Economic Growth and Loans with Problems:
The Case of Albania

Xhuljeta Meçaj[1], Brunilda Lufi[2]

Abstract:

Purpose: *According to economic theories and empirical literature, it turns out that the growth of gross domestic product affects the level of non-performing loans. This study aims to analyze the relationship between economic growth and non-performing loans for the period 2000-2020.*

Design/Methodology/Approach: *To achieve this objective, we have used data from the Bank of Albania. To analyze this relationship in more detail we have estimated the regression model between the NPL level and economic growth as an independent variable with 1 and 2 time lags.*

Findings: *If we refer to the series trends the connection seems to be negative. To show we calculate the correlation coefficient between the two variables. For the variables NPL and GDP growth we used the ADF test on stationarity and beyond we see if the series converge between them using the Johansen test.*

Practical Implications: *Based on this analysis, the study will show whether a supportive macroeconomic environment is needed to stimulate economic growth by helping to reduce the levels of non-performing loans.*

Originality/Value: *It is proved that as long as the economy is stable and banks are profitable and have adequate capital, non-performing loans are at an appropriate level for banks.*

Keywords: *Non-performing loans, GDP, ADF test, co-integration.*

JEL codes: *O47, G21, H81, O52, F43.*

Paper type: *Research article.*

---

[1]*Dr., Department of Mathematics, Faculty of Information Technology "Aleksandër Moisiu" University of Durrës, Durres, Albania, e-mail:* xhulimecaj@yahoo.com*;*
[2]*Dr., University of Shkodra, Albania, e-mail:* brunalufi@yahoo.com*;*

1. Introduction

A non-performing loan (NPL) is a loan that is several months overdue or unpaid. Credit default is mainly focused on macroeconomic factors. Macroeconomic factors are key to understanding the risk of credit default. These factors include economic stability, economic growth, etc., and play an essential role in explaining the performance of non-performing loans in the banking system.

Non-performing loans weigh on banks 'balance sheets, weaken profits and erode banks' capital. High NPLs make it more difficult for banks to use the credit channel to support economic growth.

After 2008, as a result of the global financial crisis, the Albanian banking system experienced an increase in high levels of non-performing loans, reaching the highest level in 2013 with 23.5%. Compared to other candidate countries and potential candidates for the EU, during the period 2013-2015 Albania has had the highest level of NPL. Such a situation where 1/4 of the capital of banks invested in the credit sector is problematic, poses a serious risk to financial performance.

The Albanian economy experienced two strong shocks within a short time span that includes the fourth quarter of 2019 and the first half of 2020. In November 2019, the country was hit by a very strong earthquake that caused damage to people and in the economy, while in March 2020 the COVID-19 pandemic spread to Albania, the measures taken against which had a significant impact on economic activity in the country.

In 2019, the Albanian economy marked an increase in real terms (in volume) of 2.11%, compared to 2018, after an increase of 4.02% in 2018, compared to 2017. The financial sector has remained largely stable despite a significant increase in bad loans/

2. Literature Review

According to (Alves, 2005) and Shahnazarian and Sommer (2007) who are pioneers of the literature on the analysis of the interaction between predetermined probabilities and macro variables using the VAR method. The authors found cointegration between expected frequencies and macro variables, reporting a significant correlation between short-term interest rates, economic growth, inflation, and default frequencies.

On the other hand Distinguin, Rous, and Tarazi (2006) analyzed the probabilities of default for the banking system and macroeconomic variables and concluded that the measure on which the bank's liabilities are based, market data are important in default probability effectiveness.

On the other hand, in a study exploring the relationship between macroeconomic variables and default probabilities for Dutch firms (Simons and Rolwes, 2008) found a negative correlation between economic growth, oil prices and default probability. They also reported that the interest rate and the exchange rate are positively related to the probability of default in certain sectors.

Castren, Dees, and Zaher, (2008) examined the relationship between expected frequencies and economic growth, the exchange rate, oil prices, and asset prices for euro area countries. In terms of research conducted by the Central Banks, the Central Bank of Austria (2002) used the inflation rate, the Austrian stock market index, short-term interest rates and oil prices to explain the default rate, while in a study next, the Central Bank of Finland (2004) estimated six linear credit risk equations in which a macro index obtained after the logistical transformation of default rates was used as a dependent variable for the six economic sectors.

Wong, Choi, and Fong (2006) by the Hong Kong Monetary Authority logistically used the ratio of the amount of loans that are overdue for more than three months to the total amount of loans as a dependent variable. GDP, interest rate and property price index were used as independent variables.

In their study Otani, Shıratsuka, Tsuruı, and Yamada (2009) from the Central Bank of Japan created a macro model consisting of real GDP variables, the price index of consumption, total loan amount, nominal exchange rate and interest rate. Avouyi-Dovi, Bardos, Jardet, Kendaoui, and Moquet (2010) from the Bank of France created a VAR model for the macroeconomic index obtained through the logistical transformation of historical default rates for the manufacturing sector. They used GDP, interest rate and credit differences which represent the difference between corporate bonds and risk-free interest rates as their independent variables.

Also, in an empirical study that examined seven EU countries, (Rinaldi and Sanchis, 2006) concluded that the inflation rate, the ratio of financial assets to disposable income, disposable income itself, the ratio of household debt to household disposable income, and real lending interest rates were important variables that contributed to loan problems.

Jakubik and Schmieder (2008) analyzed the impact of unemployment rate, nominal and real interest rates, inflation rate, interest rate gap, real GDP growth rate, output gap, loan-to-GDP ratio and the ratio of interest paid to disposable income to non-performing loans (Tekirdağ, 2009).

In their study, Küçüközmen and Yükse (2006) evaluated regressions involving eleven different macroeconomic variables to explain the probabilities and modeled macroeconomic variables using ARIMA models. As is clear from the literature, researchers either use a series of macroeconomic indices formed by conversion into logistic form using predetermined rates or a series of macroeconomic index obtained

through transformation into logistic form instead of default rates as a variable representing risk of credit. Some studies used variables with time delays. As explanatory variables, they often chose GDP, inflation rate, interest rate, unemployment rate, and exchange rate.

The analysis conducted by Nikolov and Popovska-Kamnar (2016) in Northern Macedonia show that in a period of economic growth and higher inflation, non-performing loans are low and stable. Increasing the ratios of capital to assets and return on equity also reduces the level of NPL (empirical analysis was conducted for the years 2006-2015). They conclude that as long as the economy is stable and banks are profitable and have adequate capital, non-performing loans are at an appropriate level for banks.

3. Impact of Economic Growth on Non-Performing Loans

The Albanian economy experienced two strong shocks within a short time span that includes the fourth quarter of 2019 and the first half of 2020. In November 2019, the country was hit by a very strong earthquake that caused damage to people and in the economy, while in March 2020 the COVID-19 pandemic spread to Albania, the measures taken against which had a significant impact on economic activity in the country.

The year 2019 marked an economic growth of 2.2 percent, compared to the growth of 4.1 percent a year earlier, due to unstable or temporary factors throughout the year, but also as a result of the earthquake, where real GDP shrank by 0.1 percent in annual terms in the fourth quarter, following a 4.2 percent increase in the third quarter.

The economy, for the second quarter of 2020, has experienced a decline of 10.23 percent compared to the second quarter of 2019 (according to Instat, 2020), followed by a decline of 2.27 percent in the first quarter. For the entire first 6 months it marked a decrease of 6.57 percent. Albania is particularly exposed to the economic contraction from the pandemic because it is strongly supported by the tourism sector and because of its intense relations with some EU economies severely affected by the pandemic.

During the second quarter of 2020 alone, final consumption decreased by 6.9 percent, while total investment contracted strongly by about 13.16 percent and as a result domestic aggregate demand shrank by about 7.68 percent.

Total final consumption, which is the largest share in the economy, increased by about 3.3 percent in real annual terms during 2019, and the final consumption of the population increased by the same value. Meanwhile, for the first half of 2020, total final consumption and that of the population marked a decrease in the rate compared to the same period of the previous year, marking a decrease of -3.07 and -3.45

percent, respectively. Figure 1 shows the real growth of gross domestic product in the years from 1997 to 2020.

Figure 1. *Real growth of gross domestic product in years*
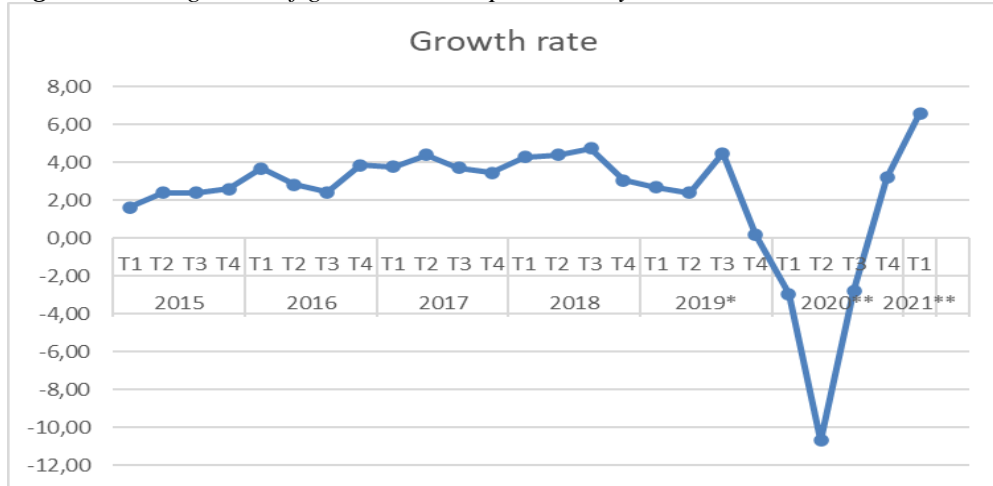
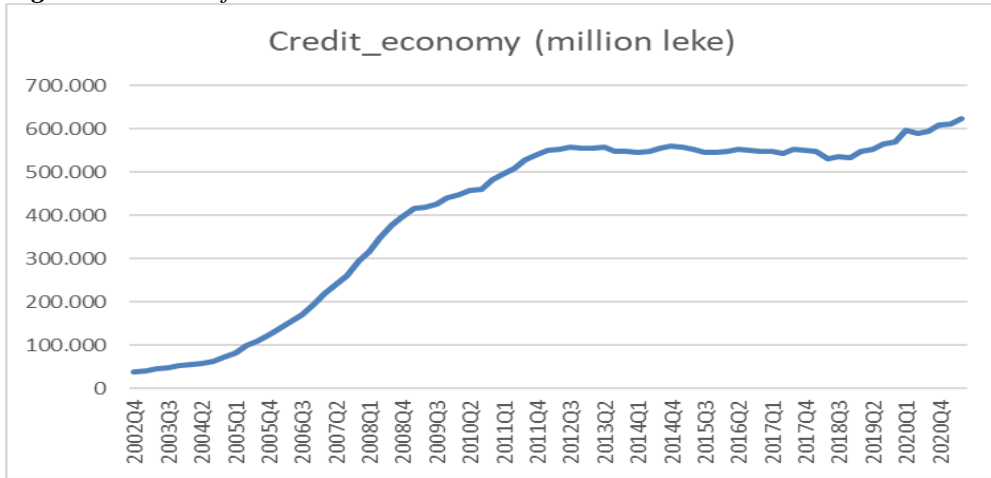**Source:** *Instat (2021), authors' elaboration.*

The ratio of non-performing loans to the financial sector in Albania is almost at the same levels as in the same period a year ago, despite a year ago under the effects of the economic crisis caused by the pandemic. In the first two months of the year, the loan portfolio growth rates slowed down and the surplus at the end of February was at levels close to the end of 2020.

The stability of the ratio of bad loans to the same portfolio value shows that they have not increased significantly even in absolute value.The stock of non-performing loans is currently estimated at approximately ALL 50 billion or slightly more than EUR 400 million.

So far, the Bank of Albania's strategy to favor loan restructuring with easing regulatory measures seems to have worked well. Banks have continued lending and the bad credit ratio has been stable for more than a year. The interim measures related to the suspension of the need to provision and reclassify restructured loans were valid until March.

So far, the Bank of Albania has not foreseen further delays, so in the coming months the effect of the completion of these measures can be felt. This effect, in all likelihood, could lead to an increase in the non-performing loan ratio. According to economic theories and empirical literature, it turns out that the increase in gross domestic product reduces the level of non-performing loans. The following graph shows the trend of economic growth and the level of NPL in Albania for the years 2000-2020.

Figure 1. Trend of Loans

Figure 3. NPL relationship and economic growth
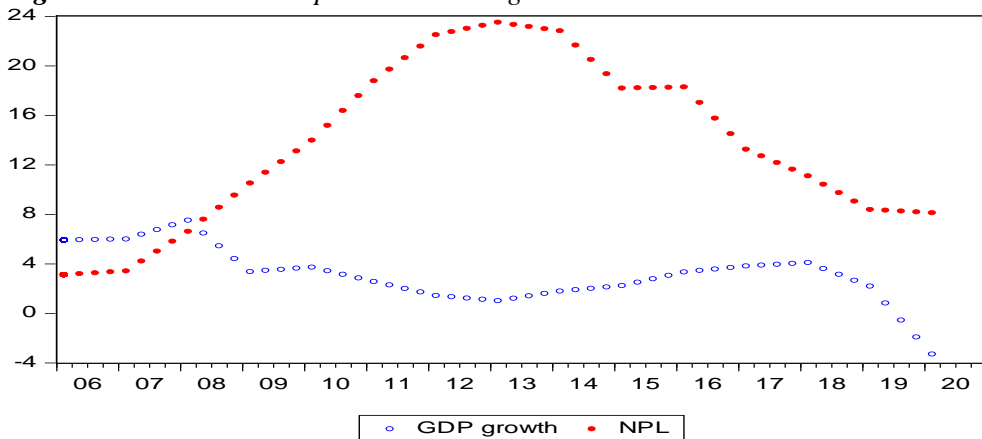
Referring to the quarterly data for NPL from 2002-2021 we will construct the trend equation which based on their performance is a quadratic trend of the general form:

NPL= β_0 +β_1 trend+ β_2 trend^2+ut.

The final model evaluated after possible corrections of the encountered problems is given in the table below and the initial model and the corrected one in Table 1 and 2.
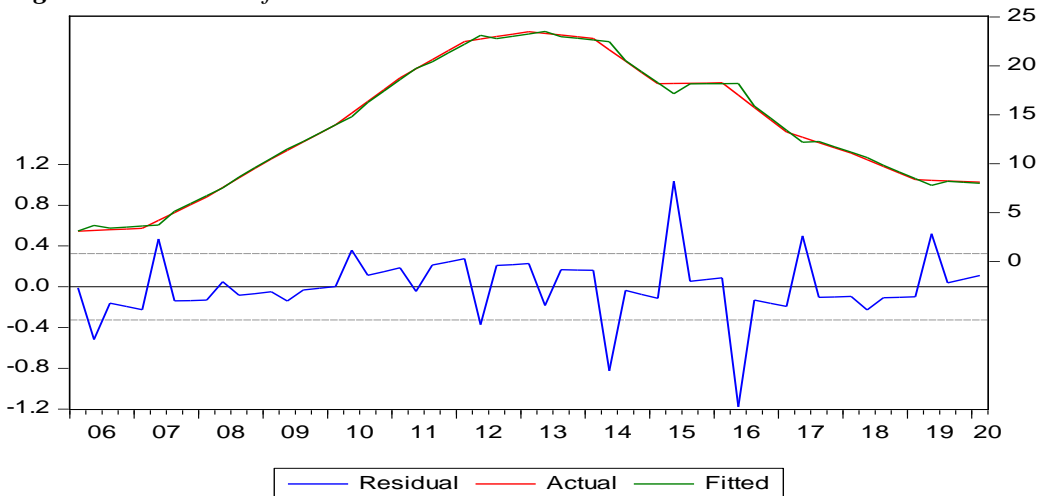
Figure 4 presents the data and predicted values to understand the appropriateness of the predicted values.

Table 1. *Estimated NPL Trend*

Estimation Equation:
=========================
NPL_RATIO = C(1) + C(2)*Trend + C(3)*Trend^2
Substituted Coefficients:
=========================
NPL_RATIO = -0.04779 + 0.0096*Trend - 0.0001035*Trend^2

Source: *Authors' elaboration.*

Figure 4. *Trend NPL forecast.*

Source: *Authors' elaboration.*

A high fit of the predicted values with the data is seen and this model can be used for NPL forecasts in future periods. We emphasize that the only limitation in this case for forecasts is precisely the impact that the Covid-19 pandemic has on the reduction of solvency, and this may affect the change of values from their economic normal.

If we refer to the series trends the connection seems to be negative. To show we calculate the correlation coefficient between the two variables. If the value of the correlation coefficient is positive then there is a positive relationship between the variables, and if its value is negative then the relationship between the variables is negative.

The value of the correlation coefficient is - 0.55, so there is a negative relationship between the variables.For testing we use the value of p for our one-sided hypothesis, $p = 0$ less than the 5% significance level we used throughout the study, consequently the basic hypothesis falls down. So, between economic growth and the level of non-performing loans there is a strong negative link.

Table 2. *Correlation coefficient between GDP growth and NPL*

Correlation Probability	GDP_GROWTH	NPL
GDP_GROWTH	1.000000	

NPL	-0.552335	1.000000
	0.0000	-----

Source: Authors' elaboration.

To analyze this relationship in more detail we have estimated the regression model between NPL level and economic growth as independent variables with 1 and 2 time lags. The estimated model is presented in Table 3.

Table 3. *NPL estimated model and GDP growth*

```
Estimation Command:
=========================
LS NPL C GDP_GROWTH(-1) GDP_GROWTH(-2)
Estimation Equation:
=========================
NPL = C(1) + C(2)*GDP_GROWTH(-1) + C(3)*GDP_GROWTH(-2)
Substituted Coefficients:
=========================
NPL = 23.47 + 3.952*GDP_GROWTH(-1) - 6.539*GDP_GROWTH(-2)
```

Source: Authors' elaboration.

The model is important and the parameters are important as the values of p are 0. According to the results, economic growth gives its highest effect after six months and the relationship between them is strongly negative.

For the NPL and gdp growth variables we use the ADF test on stationarity.

Table 4. *The result of ADF test*

Null Hypothesis:	t-statistics	Prob	Result
GDP_GROWTH has a unit root	-0.889644	0.7843	
dGDP_GROWTH has a unit root	-7.265223	0.000	I(1)
NPL has a unit root	-2.717951	0.2341	
dNPL has a unit root	-9.644167	0.0000	I(1)

Source: Authors' elaboration.

Based on the values of p it turns out that the series are integrals of the first order. For this reason we see if the series converge between them: The results of the Johansen test are presented in Table 5:

Table 5. *Results of Johansen Test*

Series: NPL GDP_GROWTH				
Lags interval (in first differences): 1 to 1				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None	0.118468	7.003378	15.49471	0.5772
At most 1	0.001240	0.068228	3.841466	0.7939

Source: *Authors' elaboration.*

Based on the values of p it is seen that the series do not cointegrate between them. So between the series there are important relationships but this relationship does not last long.

4.   Conclusions

According to economic theories and empirical literature, it turns out that the growth of gross domestic product affects the level of non-performing loans.

From the constructed trend is seen a high compatibility of the predicted values with the data and this model can be used for NPL forecasts in future periods. We emphasize that the only limitation in this case for forecasts is precisely the impact that the Covid-19 pandemic has on the reduction of solvency, and this may affect the change of values from their economic normal.

If we refer to the series trends the connection seems to be negative. By calculating the correlation coefficient between the two variables it was seen that its value is negative, then the relationship between the variables is negative. So between economic growth and the level of non-performing loans there is a strong negative link.

To analyze this relationship in more detail we estimated the regression model between NPL level and economic growth as independent variables with 1 and 2 time lags. According to the results, economic growth gives its highest effect after six months and the relationship between them is strongly negative.

Using the ADF test on stationarity it turned out that the series are integrals of the first order. For this reason we use the Johansen test to see if the series co-integrate with each other and from the test results it was seen that the series do not co-integrate with each other. So, between the series there are important relationships, but this relationship does not last long.

References:

Alves, I. 2005. Sectoral fragility factors and dynamics. Bank for International Settlements. http://www.bis.org/publ/bppdf/bispap22w.pdf.

Avouyi-Dovi, Bardos, J., Kendaoui, M. 2010. Macro Stress Testing with a Macroeconomic Credit Risk Model: Application to the French Manufacturing Sector. Banque de France Working Paper No. 238. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1666737.

Castren, O., Dees, S., Zaher, F. 2008. Global macro-financial shocks and expected default frequencies in the euro area. European Central Bank. http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp875.pdf.

Distinguin, I., Rous, P., Tarazi, A. 2006. Market dicipline and the use of market data to predict bank financial distress. Journal of Financial Services Research, 151-177.

Instat. 2020. Retrieved from: http://www.instat.gov.al/al/temat/ekonomi-dhe-financ%C3%AB/llogarit%C3%AB-komb%C3%ABtare-gdp/.

Nikolov, M., Popovska-Kamnar, N. 2016. Determinants of NPL growth in Macedonia. Journal of Contemporary Economic and Business Issues.

Otani, A., Shıratsuka, S., Tsuruı, R., Yamada, T. 2009. Macro stress-testing on the loan portfolio of Japanese banks. Bank of Japan Working Paper Series No.09-E-1. http://www.boj.or.jp/en/type/ronbun/ron/wps/data/wp09e01.pdf.

Rinaldi, L., Sanchis A. 2006. Household dept sustainability: What explains hausehold non-performing loans? An empirical analysis. European Central Bank. http://www.ecb.int/pub/pdf/scpwps/ecbwp570.pdf.

Simons, D., Rolwes, D. 2008. Macroeconomic default modelling and stress testing. bank for International Settlements. http://www.bis.org/bcbs/events/rtf08simonsrolwes.pdf.

Tekirdağ, A. 2009. Increasing Individual Credit in Turkey and Risk Analysis. Central Bank of the Republic of Turkey, Turkey.

Wong, Choi Fong. 2006. A Framework for Stress Testing Bank's Credit Risk. Working Papers 0615. Hong Kong Monetary Authority. https://ideas.repec.org/p/hkg/wpaper/0615.html.