

# International Conference on Business and Economics - Hellenic Open University

Vol 1, No 1 (2021)

ICBE-HOU Proceedings 2021



## The impact of Non-Performing Loans on the Banks' Profitability

*Mihail Diakomihalis, Sofia Economakou*

doi: [10.12681/icbe-hou.5305](https://doi.org/10.12681/icbe-hou.5305)

### To cite this article:

Diakomihalis, M., & Economakou, S. (2023). The impact of Non-Performing Loans on the Banks' Profitability. *International Conference on Business and Economics - Hellenic Open University*, 1(1). <https://doi.org/10.12681/icbe-hou.5305>

## The impact of Non-Performing Loans on the Banks' Profitability

**Mihail Diakomihalis**  
Department of Accounting and Finance  
University of Ioannina  
481 00 Preveza, Greece  
Hellenic Open University  
E-mail: diakom@uoi.gr  
diakomichalis.michail@ac.eap.gr \*

**Sofia Economakou (MSc)**  
Freelancer Accountant  
45500 Ioannina  
E-mail: sofakimak@yahoo.gr\*\*

\*Professor \*\*Freelancer Accountant

---

### Abstract

The global financial system after and during the financial crisis had to face the major issue which has extremely influence their profitability: The Non-Performing Loans portfolio (NPLs).

The present study aims to reveal the interrelation and the possible impact of the NPLs to the profitability indicators of the Greek banks and specifically how they affect the profitability of the banks.

The empirical investigation of included a comparative study of Financial ratios of certain Greek banks were calculated in order to reveal the impact of Non-Performing loans to their profitability for the year 2017.

Interest income on loans is positive for all Banks but with a wide variation, while Interest-Expenses show an asymmetric distribution. Overdue loans for more than 90 days show uniformity with the exception of Piraeus Bank which shows an extreme price. The correlation between ROA and ROE with loans is not statistically significant.

The effect on the Equity of loans in all forms except regulated is considered statistically significant. The negative effect of NPLs for more than 90 days on Net Profit before Tax is considered statistically significant.

**JEL Classifications:** G210, D140, G300, O160

**Key words:** Non- Performing loans, Greek Banks, Profitability, Credit risk, Legal frame of NPLs

This is a first draft of the ongoing research regarding the Non-Performing Loans and their impact on the Banks' Profitability, which was presented at the 7th International Conference on Business and Economics (ICBE) of the Hellenic Open University, Virtual Conference, Greece, 7-8 May 2021.

---

## 1 Introduction

The unprecedented crisis erupted in 2008, has affected the Greek banking system which suffered alike the international financial system. The capital of Banks has reduced rapidly, and significant losses have been recorded during this period, which in some cases have brought banks near their bankruptcy. A general result was the absorption of certain, rather weak financially banks by the stronger banks. The 13 Greek banks before the financial crisis, have decreased in 2011 to eight, in 2012 to seven and in 2013 to five. The five strongest banks that survived the crisis are the National Bank, Piraeus Bank, Alpha Bank, Eurobank and Attica Bank (Diakomihalis, et.al., 2016).

The European Banking Authority (EBA) has defined and determined Non-Performing Loans (NPLs) as well as Non-Performing Exposures (NPEs). According to the EBA non-performing exposures (NPEs) include:

- (a) Loan exposure delays of equal or more than 90 days,
- b) Exposures of “unlikely to pay” Loans, even with not particular delay or with a delay equal or greater than 90 days determined by quality criteria,
- (c) Claims that have been filed regardless of whether they have been declared bankrupt.

“Non-performing loans” and “overdue loans” do not express the same condition of loans according to the Bank of Greece, with the main difference that the new definition of Exposures is wider than that of NPLs as it includes not only loans but also all other debit instruments such as debit securities, advances and off-balance sheet exposures (EBA, 2018; BoG, 2017).

The high public and private debt and the trade deficit of the Greek government describe the conditions of the Greek economy until the financial crisis eruption in 2008. The falsification public deficit data by the Greek state, was justified by the Greek government, as the means to show that Greece complied with the Stability and Growth Pact (Camaione, 2014).

The high increase in non-performing loans and the outflow of bank deposits has threatened financial stability in Greece, in 2015. The “non-performing exposures”, called also “red loans”, have reached 55.4% in consumer loans, 43.3% in business and 39.8% in housing (Report of the Management of the Bank of Greece, 2016).

Greek banks wrote off loans of about 660 million euros, at the urging of the Bank of Greece, to better manage non-performing loans. Law 38699 of 2010 gave lenders the opportunity to adjust their debts, along with their non-performing loans. Greek Banks, in 2017, improved their profitability, maintained their capital adequacy, while achieving alternative sources of financing simultaneously with the reduction of non-performing loans, as defined by the third Economic Adjustment program. Consolidated earnings before taxes in 2017 were increased compared to 2016.

The increase in commission income, the reduction of operating costs and debt interest, as well as the improvement of the capital adequacy of the banks led to the increase of their profits. The Common Equity Tier 1-CET1 index increased in 2017, albeit slightly compared to 2016, to 17.1% from 16.9%. Both liquidity and private sector deposits increased in 2017, mainly due to electronic transactions and capital constraints. Private and public sector

deposits with banks increased by 4.5% in 2017. Also, the dependence of Greek financial institutions on the Euro-system financing mechanism (European Central Bank -ECB) and the Extraordinary Liquidity (ELA) for additional liquidity, decreased significantly in 2017, approximately at half of the amount of 2016.

The balance of loans to the private sector in 2017 reached 183.9 billion euros compared to 195.2 billion euros in 2016. The decrease in private sector financing, according to the Bank of Greece, slowed in 2017 due to the decrease in loan interest rates but also the improvement of economic activity.

The single monetary policy of the euro area has contributed to financial stability, improved growth, and increased Gross Domestic Product. In addition, in 2018, the implementation of the International Financial Reporting Standard 9 (IFRS 9), the implementation of the pan-European stress test by the ECB and the strict framework for managing provisions for new non-performing loans were introduced. The situation from the operation of the Greek banking system may have been positive in 2017, but the non-performing exposures (NPEs) remained at the same high levels as in 2016.

For the purpose of this research, the financial ratios of all four systemic Greek banks are examined, plus the Bank of Attica, and in addition four Cooperative Banks, namely Epirus, Thessaly, Crete and Serres.

Furthermore, the reasons for forcing European Community to decide on the institutional framework for dealing with the crisis due to non-performing loans are explained. For the needs of the research, the analysis of banks was selected using the indicators of profitability, capital structure, liquidity and valuation.

The paper has the following structure: Section 1 contains the Introduction, which is followed by Literature review in Section 2. Section 3 describes the aims and the research objectives, while Section 4 contains Data and Methodology. The results are presented and analysed in Section 5, and finally the last Section 6 demonstrates the Conclusion of the paper.

## **2 Literature review**

Profitability of the banking sector has been a popular subject for many researchers, and the reason for the numerous studies on the issue, both worldwide and in Greece.

The rapid increase of non-performing loans during the financial crisis and thereafter is evident in both the private and business lending sectors in all banks. Several studies have focused on the profitability of the Greek Banking Sector and some of them aimed to evaluate the effect on NPLs in recent years on the banks' profits.

The relationship between credit quality and macroeconomic conditions, is an issue of academic interest in order to link banking stability to the financial and business cycle (Louzis et al., 2012) along with the impact of non-performing loan ratio on the business cycle (Quagliariello, 2007).

It is unavoidable that the economy in total might be affected by the increase in non-performing loans in the whole of Europe. Several studies in central, eastern and southeastern Europe reveal the strong pressure on the balance sheets, with potential adverse effects on banks' lending activities, as the levels of non-performing loans grow (Klein, 2013).

The impact of non-performing loans to the cost / efficiency ratio is determined as a case of "bad luck" (Berger and DeYoung, 1997) but the cost / effectiveness ratio leading to Non-Performing Loans is characterized as a "bad management" issue (Klein, 2013).

Non-Performing Loans (NPLs) of every loan category, in the Greek banking system, can be explained by macroeconomic variables and management quality (Louzis et al., 2012), but they are the least responsive to changes in the macroeconomic conditions.

Besides, low-cost efficiency for the banks may lead to NPLs increase (Louzis et al., 2012; Berger and DeYoung, 1997).

The effect of credit risk is reported as the most important element of market risk (Louzis et al., 2012: 9) for the resilience of Greek banks to internal and external crises (Kalfaoglou, 2006), with a significant negative simultaneous effect of GDP growth on NPL index (Salas and Saurina, 2002).

The exaggerated provision of loans in the last decades by the banks might be considered arising from the disorganization of banks and perhaps to the full or partial deregulation process of financial markets, as well as to technological improvement of banking transactions and services (Cingolani 2013; Panopoulou 2005; Rinaldi and Sanchis-Arellano 2006).

Even though competition among banks has been strengthened by deregulation in the banking sector (Salas and Saurina 2003), but is also increased banks' risk, along with bad loan participation through weak screening and lax lending criteria, which has affected their loan portfolios (Manove, Padilla, and Pagano 2001; Bolt and Tieman 2004; Jeong and Jung 2013).

The existence of non-performing loans is related negatively with the profitability in commercial banks in Tanzania (Kingu et al., 2018), while NPLs have shown a lagged impact on industrial production in Turkey (Cifter et al., 2009; Louzis et al., 2012).

A strong correlation has been revealed between NPL and various macroeconomic values such as public debt and GDP increase as well as with other bank related factors, such as capital adequacy, ROE and rate of NPL (Makri et al., 2014; Patwary and Tasneem, 2019).

The increase in cash and diversification of portfolios are some effective measures taken by financial institutions in times of uncertainty or even crisis, to reduce their risk.

Scholars contradict on the correlation of liquidity and profitability, with some of them insisting that this relationship has been negative (Molyneux & Thornton, 1992), while others support that there is a positive correlation between the liquidity ratio and profitability (Bourke, 1989; Spathis, 2001; Miller & Noulas, 1997).

### **3 Research Aim and Objectives**

The research question aimed to be answered by this paper concerns Non-Performing Loans–NPLs and their possible relation to the profitability of Greek banks.

The research objectives set out for the above research aim are the following:

- The first research goal concerns the recording of the financial values of the banks that constitute the sample of the research.
- The second research objective concerns the correlation with the use of simple loan correlation coefficients with the data of outflows or profitability of the banks.
- The third research goal concerns the research's objective which is characterized by the

measurement of the effect of loans on net income, net profit before taxes, the ROE and the ROA ratios.

- The fourth research goal is to control the impact of loans on the change in profitability to positive or negative.

## **4 Data and Methodology**

The statistical analysis of data is the methodology applied in the present study. Balance sheet accounts, usage results, loans and indices from the nine Greek banks, are the data used in this paper. Data were collected from the reports of the banks, the websites of the banks and the reports of the Governor of the Bank of Greece, for the year 2017, during which the data were published in sufficient completeness for all the banks included in the sample of the research.

The overall financial performance of each bank is monitored by the following five categories of its financial situation (Dimopoulou, 2007):

- Administrative management
- Capital adequacy
- Quality of its assets
- Profitability
- Liquidity and sensitivity to market risk

Data from the balance sheet and profit and loss statement have been used to evaluate the financial situation of the banks. Since not a single or specific analysis will be sufficient enough to interpret the financial state on the profitability of a banking institution, a variety of analysis assessments has been provided to assess the overall situation of the banks.

Profitability ratios depict the ability of the bank to make profits considering the costs required over a given period of time. Therefore, high prices of profitability ratios indicate a positive course in financial efficiency of the credit institution.

The statistical approach, and specifically the use of statistical methods in order for the results of inductive or descriptive statistics to lead to conclusions, is the methodology applied. The SPSS Version 20 is the software used to register and analyze the research data.

Descriptive statistics required to capture sample data, along with inductive statistics necessary to draw conclusions based on sample data, have been used to answer the research questions. The population in our case might be either the wider sum of Greek banks, or the total of banks in a more general context beyond Greek territory.

The aim of the study focused to the extraction of the mean value, the median, the standard deviation, the minimum and maximum value with respect to the descriptive indicators. Pearson correlation test and Spearman correlation test were used, as well as the mean value control for independent samples, the well-known t-test control, and the multivariate regression analysis.

## **5 Results**

Among the research goals, the first one is the presentation of descriptive data for the

balance sheet accounts of the sample banks. In the accounts such as loans of credit, financial indices, expenses, results statement, etc., the average value, the median, the standard deviation, the minimum and the maximum value are recorded. The majority of the nine banks of the sample have a certain price range and a small portion of the sample is distributed at very high prices. The accounts of profit and loss statement take either positive or negative values, while the income from interest on loans is positive for almost all banks with a large variation. Debit interest and other similar expenses are negative for all banks. Net interest income is set for all banks at a positive price. Pre-tax and after-tax profits or losses on operating results for most banks are almost in values that are in order of magnitude close to the zero axis with few extreme values in each case. Personnel salaries and operating expense accounts, including general administrative expenses, are about the same size in terms of variation for all banks. The general and administrative costs vary from very low to very high, depending on the retail network the banks serve. The loans of credit accounts consist of many intermediate accounts and with great diversity in the amounts represented. They are presented separately, loans with a delay of up to 30 days, loans with a delay of 30 to 90 days and loans with a delay of more than 90 days. In loans overdue for more than 90 days, it appears that all banks have a homogeneity with the exception of Piraeus bank, which shows a large set of loans overdue for more than 90 days.

The second goal refers to an absolute correlation between the ROA and ROE indices is revealed which could mean that the results for ROA could be immediately adopted for ROE without performing relevant checks, but in addition it appears that there is a strong statistically significant correlation between the ROA, ROE and net equity indices. As net equity increases by an absolute value, the equity index and the ROA index tends to decrease. There is a strong correlation between loans and net equity with the exception of profits and pre-tax losses with net equity where the correlation is negative and very weak. As the loan amounts increase, so does net equity or equity as an element of the balance sheet. There is a tendency for the ROE factor to decrease as the loans increase. The higher the value of the variable that captures a particular loan account, it is so likely that the ROA will decrease slightly. Net equity is positively or negatively correlated with many of the variables that are elements of the accounts and the data. The ROE and ROA indices are basically correlated, strongly and positively, only with the results before taxes and interest income. The amount of loans in various forms, with overdue loans of a few or many days, loans without delay, etc., leaves the price of the bank's ROE index indifferent. From all the variables used, those that have a statistically significant effect are loans and receivables from customer after the allowances, which is an element of the balance sheet, are loans with a delay of more than 90 days and loans with a delay of up to 30 days, loans with a delay of 30 to 90 days and impairment loans with a delay of more than 90 days.

The third goal deals with the effect of loans on net profits before taxes. Non-overdue and unsecured loans, overdue loans for one to 30 days, overdue loans over 90 days and loans settled after a reduction in loans have a statistically significant effect on net profit before taxes. The loans without delay and not impaired have a negative affect net earnings before taxes.

All other loan cases have positive determinants, which means that it is expected that as the loans amount increases, profits will increase.

It appears that in the end the only variable that affects net profit before taxes is the loans with a delay of more than 90 days, the not impaired loans.

As long as overdue loans tend to grow, there is a tendency to reduce net profits before taxes. Besides, it is found that as loan prices increase on various loan accounts, there is a tendency to reduce net profit before taxes.

The fourth goal deals with the effect of loans on profitability. This section explores whether borrowing has an effect on the sign of the ROE and ROA coefficients.

The results of the audit show that loans that have a statistically significant effect on the sign of profitability and can make the bank's efficiency negative, according to the sample, are loans and claims against customers after allowances, which is an element of balance sheet, not overdue and not impaired loans, as well as overdue and not impaired loans, and overdue loans over 90 days not impaired, while impaired loans, regulated loans and loans with a short delay of one to 30 days do not have a statistically significant effect on banks' profitability when this profitability is measured by the ROE or ROA index.

It seems that overdue or outstanding loans are those that create or exacerbate the problem of profitability and therefore banks should adopt procedures to reduce, or to regulate loans. It seems, therefore, that for the various balance sheet items or the various data relating to loans, the positive sign of profitability concerns smaller loan cases.

## **6 Conclusions**

The present research aimed to investigate the relation between loans from the Greek banks with their profitability.

After the research's results we conclude the major outcomes as follows:

Profit and loss statement accounts take either positive or negative values. Interest income from loans, are positive for almost all banks with a large enough variation which is ought to a great deal of inequality and heterogeneity of these revenues among the banks. Debit interest and related expenses are show a negative price for all banks.

Net interest income is set for all banks at a positive price with a fairly large heterogeneity, while earnings or pre-tax losses, on profit and loss statement, or post-tax profits or losses for most banks are almost at prices that are close to the zero axis with two or three cases of extreme values. Personnel salaries and expenses, have about the same order of magnitude in terms of variation, while their differences are basically related to the retail network they serve.

Loan accounts vary widely on their amounts. All banks, except one of them, show homogeneity in loans overdue for more than 90 days.

The correlation of loans with net equity, reveals that as loan amounts increase, so does net equity.

The correlation of ROA and ROE indices with loans is statistically significant.

There is a tendency for the ROE factor to decrease as the loans increase, even if it statistically significant outcome. Net equity is positively or negatively correlated with many of the variables related to accounts and data, ROE and ROA indices are correlated strongly and positively, only with the results before taxes and interest income.

Variables like the amount of loans in various forms, with overdue loans a few or many days, loans without delay, are considered incapable of predicting the ROE index value, and leave the price of the bank's ROE index indifferent.

The case of ROA index as a dependent variable gives the same result, as the ROE, since none of the variables had the ability to function predictively for the ROA index value.

Significant effect of loans on net worth or owners' equity, have loans and claims against

customers after allowances, loans overdue more than 90 days and loans overdue up to 30 days.

The variables that relate to loans of various forms with or without delay, impaired or non-impaired, demonstrate and show a significant and statistically significant effect on net equity, but does not show statistically significant effect on the two ROE and ROA coefficients at least at 95% level.

The coefficients of determination in the regression of the ROE and ROA cases, have a negative value, which shows that there is a faint trend that the increase in loans leads to a decrease in profitability in the sense of the bank's ROE and ROA rates.

All explanatory variables, like not overdue loans and non-impaired, overdue loans of one to 30 days, overdue loans of more than 90 days and loans regulated after a reduction, are also capable of predicting with great adequacy the dependent variable which is pre-tax profits.

Not overdue and not impaired loans have a negative coefficient of determination, which means that these loans affect negatively net earnings before taxes.

Other loan cases, have positive determinants, which means that as the amount of those loans increases, profits are expected to increase. The only variable that affects net profit before taxes is loans overdue for more than 90 days, not impaired loans, meaning that as long as overdue loans tend to grow, there is a tendency to reduce net profits before taxes. As loan prices rise in various lending accounts, there is a tendency to reduce net profit before taxes.

Loans that have a statistically significant effect on the sign of profitability and can make the bank's profitability negative, are loans and receivables against customers after allowances, non-overdue and non-impaired loans, overdue and non-impaired loans and overdue and non-impaired loans over 90 days.

Summarizing the results obtained from the survey, we end up to the following conclusion:

Interest income on loans is positive for all banks while Interest-Expenses have an asymmetric distribution. Overdue loans for 90 days and more, are uniform except Piraeus Bank which has an extreme price.

ROA and ROE have a negative correlation with the loans, and the impact on the Equity of all form loans, except the regulated.

The impact on Net Profit before Tax of loans over 90 days is considered significant and negative.

The research should be extended to an analysis of the Greek banks for more years, but also encompass banks from other European countries.

## References

- Athanasoglou, P., Brissimis, S., and Delis M. (2008). Bank-Specific, Industry-Specific and Macroeconomic Determinants of Bank Profitability. *Journal of International Financial Markets, Institutions and Money* Vol. 18 (2), 121 – 136.
- Bolt, W. and Tieman, A. (2004). "Banking Competition, Risk and Regulation." *International Monetary Fund Working Paper WP/04/11*.

- Bourke, P. (1989). Concentration and other determinants of bank profitability in Europe, North America and Australia, *Journal of Banking and Finance* Vol. 13, pp. 65-79.
- Cifter, A., Yilmazer, S., Cifter E. (2009). Analysis of Sectoral Credit Default Cycle Dependency with Wavelet Networks: Evidence from Turkey. *Economic Modelling* Vol. 26, pp. 1382-1388
- Cingolani, M. (2013). Finance Capitalism: A Look at the European Financial Accounts. *Panoeconomicus*, 60(3): 249-290.
- Diakomihalis, M., Sagka, I. and Chatzi, I. (2016). 'Financial crisis and Greek banks' performance variation', *Int. J. Financial Services Management*, Vol. 8, No. 4, pp.317–332.
- European Banking Authority. Risk Dashboard (2017). Ανακτήθηκε στις 20/04/2020 από: <http://www.eba.europa.eu/risk-analysis-and-data/risk-dashboard>
- Jeong, S., and Jung H. (2013). Bank Wholesale Funding and Credit Procyclicality: Evidence from Korea. *Panoeconomicus*, 60(5): 615-631.
- Kalfaoglou, F. (2006). Stress Testing of the Greek Banking System. Bank of Greece: Economic Bulletin 27. Athens. Bank of Greece.
- Kalfaoglou F. (2015). Alternative approaches to consolidating non-performing bank loan portfolios. Case analysis. *Financial Bulletin*, Vol. 41, pp. 49-78. Athens. Bank of Greece. Retrieved 22-04-2020 from: <https://www.bankofgreece.gr/BogEkdoseis/oikodelt201507.pdf>
- Kingu P., Macha S., Gwahula, R. (2018) Impact of Non-Performing Loans on Bank's Profitability: Empirical Evidence from Commercial Banks in Tanzania, *International Journal of Scientific Research and Management (IJSRM)*, Vol. 06 (01), pp. 71-79.
- Klein N. (2013). Non-Performing Loans in CESEE: Determinants and Impact on Macroeconomic Performance. IMF Working Paper
- Louzis D., Vouldis A., Metaxas, V. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios *Journal of Banking and Finance*, Vol. 36 (4), pp. 1012-1027
- Makri, V., Tsagkanos A., Bellas, A. (2014). Determinants of non-performing loans: The case of Eurozone *Panoeconomicus*, Vol.61 (2), pp. 193-206 <https://doi.org/10.2298/PAN1402193M>
- Manove, M., Padilla, J., and Pagano M. (2001). Collateral versus Project Screening: A Model of Lazy Banks. *RAND Journal of Economics*, 32(4): 726-744.
- Miller, S. and Noulas, A. (1997). Portfolio Mix and Large-Bank Profitability in the USA. *Applied Economics*, 29, 505-512. <http://dx.doi.org/10.1080/000368497326994>
- Molyneux P., Thornton J. (1992). North-Holland Determinants of European bank profitability: A note, *Journal of Banking and Finance* Vol.16, 1173-1178
- Panopoulou, M., (2005). Technological Change and Corporate Strategy in the Greek Banking Industry, Athens: KEPE
- Patwary S. H. and Tasneem N. (2019). Impact of Non-Performing Loan on Profitability of Banks in Bangladesh: A Study from 1997 to 2017, *Global Journal of Management and Business Research: C Finance* Vol. 19 (1), Version 1.0
- Quagliariello M. (2007). Banks' Riskiness Over the Business Cycle: a Panel Analysis on Italian Intermediaries. *Applied Financial Economics* 17, 119-138.
- Rinaldi, L. and Sanchis-Arellano, A. (2006). Household Debt Sustainability, what Explains Household Non-Performing Loans? An Empirical Analysis. *European Central Bank Working Paper Series* 570.
- Salas, V., and Saurina, J. (2003). Deregulation, Market Power and Risk Behaviour in Spanish Banks. *European Economic Review*, 47(6): 1061-1075.

Spathis Ch., Kosmidou K., Doumpos M. (2002). Assessing profitability factors in the Greek banking system:A multicriteria methodology. *International Transactions in Operation Research*. Vol. 9(5), pp.517 – 530, DOI: 10.1111/1475-3995.00371