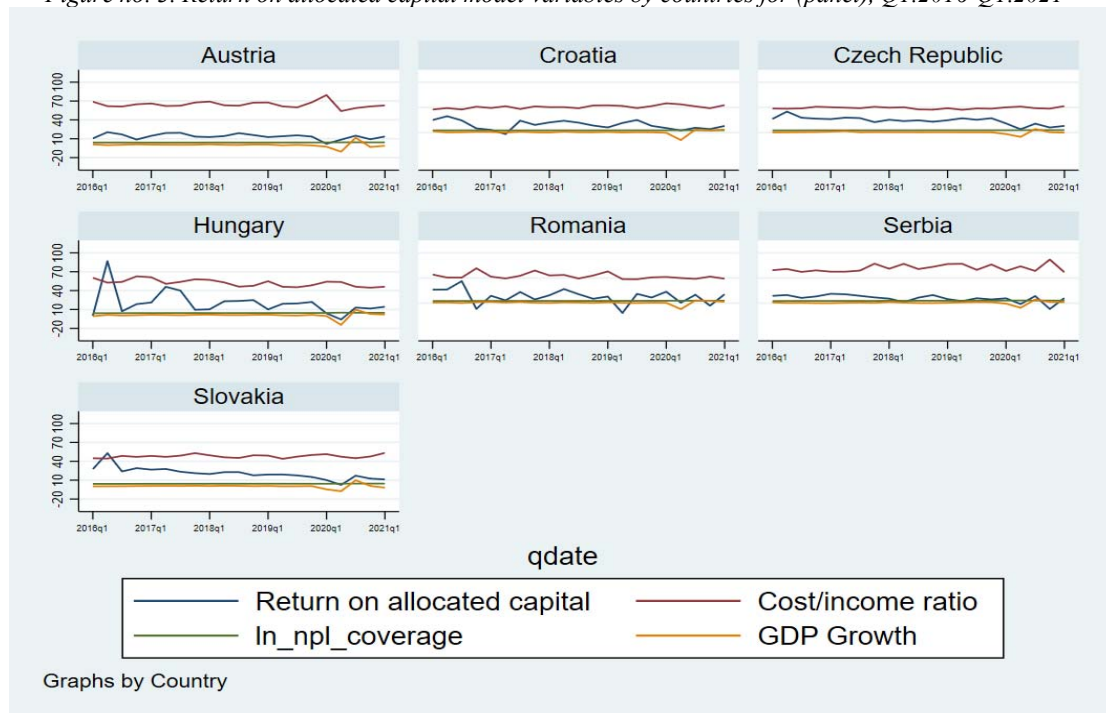
<https://appsso.eurostat.ec.europa.eu/nui/show.do>

*Note:* Fisher-ADF tests with drift, one lag and cross-sectional means removed. Its null hypothesis states that all panels contain unit roots, with the alternative that at least one panel is stationary. In the table no. 8 are reported the statistics and p-values for the following Fisher tests: inverse chi-squared, inverse normal, inverse logit and modified inverse chi-squared.

#### 4. Findings

All dependent variables in our models that have a significant impact - p value is below 1%. There is a negative link between cost to income ratio and Return on allocated capital, this means that an increase of cost to income ratio with 1 unit leads to a decrease by -0,438 of Return on capital for Q1.2016-Q1.2021. The model also presents an inverse proportionality between NPL coverage ratio and Return on allocated capital. The only positive impact in our model is given by GDP growth; in a country with increasing GDP the bank profitability is positively impacted.

Figure no. 3. Return on allocated capital model variables by countries for (panel), Q1.2016-Q1.2021



*Source:* Authors’ processing, based on data available at <https://www.erstegroup.com/en/investors/reports/financial-reports> and <https://appsso.eurostat.ec.europa.eu/nui/show.do>

The estimation results suggest that Return on allocated capital is not solely influenced by our dependent variables which were analyzed in these models. There are also other variables that explain the variation of Return on allocated capital which are not showed in the presented model.

#### 5. Conclusions

We have described in this paper that most studies confirmed the relationship between profitability of banks, measured by ROA, ROE or another capital ratios (return on allocated capital) and internal banking variables, as the non-performing loans coverage ratio or cost to income. Also, the empirical literature has proved that GDP growth influence the banking profitability.



Results of our research are in line with a number of studies that argue these types of influences (an inverse relationship between first two mentioned explanatory variables and a positive relationship for the last one, respectively GDP). Our sample consists in a panel data, based on the Erste Group’s subsidiaries from Austria, Croatia, Czech Republic, Hungary, Romania, Serbia and Slovakia for the last three years shown quarterly from the second quarter of 2018 to the first quarter of 2021. We use Ordinary Least Squares OLS method with robust standard errors, consistent with panel-specific autocorrelation and heteroskedasticity. The independent variables explain 37,5% of the variation of Return on allocated capital (Q2.2018-Q1.2021) or 28% of the variation of Return on allocated capital (Q1.2016-Q1.2021).

We consider that is too early to clarify the entire set of the mechanisms and the indicators that influence the banking system in the COVID-19 crisis, but is already clear that the actual pandemic will certainly put further pressure on the profitability of the banks, through directly and indirectly channels – such the decrease of the operational revenues, the possible non-performing loans, the psychological components of the action of bank customers, whose risk appetite and interaction with the banks decreased considerably during the pandemic period.

## 6. Acknowledgements

This work is supported by project POCU 125040, entitled Development of the tertiary university education to support the economic growth - PROGRESSIO, co-financed by the European Social Fund under the Human Capital Operational Program 2014-2020.

## 7. References

- Alihodzic A., 2020. Sensitivity of bank profitability to changing in certain internal and external variables: the case of Bosnia and Herzegovina, *Eastern Journal of European Studies*, 11- 2, 182-202
- De Guindos L., 2020. The euro area financial sector in the pandemic crisis, Keynote speech at Euro Finance Week, 16.11.2020 [online] Available at: <https://www.ecb.europa.eu/press/key/date/2020/html/ecb.sp201116~36fba64064.en.html>
- Ercegovic R., Klinac I., Zdrilic I., 2020. Bank specific determinants of EU banks profitability after 2007 financial crisis, *Journal of Contemporary Management Issues*, 25-1, 89-102
- Erste Group, 2021, *Key financial data & ratios 2016-2021 – Annual and Interim Reports plus additional financial information* [online] Available at: <https://www.erstegroup.com/en/investors/reports/financial-reports>
- European Banking Authority EBA, 2013, *EBA Final draft Implementing Technical Standards on Supervisory Reporting on forbearance and non-performing exposures under article 99(4) of Regulation (EU) no. 575/2013* [online] Available at: <https://www.eba.europa.eu/regulation-and-policy/supervisory-reporting/draft-implementing-technical-standard-on-supervisory-reporting-forbearance-and-non-performing-exposures->
- European Central Bank, 2020. *Annual Report on Supervisory Activities* [online] Available at: <https://www.bankingsupervision.europa.eu/press/publications/annual-report/html/ssm.ar2020~1a59f5757c.en.html#toc2>
- European Commission, 2020, *Communication from the Commission to the European Parliament, the Council and the European Central Bank – Tackling non-performing loans in the aftermath of the COVID-19 pandemic* [online] Available at: [https://ec.europa.eu/transparency/documents-register/detail?ref=COM\(2020\)822&lang=EN](https://ec.europa.eu/transparency/documents-register/detail?ref=COM(2020)822&lang=EN)
- European Parliament, 2020, *COVID-19: Easing rules to encourage banks to lend to companies and households* [online] Available at: <https://www.europarl.europa.eu/news/ro/press-room/20200615IPR81234/covid-19-easing-rules-to-encourage-banks-to-lend-to-companies-and-households>
- Eurostat database, *GDP Growth by country 2016-2021* [online] Available at: <https://appsso.eurostat.ec.europa.eu/nui/show.do>
- Gabeshi K., Analysis of Credit Growth Determinants in the European Countries. “Ovidius” University Annals, *Economic Sciences Series*, XX-2, pp. 38-43
- International Monetary Fund, 2020. *Assesing the Impact of the COVID-19 Pandemic on the Corporate and Banking Sectors in latin America*

- Korzeb Z., Niedziółka P., 2020. Resistance of commercial banks to the crisis caused by the COVID-19 pandemic: the case of Poland. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 15-2, 205–234
- Thornton J., Di Tommaso C., 2020. The effect of non-performing loans on credit expansion: Do capital and profitability matter? Evidence from European banks, *International Journal of Finance & Economics*, 1-18
- Wulandari T., Lukytawati A., Andati T., 2016. Modeling the profitability of commercial banks in Indonesia, *Economic Journal of Emerging Markets*, 8-2, 109-119
- \* \* \* Government Emergency Ordinance no. 37/2020 on granting facilities for loans granted by credit institutions and non-bank financial institutions to certain categories of borrowers, published in the Official Gazette of Romania no. 261/30.03.2020
- \* \* \* Government Emergency Ordinance no. 227/2020 on granting facilities for loans granted by credit institutions and non-bank financial institutions to certain categories of borrowers, published in the Official Gazette of Romania no. 1331/30.12.2020
- \* \* \* Regulation (EU) no. 575/2013 - Capital Requirements Regulation - of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms [online] Available at:  
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32013R0575>
- \* \* \* Regulation (EU) no. 2019/630 of the European Parliament and of the Council of 17.04.2019 amending Regulation (EU) no. 575/2013 as regard minimum loss coverage for non-performing exposures [online] Available at:  
<https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32019R0630>