JOMAES

Journal of Management and Economic Studies

2022, 4(1): 15-29 DOI: 10.26677/TR1010.2022.956

Journal Homepage: https://www.jomaes.org

Sustainability of Turkish Banking Sector Credit Mechanism: A Study on Non-Performing Loans

Mustafa ÖZYEŞİL

Istanbul Aydın University, Anadolu Bil Vocational School, Business Management (English) Dept. / Turkey

www.orcid.org/0000-0002-4442-7087

mozyesil@aydin.edu.tr

Abstract

In this study, the efficiency of the credit mechanism in the Turkish banking system is investigated. The effectiveness of the credit allocation mechanism is analyzed by questioning how much of the increase in total loan volume in the banking system is becoming non-performing loan. For this purpose, the data set consisting of weekly total loan volume and non-performing loan volume for the period January 2015 – July 2021 has been studied. The stationarity of the series is questioned by the ADF Unit root test and the series are found to be stationary. The causality test between the series is examined with the Granger causality test and a bi-directional and statistically significant causality relationship is determined between total loans and non-performing loans series. In the study, Regression analysis is used with OLS method and according to the analysis result, a positive and significant relationship has been determined between loans and non-performing loans. According to the results of the analysis, it has been found out that if the total loans increase by one unit (excluding the fixed term), it is expected that the non-performing loans will increase by 0.05 units. According to the result of this analysis, which shows that approximately 5% of the total loans will be non-performing, it is recommended that banks should apply a more selective valuation during credit allocation decision stages in order to prevent any boost in volume of the non-performing loans as a result of the loosening monetary and fiscal policies especially during the post-Covid-19 period.

Keywords: Banking System, Total Loans, Non-Performing Loans, Unit Root Test, Causality Test, Regression Analysis

1. Introduction

The financial system is a set of institutions and rules that ensure the flow of funds between individuals and institutions in a country. Within this system, there are real and legal persons who perform the supply and demand of funds, organizations that act as intermediaries in the transfer of funds, and regulatory institutions that provide supervision and audit services on behalf of the government. It is very curicial for the financial system to be sound, sustainable and secure in terms of ensuring that savings are converted into investments and thus achieving the growth of the country's economy.

The banking system has the largest share in the financial system in Turkey. According to the data of the Banking Regulation and Supervision Agency (BRSA) for 2021, 80% of the total assets of the financial system belong to the banking system. For this reason, the safe and efficient operation of the banking system plays a key role in the success of the financial system and general economy in Turkey.

As it is known in the simplest terms, banks are financial institutions that bring together the economic units that have savings (savers/suppliers) and economic units that have a savings deficit (borrowers/demanders), that transfer funds through the credit mechanism and create fiat money. The banking crisis experienced in our country in 2000 brought the concept of risk management to the agenda in the banking system. Due to the inability of Turkish banks to effectively implement risk management practices before 2000s, 20 banks, corresponding to 25% of the total number of banks in the sector, went bankrupt during the 1997-2001 period and were transferred to the Savings Deposit and Insurance Fund (SDIF) (Gunay and Tektas, 2006:418). After this crisis erupted in 2000-2001, very important legal regulations on risk management in Turkish banking were prepared by money and capital market regulators, and the compliance process of banks with these, especially with Basel criteria, was carefully monitored and managed. During the last 20 years, a sense of trust has prevailed in the Turkish banking system, thanks to the very careful approach of banks in credibility assessment and the high degree of compliance with Basel criteria. As a result of effective risk management practices, Turkish Banks have had a much higher Capital Adequacy Ratio (CAR) than banks from many European countries. Thanks to the measures taken after the 2001 crisis, the ratio of banks' equity to total risky assets (credit risk, market risk and operational risk) has always remained above 10% (Dincer et.al, 2011:1534). In fact, Turkish banks were among the banks that were least affected by the global financial crisis that broke out in 2008, thanks to the aforementioned successful risk management practices.

Along with the positive developments mentioned above, there are also negative developments observed in the Turkish economy during a nearly last decade.

Slowing economic growth, increasing unemployment and inflation rates, the economic consequences of regional problems such as war and natural disasters, and the global monetary policy implemented by the US Federal Reserve, etc. Slammed Turkish Lira and it depreciated against many currencies, especially the US Dollar. The Turkish lira is one of the currencies that the most depreciated against the US Dollar, and Turkey has negatively differentiated from other countries even from fragile five countries. In addition to all these developments, when Covid-19 epidemic, which world has been dealing with for the last 2 years, cause the demand and supply shocks in both domestic and global economy, serious concerns are heard about both the global and Turkish economy. Since China is not among Turkey's export destinations it was expected that the epidemic will not create any shift in terms of export revenues for Turkey. Despite the fact that China is one of the most important origin country in imports, it was expected that the effect of Covid-19 would not have much especially in the short term, thanks to the expectation of the shifts caused by the epidemic in the production facilities from China to other countries (Acıkgoz and Gunay, 2020:521-522). However, due to the rapid spread of the epidemic across to all countries, the economic effects of the epidemic turned also negative for Turkey. Because of declining export volume and tourism revenues, both current account deficit financing has become a bigger problem. moreover, the effect of the crisis began to be felt more deeply with the effect of the expansionary monetary and fiscal policies implemented by the current government to stimulate the economy.

As it is known, during the Covid-19 period, there are measures taken by the governments in the economic field and these economic packages implemented in our country as in the whole world. Due to the economy that came to a standstill during this period, many people lost their jobs, albeit temporarily, and/or did not receive their monthly salary for a while. In order not to cause a demand stagnation, the current government intervened in the economy with loose monetary and fiscal policies. Lots of support has been provided to people such as income support was provided by the government to people who lost their jobs or could not receive their monthly salary, tax debts of companies were postponed, tax reductions were made on many products, etc. One of most important measurements among these are loans provided to individuals and companies with zero or very low interest rates. Thanks to these loans, many companies and real persons suffering from liquidity difficulties were relieved and became able to clear their debts at maturtiy.

In this study, the efficiency of the credit mechanism of the banking system in Turkey will be examined. The efficiency of the credit mechanism will be investigated by calculating the ratio of non-performing loans. The aim of the study is to analyze how much of the loans used in the banking system are / may be bad loans during the January 2015 – July 2021 period. The developments in total loan volume and non-performing loans volume, especially in the post-Covid-19 period, will also be examined.

In the second part of the study, previous studies in the related literature will be examined, in the third part the tests and calculations in the practice part of the study will be performed, and in the 4th part the test findings will be analyzed and interpreted.

2. Literature Review

Brei meat. al (2020) examined whether the means of segregating impaired assets, also called bad banks, provide an improvement in the credits of the source banks or a decrease in the volume of non-performing loans. The analyzes are based on a sample of 135 bank data from 15 European countries for the period 2000 – 2016. According to the results of the analysis, it has been determined that bad bank segregating is possible to improve balance sheets only when recapitalization and asset separation practices are applied together.

Stephen et. al (2018), investigated the effect of non-performing loans on bank profitability in the light of information asymmetry and mismanagement hypotheses. They used ordinary OLS method, Fixed Effects and Random Effects method on the dataset consisting of data of 16 commercial banks in Tanzania from 2007 to 2015. As a result of the analysis, a negative significant relationship was found between the non-performing loans of commercial banks and their profitability. In other words, it has been determined that the profitability of banks will decrease as non-performing loans increase.

Dwipayana (2020) analyzed the quality of loans in the fintech P2P loan system consisting of 72 firms in Indonesia. In his research, he examined the quality and data trend of loans during the January – October 2018 period. According to the results of the analysis, it was determined that the debtor and creditor accounts increased by 10.8 and 1.8 times, respectively, in the analysis period compared to the previous year. He emphasized that most of the loans in the P2P loan system are current loans with a maturity of less than 30 days. The ratio of current loans was calculated as 97.09% on average. The ratio of non-performing loans was calculated as 1.03% and the situation was interpreted positively in terms of the quality of loans in the P2P loan system.

Adusei (2018) analyzed the determinants of non-performing loans in the Ghana banking system using the annual historical time series for the 1998-2013 period with Seemingly Unrelated Regression and Principal Component Analysis method. According to the analysis result; money supply and financial development were found to be a significant determinant of non-performing

loans. In addition, it has been determined that macroeconomic variables other than real income are also significant determinants of nonperforming loans.

Messai and Jouini (2013), analyzed the macro and micro determinants of non-performing loans. They conducted a study covering the analysis period of 2004-2008 on a sample of 85 banks stemming from Italy, Spain and Greece. The authors stated that all three countries are among the countries most affected by the global financial crisis that started in 2008, and therefore they were taken into the sample. GDP growth rate, unemployment rate and real interest rates were included in the analysis as macro determining factors while return on assets (ROA), loan change ratio, loan loss reserves to total loans ratio were used as micro-determining factors. According to the results of panel data analysis, it was determined that non-performing loans were negatively associated with GDP growth rate and banks' return on assets, and positively associated with unemployment rate, loan loss reserves to total loans ratio and real interest rates.

Makri et.al (2014) analyzed the determinants of non-performing loans in the European banking system for the period 2000-2008. Both macro and micro variables were included in the analysis. GDP annual growth rate, public debt to GDP ratio, unemployment rate are used as macro variables. On the other hand, loan / deposit ratio, return on assets (ROA) and return on equity (ROE) were used as micro variables. According to the results of the analysis, it has been determined that there is a statistically significant correlation between non-performing loans and both some macroeconomic factors (GDP growth rate, unemployment, public debt ratio) and some micro-variables of banks (capital adequacy ratio, ratio of previous year's non-performing loans and ROE).

Khemraj and Pasha (2009) analyzed the determinants of non-performing loans in the Guyana banking sector using panel data and fixed effect model. According to the results of the analysis, in parallel with the findings in the international literature, it has been determined that real exchange rates have a statistically significant positive effect on non-performing loans. Non-performing loans also increase when there is an increase in the local currency.

Also, they found out that GDP growth rate has negative impact on non-performing loans. Interest rates and lending amount has positive impact on non-peforming loans that suggests when interest is charged higher or lending amount provided to market gets larger, this will trigger non performing loans. In addition to these findings, unlike previous studies in existing literature, they also observed that larger banks are not better in terms of monitoring loans by customers than smaller ones.

Beck et.al (2013) analyzed the macro determinants of non-performing loans by analyzing panel data consisting of 75 countries. According to the dynamic panel results, it has been determined that GDP growth rate, stock prices, exchange rates and lending rate affect non-performing loans significantly. It has been determined that the effect of stock prices is greater in countries where the ratio of stock market to total GDP is higher. Also, the authors found out that effect of exchange is based on size of foreign exchange amount provided to borrowers who are not hedged against to fluctation observed in foreign exchange in a country where exchange rates are pegged.

Skarica (2014) analyzed the determinants of non-performing loans in the banking sector of 7 developing countries in Europe consisting of Bulgaria, Croatia, Czech Republic, Hungary, Latvia, Romania and Slovakia, using panel data and fixed effects model. The analysis period covers the 2007-2012 period. The macroeconomic variables used in the analysis are GDP, uneployment and inlation rate. According to the results of the analysis, the biggest reason for the increase in non-performing loans was determined as the contraction in the economy.

Akinlo and Mofoluwaso (2014) performed a macroeconomic analysis for non-performing loans

in the Nigerian banking system. They worked on the data set covering the 1981-2011 period. In their studies, they examined the relationship between some macroeconomic indicators and non-performing loans for both the short and long term. According to the results of the analysis, a negative relationship was found between economic growth and non-performing loans in the long run, and a positive relationship with unemployment, the amount of loans given to the private sector and exchange rates. In the short-term analysis, it has been determined that the amount of loans given to the private sector, exchange rates, lending rate, stock index are the main determinants of non-performing loans.

Zheng et.al (2020) conducted an analysis on the determinants of NPL in the Bangladesh banking sector. ARDL analysis was performed on a long time series such as 1979 – 2018 and the reliability of the results was tested with the VEC model. According to the results of the analysis, it has been determined that both banking sectoral and macroeconomic factors affect non-performing loan receivables. As industry-specific factors; it has been determined that bank loan growth, net operating profit, deposit rates have a significant negative relationship with non-performing loans, while bank liquidity and lending rates have a significant positive relationship. While GDP growth and unemployment rate, which are among the macro-economic factors, have a negative relationship with non-performing loans, credit and exchange rates have a positive and significant relationship with non-performing loans.

3. Analysis and Interpretation of Result

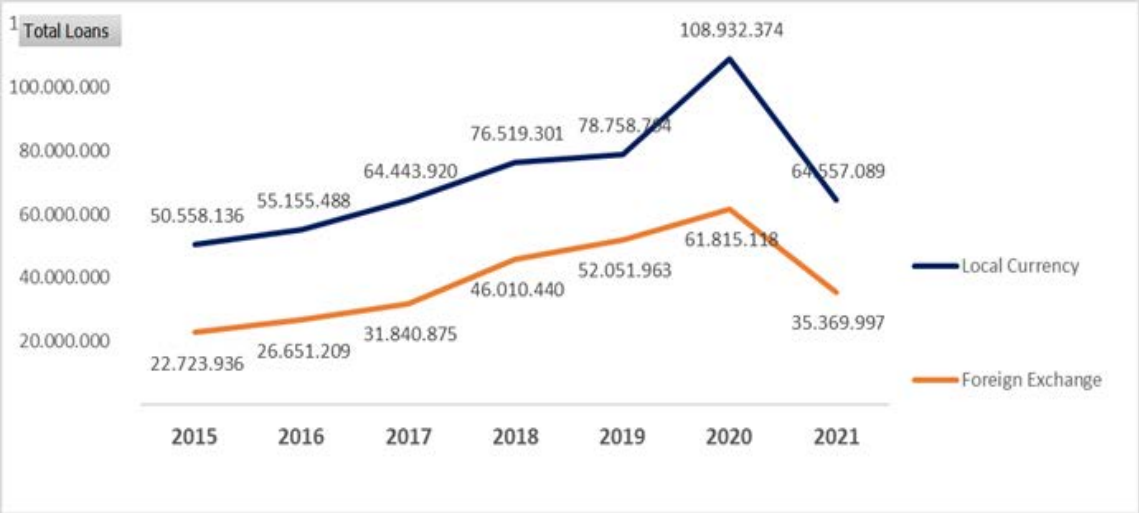
Data Presentation

The monthly data on Total Loan Volume and Total Volume of NPLs from 2015 to 2021 are presented in table 1 and table 2 respectively in the appendix.

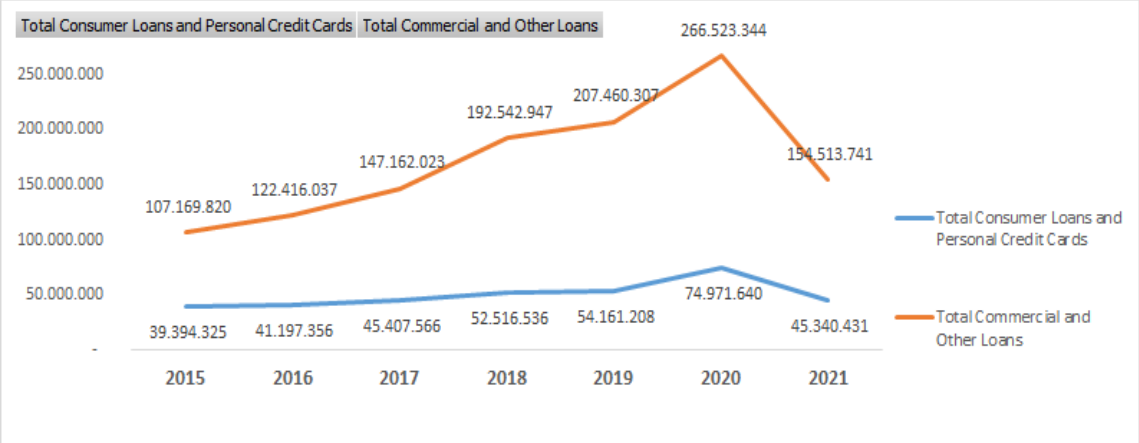
Data Set and Sample Structure

In this study, the data were obtained from the weekly bulletin of the Banking Regulation and Supervision Agency (BSRA), Turkey's regulatory agency in the field of banking. The period 2015-2021 was determined as the analysis period, and the total number of observations is 340. Total loan volume and non-performing loan volume data were used in the analysis. Analysis of each data on the basis of type and currency was also performed.,

The breakdown of loans in the banking system by type and currency is shown in Chart 1 and Chart 2 respectively as follows:



Source: www.bddk.gov.tr **Chart 1. The Breakdown of Total Loans by Currency**



Source: www.bddk.gov.tr **Chart 2. The Breakdown of Total Loans by Type**

As can be clearly seen from the graphics, it is seen that the loan volume peaked in 2020 in order to revive the stagnating economic activity in 2020, when the Covid-19 epidemic erupted.

4. Methodology

In this study, the relationship between the total loan volume and the volume of non-performing loans in the Turkish banking sector has been examined. For this purpose, linear regression and causality analyzes are applied.

In the study, total banking loan volume is considered as the independent variable, and non-performing loans as the dependent variable. In other words, it will be analyzed to what extent a one-unit increase in the total loan amount causes an increase in the non-performing loans. It is aimed to analyze how much expansionary monetary policies implemented in a country cause bad loans in the banking system. In particular, it is desired to conduct a risk analysis of the increased loan volume as a result of the economic development packages implemented after Covid-19. OLS regression method and Granger (1969) causality tests are applied in the study. Analysis will be peformed through E-views 10 program.

The linear regression applied in the analysis is shown in the following equation:

Dependent variable= Constant coefficient+Independent variable. The equation is

mathematically represented in equation 3 as follows.

$$Y = \alpha + \beta_{yx} * X + \varepsilon \quad (1)$$

The explanation of the notations in the equation is as follows:

Y = The dependent variable,

X= The Independent variable,

α = Constant term

β = The coefficient of the independent variable, the degree to which the independent variable affects the dependent variable,

ε = Error terms

In this study, the existence of causality relationships between the series was examined with the Granger (1969) based causality test. This test is carried out with the help of the following system of equations.

$$Y_{it} = \alpha_i + \sum_{k=1}^{p} \gamma_i Y_{i,t-k} \sum_{k=1}^{p} \beta_i X_{i,t-k} + \varepsilon_{i,t} \quad (2)$$

$$X_{it} = \theta_i + \sum_{k=1}^{p} \delta_i X_{i,t-k} \sum_{k=1}^{p} \varphi_i Y_{i,t-k} \quad (3)$$

Here m; is the ideal (optimal) lag length. Equation (69) investigates casuality from X to Y while Equation (65) tests the existence of a causality relationship from Y to X.

5. Test Results

Descriptive Statistics

Descriptive statistics of the sample are provided in Table 1 as follows:

Table 1. Descriptive Statistics

	Total Loans	**Non-Performing Loans**
Mean	2280555.	88606.06
Median	2205407.	65610.73
Max	3901998.	153577.6
Min	1225351.	36395.65
Std. Deviation	744690.0	42101.80
Skewness	0.559628	0.477492
Kurtosis	1.283358	1.587633
N	340	340

In Table 1, the descriptive statistics of the variables of total loans and non-performing loans are provided. According to the results, it is understood that the variables of total loans and non-performing loans have a normal distribution since the skewness and kurtosis values vary between +2 and -2.

Unit Root Test

Before starting the analysis, it is necessary to measure the degree of stationarity of the series. Since there will be an outlier value in the non-stationary series, it will be possible to encounter a spurious regression problem in the analysis to be made. The stationarity of the series is measured by the unit root test.

The results of the ADF unit root test are shown in Table 2 as follows:

Table 2. Unit Root Tests

Null Hypothesis: D(Total Loans) has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=16)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.146901	0.0000
Test critical values:	1% level	-3.449679	
	5% level	-2.869952	
	10% level	-2.571321	

Null Hypothesis: D(Non-Performing Loans) has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on SIC, maxlag=16)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.650118	0.0053
Test critical values:	1% level	-3.449797	
	5% level	-2.870004	
	10% level	-2.571349	

The following hypotheses were developed while determining the stationarity of the dependent and independent variables.

H0: The series has a unit root (H0: pi=p=1).

H1: There is no unit root in the series. (H0=pi=p<1).

In Tables 1 and 2, the stationarity of the variables was examined. In order to detect a significant relationship between the series in statistical analysis, the variables should not have a unit root. If there is a trend in the time series for the variable, the relationship may be spurious. For this reason, it is related to the stationarity of the variables in the regression models whether they show a false relationship or a real relationship (Sevinç, 2013). Unit root tests are divided into 2 groups as second and first generation tests. Second generation tests have been developed by authors such as Pesaran (2004), Philips and Sul (2003), Moon and Bai and Ng (2004), Perron (2004). First

generation tests were derived by Haris and Tzavalis (1999), Levin, Lin and Chu (LLC) (2002), Fisher Philips and Perron (PP-Fisher ADF), Im, Pesaran and Shin (1997). As can be seen from Table 1, the unit root test result indicates that there is no unit root in the variables, that is, they are stationary. Due to the stationarity of the variables, the null hypothesis (H0), which claims that the series is a unit root, is not accepted.

Casuality Test

The causality test is used to analyze the interaction between the series included in the analysis. The aim here is to reveal what kind of interaction there is between the series and to indicate which series affects the other.

In this study, Granger (1969) causality test was applied to determine the causality relationship.

The hypotheses of the Granger (1969) causality test:

H_0: $\beta_i = 0$ There is no causality from X to Y.

H_0: $\beta_i \neq 0$ There is a causal relationship from X to Y.

In the study, Granger (1969) causality test was performed and the results are presented in Table 3.

Table 3. Causality Tests

Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
Total Loans does not Granger Cause Non-Performing	338	6.58732	**0.0016**
Non-Performing does not Granger Cause Total Loans		4.68451	**0.0099**

In Table 3, the relationship between banks' total loans and non-performing loans was tested through granger causality test. According to the results, there is a bidirectional and statistically significant causality between the variables of total loans and non-performing loans ($p<0.05$).

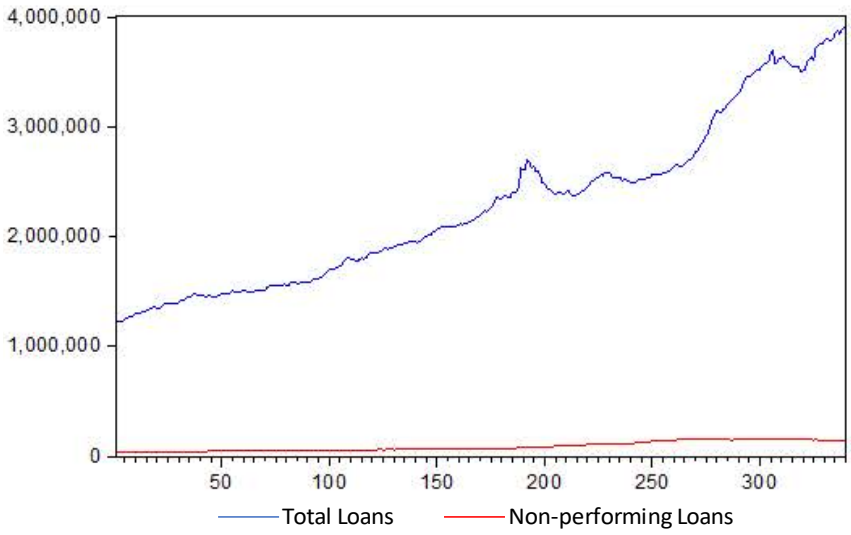


Chart 3. Total Loans and Non-Performing Loans

Chart 3 shows the relationship between total loans and non-performing loans. As can be seen from the graph, there is a linear relationship between total loans and non-performing loans. In other words, as total loans increase, non-performing loans will also react positively.

Model Estimation

In this part of the study, the effect of the independent variable on the dependent variable will be estimated. In other words, the coefficient of the independent variable will be calculated.

For this, the Ordinary Least Squares (OLS) method was applied and the results are shown in Table 4 as follows:

Table 4. Estimation Results

Dependent Variable: Non-Performing Loans
Method: Least Squares
Included observations: 340

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Total Loans	0.052552	0.001134	46.34610	0.0000
C	-31242.19	2719.930	-11.48640	0.0000

R-squared	0.864036	Mean dependent var	88606.06
Adjusted R-squared	0.863634	S.D. dependent var	42101.80
S.E. of regression	15547.24	Akaike info criterion	22.14702
Sum squared resid	8.17E+10	Schwarz criterion	22.16954
Log likelihood	-3762.993	Hannan-Quinn criter.	22.15599
F-statistic	2147.961	Durbin-Watson stat	0.007999
Prob(F-statistic)	0.000000		

In Table 4, the effect of total loans on non-performing loans is analyzed by regression analysis. As a result of the analysis, it is understood that total loans have a statistically significant effect on non-performing loans ($p<0.05$). In other words, there is a positive and significant relationship between total loans and non-performing loans. As total loans increase, non-performing loans also increase. The rate of explaining the dependent variable of the independent variable is 86%.

When we apply the regression equation ($Y=\alpha+\beta_{yx}*X+\varepsilon$) to the analysis results, non performing loans can be estimated as follows:

Non-Performing Loans= -31242.19+ Total LoansX0.052552

For example, if the total loans are 1.000.000 TL the amount of non-performing loans will be calculated as follows.

Non-Performing Loans = -31242.19+ 1.000.000X0.052552 then

It can be estimated that the NPLs will be 21.309,81. TL

6. Conclusion and Discussions

The financial system is an environment that covers individuals and institutions that supply and demand funds, institutions that act as intermediaries in the transfer of funds, and regulatory institutions that prepare and implement the legal regulations regarding the transfer of funds. The

meeting of the supply and demand of funds within the financial system takes place in the financial markets. The success of financial markets is directly reflected in the growth of a country's economy. For this reason, the depth, development of financial markets and their provided trust have vital importance.

Banks are at the forefront of the most classical and largest players in financial markets. Banks transforms savings into investments through loans they provide to real and legal persons. Thus, with increased investment and employment, both economic development and economic growth will be realized in the given country. However, the credibility of those who request funds should be analyzed very carefully when allocating loans. Otherwise, the profitability and operational efficiency of the banks, which have to compensate for the increasing non-performing loans, will decrease. Moreover, if the inefficiency in the credit valuation process continues, that is, if banks continue to provide loans to uncredited individuals and institutions, this may lead to the bankruptcy of the relevant bank. Since a crisis in the financial system today will have much more effective results than a crisis in the real economy, the result such as bankruptcy of banks may bring along unpreventable crises in the given economy.

In this study, the credit mechanism of the Turkish banking system is analyzed in detail. Data obtained from weekly bulletins of the Banking Regulation and Supervision Agency (BRSA), which is the Turkey's banking regulatory agency in banking field, were used for the 2015 – 2021 period. Two variables as total loan volume and non-performing loan volume, were used in the study. The aim of the study is to observe the trend of non-performing loans over time and to give an idea about the sustainability of the loan mechanism in the country. In the study, non-performing loans were included in the analysis as a dependent variable and while total loans as an independent variable, and regression analysis was applied. In the analysis, the stationarity of the series was examined with the unit root test and it was determined that the series were stationary at their original level values.

According to the results of the analysis, a statistically significant positive relationship was found between total loans and non-performing loans. In other words, as total loans increase, non-performing loans will also increase. According to the results of the analysis, the amount of non-performing loans for each 1 mn TL total loan is approximately 21 thousand TL (2.1%). During the analysis period, 2015 – 2021, the share of non-performing loans in total loans varies between 3% and 4.71%. The highest annual increase in non-performing loans was observed in 2019. In 2019, it increased by approximately 58% compared to the previous year and reached to 6.2 billion TL from 3.9 billion TL, and its share in total loans reached its peak with 4.71%. Especially in 2020, when the Covid-19 epidemic erupted, the increase in non-performing loans continued and increased by approximately 38% compared to the previous year, reaching to 8 billion TL from 6.2 billion TL, and its share in total loans was calculated as 4.69%. As a result of the expansionary monetary and fiscal policies implemented by the government in order to eliminate the negative economic consequences of the Covid-19 epidemic and to revive the general economy, which was mentioned earlier in this study, the total loan volume increased by a record 31% in 2020 compared to the previous year and increased from 131 Billion TL and reached to 171 billion TL.

Some of this increased loan volume was reflected in non-performing loans due to economic units were not affordable to clear their debts on due time, and therefore non-performing loans broke the peak level in 2019 and reached a new peak level in 2020. As of July 2021, when the analysis was made, an improvement was observed in non-performing loans. Non-performing loans decreased by approximately 51% compared to 2020 and their share in total loans was calculated as 3.90%. The status of non-performing loans may also change depending on the macroeconomic developments to be experienced in the remainder of 2021 and the progress of the Covid-19 epidemic.

When analyzed in terms of currency, it is seen that the share of foreign currency loans in total loans during the analysis period 2015 – 2021 varies between 31% and 40%. In general terms, one third of every 1 Turkish Lira in the banking system is foreign currency loans. For this reason, it can be stated that the banking credit mechanism is very sensitive to the movements in exchange rates. The share of foreign loans in non-performing loans is relatively low. The ratio of non-performing loans in foreign currency loans varies between 2% and 3% in the 2015 – 2018 period. However, the rate of non-performing loans increased to 5% in 2019 and to 9% in 2020. It is thought that this situation is caused by the unpaid loans of companies and real persons whose business volumes have decreased due to the stagnating global economic activity due to the Covid-19 epidemic.

When analyzed as a loan type, it is observed that approximately two-thirds of non-performing loans consist of Commercial Loans. In the period of analysis, 2015 – 2021, the share of commercial loans in non-performing loans varies between 64% and 87%. Especially in 2020, when the Covid-19 epidemic broke out, the share of commercial loans in non-performing loans reached the peak of all time with 86%. It should be highlighted that this situation is due to the fact that the decreased commercial mobility due to Covid-19 caused a deterioration in the financials of the companies.

As a result, the rate of non-performing loans has been increasing over time, but this increase has reached higher levels with the Covid-19 outbreak. The interventionist practices implemented by the government in the economy increase the liquidity of individuals and institutions in the short term, but if the effect of the epidemic on economic activity continues, the volume of non-performing loans is expected to increase. Therefore, it is recommended that the authority should be more careful than ever in the allocation of loans, except for economic packages such as support loans given to bail out failed firms.

Importance of the Study and Suggestions for Further Studies

In this study, the relationship between non-performing loans and total loan volume was investigated by analyzing the annual data of the last 6 years. The aim of the study is to examine the results of the money easing policy applied in the money market (credit mechanism) in order to stimulate the economy, especially in the post-Covid-19 period. We consider the empirical results of this study important in terms of examining the practices of regulatory agencies. In the continuation of this study, it is important to carry out studies such as the effect of non-performing loans on the profitability of the sector, macro and micro determinants of non-performing loans, and detailed analyzes of non-performing loans on the basis of bank type and maturity, in terms of presenting more effective solution proposals to regulatory institutions.

References

Acıkgoz, O. and Gunay, A. (2020). The early impact of the Covid-19 pandemic on the global and Turkish economy, Turkish Journal of Medical Sciences, 50, 520-526.

Adusei, C. (2018). Determinants of Non-Performıng Loans in The Bankıng Sector of Ghana between 1998 and 2013, Asian Development Policy Review, 6(3), 142-154.

Akinlo, O. and Mofoluwasa, E., O. (2014). Determinants of Non-Performing Loans in Nigeria, Accounting & Taxation, 6(2), 21-28.

Beck, R., Jakubik, P. and Piloiu, A. (2013). Non-Performing Loans: What Matters in Addition to the Economic Cycle?, ECB Working Paper No. 1515, 1-34.

Brei, M., Gambacorta, L., Lucchetta, M. and Parigi, B., M. (2020). Bad Bank Resolutions and Bank Lending, BIS Working Paper No. 837, Available at SSRN: https://ssrn.com/abstract=3535900

Dickey, D. A. and Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74(366a), 427–431.

Dincer, H., Gencer, G., Orhan, N. and Sahinbas, K. (2011). A Performance Evaluation of the Turkish Banking Sector after the Global Crisis via CAMELS Ratios, 24, Procedia - Social and Behavioral Sciences, 1530 – 1545.

Dwipayana, D., P. (2020), Legal Protection for Debtors of Online Loans, Jurnal Ilmu Hukum, Universitas PGRI Madiun, Indonesia,4(1), 46-56.

E.N. Gunay and A. Tektas. (2006) Efficiency analysis of the Turkish banking sector in precrisis and crisis period: a DEA approach. Contemp. Econ. Policy, 24, 418–431.

Granger, C.W.J. (1969). Investigating Causal Relations by Econometric Models and Cross-Spectral Methods. Journal of Econometric Society, (37). 424-438.

Gujarati, D.N. (2004). Basic Econometrics, Fourth Edition McGraw Hill.

Khemraj, T. and Pasha, S. (2009). The determinants of non-performing loans: an econometric case study of Guyana, New College of Glorida, University of Guyana, MPRA Paper No. 53128, 1-26.

Makri V., Tsagkanos A., & Bellas A. (2014). Determinants of Non-Performing Loans: The Case of Eurozone. Panoeconomicus, 61(2), 193-206.

Messai, A. and S., Jouini, Fathi. (2013). Micro and Macro Determinants of Non-performing Loans, International Journal of Economics and Financial Issues, 3 (4), 852-860.

Skarica, B. (2014). Determinants of non-performing loans in Central and Eastern European countries, Financial Theory and Practice, 38(1), 37-59.

Stephen Kingu, P., Macha, D. S. and Gwahula, D. 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, 6(1), 71-79.

https://www.bddk.org.tr/bultenhaftalik [Date of access: 02.07.2021].

APPENDIX

Annex-1: Monthly Total Loan Volume During the 2015 – 2021 Period (Average, Million TL)

Months / Years	2015	2016	2017	2018	2019	2020	2021	Grand Total
1	6.178.153	5.982.795	3.561.749	8.396.065	9.583.335	13.272.396	17.778.430	64.752.924
2	5.089.004	6.008.971	7.132.807	8.477.975	9.554.775	10.887.192	14.116.190	61.266.913
3	5.223.453	5.996.867	9.027.702	10.835.165	12.304.895	11.302.767	14.556.612	69.247.462
4	6.687.895	7.555.560	7.409.544	8.915.960	10.136.589	15.022.052	18.841.283	74.568.884
5	5.423.257	6.185.772	7.505.412	9.237.575	12.847.768	12.580.165	15.221.489	69.001.437
6	5.551.971	6.211.735	9.496.947	11.789.616	10.140.219	12.845.964	15.511.084	71.547.536
7	7.003.999	7.847.205	7.719.673	9.561.236	10.046.683	16.529.915	3.901.998	62.610.708
8	5.747.961	6.321.362	9.754.974	12.991.493	12.510.405	13.818.110		61.144.305
9	5.884.631	7.959.474	7.860.414	10.532.142	10.097.278	14.031.188		56.365.127
10	7.302.270	6.477.855	8.069.548	10.121.235	10.225.615	17.944.396		60.140.919
11	5.814.291	6.670.738	8.282.372	12.081.122	12.868.798	14.472.236		60.189.556
12	7.375.187	8.588.364	10.463.653	9.590.156	10.494.397	18.041.112		64.552.869
Grand Total	**73.282.072**	**81.806.697**	**96.284.794**	**122.529.741**	**130.810.758**	**170.747.492**	**99.927.086**	**775.388.640**

Annex-2: Volume of Monthly NPLs During the 2015 – 2021 Period

(Average, Million TL)

Months / Years	2015	2016	2017	2018	2019	2020	2021	Grand Total
1	182.912	191.964	232.610	252.841	391.740	753.779	606.543	2.612.391
2	150.625	197.494	237.845	257.064	403.223	609.269	603.437	2.458.957
3	153.598	203.219	301.756	325.168	526.395	611.133	599.565	2.720.833
4	196.028	258.979	182.763	264.807	430.020	758.025	744.359	2.834.982
5	159.550	211.698	244.465	268.874	550.184	603.550	594.465	2.632.787
6	162.395	215.915	306.832	345.729	455.639	600.274	594.944	2.681.729
7	208.859	266.954	306.346	297.663	468.803	753.462	149.224	2.451.311
8	169.456	209.291	311.387	389.868	606.046	602.039		2.288.087
9	173.979	270.383	251.611	327.921	502.687	602.782		2.129.364
10	224.778	222.083	250.414	348.586	543.369	756.135		2.345.365
11	182.184	226.184	253.682	450.342	704.769	603.375		2.420.536
12	232.183	285.901	316.624	375.329	584.761	754.922		2.549.720
Grand Total	**2.196.549**	**2.760.065**	**3.196.336**	**3.904.192**	**6.167.636**	**8.008.744**	**3.892.539**	**30.126.061**