THE RELATIONSHIP BETWEEN CREDIT INTEREST, CREDIT VOLUME AND NET PROFIT IN THE TURKISH BANKING SECTOR

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Abstract:

In the last two decades, foreign capital investments in the financial sector of emerging markets have increased tremendously. Foreign direct investment is now important for every country. With the development of globalization, foreign capital investments have started to take place more in the financial sector. Turkey, which is among the developing countries, is among the preferred countries for foreign direct investments. The regulations that took place after the crises in the banking sector in 2000 and 2001 and the growth trend in the world economies made the banking sector attractive. It cannot be denied that foreign investments have positive contributions to the current account deficit, employment, gross domestic product, and raising quality standards with competition rules. In addition, the indirect effect of foreign capital is a larger increase in the deposit and loan volume of the banking system due to the increase in production, and an increase in trade volume and profit. The secondary effects of foreign capital investments on the sector are that it creates a multiplier effect on service standards, product variety and profit margin together with developing market conditions. This study describes the tests and analyzes on the effect of loan interest net profit and volume of the Turkish banking sector on the net profit of public and private banks. The main purpose of this study is to evaluate the effect of non-performing loans on banks' profits. Since profitability is a very broad concept, models covering the return on assets ratio and return on equity ratio, which are widely used in studies in the literature, have been established. Unlike other studies, the effect of non-performing loans on the net profit margin is also examined. The study is carried out on banks with at least 100 branches operating in Turkey. In practice, the relationship between the net profit margin of non-performing loans, return on assets and return on equity is analyzed using the data for the period 2012-2021.

Keywords:

1. Introduction

Throughout history, people have measured the value of scarce resources in nature with money to meet their basic needs. In line with the world banking system, economy structure and needs, the role of state authorities has changed over time and from country to country, with economic power, political and sometimes ideological effects. This situation is compatible with economic activities. Economic activities are the activities that people have to do in order to continue their lives. Money is used to meet the basic needs of all people. The use of money under the roof of participation banks should be evaluated under the umbrella of Islamic Economics. The Qur'an is the main source for Islamic rulings. Other sources of judgment have emerged with the interpretation of the Qur'an, and as a result, they gain meaning in the integrity of the system on which the Qur'an is based. "Islamic Economics is to form a mind, a vision about human, society, things and the universe with a purpose from the window of truth, and to reconstruct life materially and spiritually on a moral basis through this mind" (Hazıroğlu, 2015, s. 122).

Money has been in constant change with the rapidly flowing time and developing technology. The history of money, which started with metal money, has reached to virtual crypto money. With the developing money types and the increasing demand for money, banks; In the current century, it is considered among the important financial institutions that bring the actors in the supply of funds and demanding funds to the same place. Along with the

globalization process, developing countries have faced difficulties in making their economic stability situation sustainable. In this context, the structure of banks, which contribute positively to the productive capacity of countries and have important functions in the process of economic growth and development, has been tried to be strengthened with the reforms carried out. In addition to these reforms, another issue that needs to be addressed is the concept of banking risk and management. When the economic instabilities occurring in the developing economies in the world are examined in the direction of unlimited capital mobility, it has clearly revealed the necessity of risk management. As a result of this, conventions accepted by the whole world in the international arena have emerged. These agreements, which established common arrangements and minimized risk, also played an active role in the formation of the Basel Committee.

2. Theoretical Framework

Ekinci and Poyraz, (2019) study consists of 26 commercial banks operating in Turkey between 2005 and 2017 to analyze the effect of credit risk on bank performance. In the comparison of the banks according to their ownership structures, the data of the three panels were evaluated as state banks, private banks and foreign banks, respectively. Return on assets (ROA) and return on equity (ROE) are used as credit risk indicators as proxies of financial performance indicators. The results of the analysis showed that there is a negative relationship between credit risk and ROE and ROA. This result reveals that there is a relationship between credit risk management and profitability of Turkish deposit banks from 2005 to 2017.

İncekara and Çetinkaya, (2019) in their study analyzed quarterly financial data of Islamic and conventional banks thst were used to test the panel data regression analysis of factors affecting liquidity risk management, as Islamic and traditional banking continue to operate in Turkey. Within the scope of the analysis, a total of 6 banks, 3 participation and 3 traditional, operating between 2014-2018 were included. As a result of the analysis, it has been found that there is a negative and statistically significant relationship at 99% confidence level for Islamic banks between liquid assets (ROI), gross domestic product (GDP) and inflation (INF) variables and liquidity risk.

Kirikkaleli and Gokmenoglu, (2019) in their study investigested the causal relationship or correlation between national credit risk and economic risk in Turkey's emerging market, using quarterly time series data covering the period 1991-2016, Toda-Yamamoto causality, Gradual Change causality and Wavelet Consistency tests were applied. It confirms that in Turkey, changes in credit risk lead to a significant change in economic risk, which demonstrates the importance of sovereign credit risk in predicting economic risk.

Psaila, Spiteri, and Grima (2019) study examined the effect of nonperforming loans on the profitability of commercial banks traded in the stock market. In the study, the relationship between the variables was examined by Panel Data Analysis using the data of 35 commercial banks in the Euro-Mediterranean region between 2013 and 2017. As a result of the study in which bank-specific variables were used, it was seen that bad loans negatively affect the profitability of commercial banks traded in the stock market. A negative relationship was found between return on assets and non-performing loans.

Anggriani and Muniarty (2020) investigated the effect of capital adequacy ratio and non-performing loans on return on assets in their study. In the study, which was carried out using the data of Bank Central Asia 2010-2018, multiple regression analysis was carried out with the data obtained by using classical assumptions. According to the results of the research, it has been determined that non-performing loans have no effect on the return on assets. It has been determined that the capital adequacy ratio has a significant effect on the return on assets.

Do et al. (2020) examined the effect of non-performing loans on the performance of commercial banks. In the research, the data of 15 commercial banks in Vietnam for the period of 2008-2017 were used, and panel data analysis was used as the research method. In the study where the dependent variable was selected as return on assets, the independent variables were; non-performing loans and loan-to-deposit ratio. According to the results of the research, non-performing loans, loan deposit ratio have a statistically significant relationship on return on assets. It has an impact on the profitability of the bank's total assets. However, it was determined that the effect on the return on assets was not statistically significant. As non-performing loans increase, asset profitability decreases and bank profitability decreases.

Alshebmi et al. (2020) researched to determine the effect of non-performing loans and bank profitability. Using the data of 12 commercial banks in Saudi Arabia for the period 2008-2018, the relationship between in-bank and non-bank variables was examined using Panel Data Analysis, correlation, and regression analysis. According to the results

of the research, it has been determined that there is a negative relationship between non-performing loans and return on assets, bank liquidity GDP, total loans, total assets, and inflation. A positive relationship was found between non-performing loans and capital adequacy.

Banks are the most important actors in monetary markets. Banks play an important intermediary role in ensuring the balance of money supply and demand in financial markets. Banks are the most important financial institutions for the stable operation of the money market. Banks provide intermediary services for the exchange of funds by making the savings collected from the savers who want to make use of their savings available to their customers in need of funds. As a result of the intermediary service, banks make a profit equal to the difference between their interest expense and income. The more banks lend, the more profit they can make. Therefore, the increase in the net profit for the period ensures the increase in own resources. However, banks bear many risks when extending loans. Banks add the risk premium to their profit margins while giving loans, taking into account the risks they bear. Thus, banks can extend loans to risky customers at high rates while extending loans. The risk premium applied by the banks according to the customers' ability to pay is not given to earn high profits, but to cover the cost of the risks they are exposed to. Banks take into account the possibility of non-repayment of some loans when extending loans. However, it is also possible that even customers who never fail to pay their bills may experience financial difficulties and have difficulty paying their debts. Therefore, lending by banks is risky. In particular, it is considered important to examine non-performing loans with low collectability. For this purpose, it is necessary to examine the effect of banks' non-performing loans on their profits. Although similar studies have been found in the literature, the number of studies on non-performing loans is quite low. It is expected that the examination of the effect of non-performing loans on banks' profits will contribute to the scientific literature.

3. The Relationship Between Credit Interest, Credit Volume And Net Profit In The Turkish Banking Sector

The banking sector is an important engine of financial markets. Banks are one of the most important intermediary institutions in the money market. Banks need to work within certain legal rules in order for money markets to work properly. In this regard, the Banking Regulation and Supervision Agency supervises the effective and efficient operation of banks. Legal arrangements are made regarding loan disbursement. It is aimed to ensure stability in the money market by ensuring that banks avoid arbitrary practices and that they become a financial authority that customers can easily trust with deposit guarantees. Banks, as an important actor in the money market, receive and use money. The supply and demand for money is possible with the interest rate of money. Central Banks determine the cost of borrowing and lending in the market by determining the interest rates. Banks pay interest on their deposit accounts in line with their monetary policies and provide loans to their customers who want loans. While the increase in loan interest rates decreases the use of loans, the decrease in loan interest rates increases the amount of loan use. Banks take into account the possibility of non-repayment of some loans while extending loans in line with interest rates. When some of the loans are not returned, the profits of the banks from the other loans they make decrease. For this reason, the fact that the loans are problematic affects the profits of the banks negatively. The decrease in bad loans increases profits. The fact that non-performing loans are important for the profit and profitability of banks constitutes the starting point of the study. For this purpose, the effect of non-performing loans on banks' profits is investigated.

4. Methodology And Data

The sample of the study is banks operating in Turkey. There are 54 banks with domestic and foreign capital in Turkey. Since some banks have several branches, it is thought that the use of data from all banks will adversely affect the success of the analysis. In addition, since the working principles of participation banks are different, they are not included in the analysis. For this reason, considering that banks with more than 100 branches operating in Turkey appeal to more customers, banks with more than 100 branches in Turkey are included in the application. Since the data of Şekerbank T.A.Ş. differs from other banks, it is not included in the analysis as it may adversely affect the analysis. Thus, the sample of the study consists of 12 banks.

Of the banks with more than 100 branches, 3 are state-owned, 9 have domestic capital and 21 have foreign capital. All public banks were included in the sample; Republic of Türkiye Ziraat Bankası A.Ş. Number of domestic branches is 1728, Türkiye Halk Bankası A.Ş. The number of domestic branches is 1008 and Türkiye Vakıflar Bankası T.A.O.

The number of domestic branches is 934. There are 5 banks from domestic capital banks; Akbank T.A.Ş. Number of domestic branches is 713, Anadolubank A.Ş. The number of domestic branches is 114, Türk Ekonomi Bankası A.Ş. Number of domestic branches is 451, Yapı ve Kredi A.Ş. The number of domestic branches is 835, Türkiye İş Bankası A.Ş. The number of domestic branches is 1192. Among the foreign capital banks, 4 banks were included; Denizbank A.Ş. The number of domestic branches is 693, ING Bank A.Ş. Number of domestic branches is 191, QNB Finansbank A.Ş. The number of domestic branches is 466 and Türkiye Garanti Bankası A.Ş. The number of domestic branches is 884 (TBB, 2022).

As of 2021, the bank with the highest assets is the Republic of Turkey Ziraat Bankası A.Ş.; Anadolubank A.Ş. is the bank with the lowest assets. According to the table, the three biggest banks of Turkey are Republic of Turkey Ziraat Bankası A.Ş, Türkiye İş Bankası A.Ş and Türkiye Halk Bankası A.Ş. appears to be.

As of 2021, when the ratio of non-performing loans to total loans of banks is analyzed, it is determined that the ratio varies between 3.02% and 9.25%. Anadolubank A.Ş. The ratio of non-performing loans to total loans is 9.25%, and it is the bank with the highest non-performing loans in the sample. Republic of Türkiye Ziraat Bankası A.Ş. On the other hand, it is the bank with the lowest ratio of non-performing loans to total loans with a rate of 3.02%.

When the data for 2021 are analyzed, the ratio of banks' loan provisions to total loans varies between 1.91% and 5.21%. Anadolubank A.Ş., the bank with the highest loan reserve ratio of 5.21%; The bank that allocates the lowest loan provision is Türkiye Ziraat Bankası A.Ş with a rate of 1.91%. It is an expected result that high provisioning is made for banks with non-performing loans in high amounts. However, some banks may increase the loan provision for non-performing loans at a higher rate than other banks due to prudence. It is observed that banks differ in their prudence policies in credit management.

5.Empirical Findings
5.1. Correlation Test Results
In practice, 3 different models have been developed and since the variables used are the same, correlation test should be done on dependent and independent variables. The correlation test is performed to examine the dependency relationship between two variables (Yurdakul and İç, 2009: 404). Since the independent variables used in the 3 models are the same, only the dependent variables change.

The correlation test results of dependent and independent variables are given in Table 5.1.

Tablo 5.1: Correlation Test Results

	roa	roe	nkm	npl	ka	ma	km	fgg	kfo
roa	1.0000								
roe	0,9014	1.0000							
nkm	0,8862	0.8302	1.0000						
npl	-0.1652	-0.1962	-0.3524	1.0000					
ka	-0.5195	-0.5280	-0.6085	0.1902	1.0000				
ma	0.1696	0.2701	0.1204	0.0891	-0.1375	1.0000			
km	-0.4397	-0.4948	-0.4500	-0.0118	0.6537	-0.8125	1.0000		
fgg	0.1683	0.0703	0.1611	-0.1744	0.0614	-0.2883	0.2697	1.0000	
kfo	-0.1687	-0.1533	-0.3430	0.5080	0.2265	0.0571	0.0738	-0.5630	1.0000

$p < 0.05$

When the correlation test results are analyzed, it is seen that the return on assets ratio (ROA), return on equity ratio (ROE) and net profit margin (NCM) variables calculated from the net profit account have a high correlation relationship. It has been determined that there is a negative relationship between the return on assets ratio and KA and KM variables. It has been determined that there is a negative relationship between the return on equity and the variables of PA and PF. It has been determined that there is a negative relationship between net profit margin and NA and PF. When the analysis results are evaluated together, there is a high correlation between the dependent variables. Since each of the dependent variables will be used individually in each model, the correlation relationship between the dependent variables does not pose any problem. It was determined that there was no correlation between the independent variables or that they were at a low level.

5.2. Multicollinearity Testing

In case of the possibility of establishing a spurious regression relationship between the variables, multicollinearity test should be performed. What is meant by the absence of multicollinearity problem is that the correlation coefficient between the dependent variables takes zero or close to zero values (Karabulut and Şeker, 2018: 1059). Multicollinearity can lead to the establishment of a spurious regression relationship. A VIF test is required to test if there is a multicollinearity problem.

The independent variables are the same in all 3 models in the application of the study, and the results of the multicollinearity VIF test are given in Table 5.2.

Tablo 5.2: VIF Test Results

Variables	VIF	1/VIF
km	25.82	0.036726
ma	14.68	0.068109
npl	9.00	0.111101
ka	2.17	0.461561
kfo	1.77	0.563499
fgg	1.45	0.6912
MeanVIF	9.15	

$p < 0.05$

When the VIF values are examined, it is seen that the VIF values of the KM, MA and NPL variables are higher than 5. When the variables with high VIF values are removed from the model, there is not much change in the analysis result. It is expected that the subtraction of the MA variable, which logically shows the ratio of deposits to total assets, will positively affect the results of the analysis. When the MA variable is removed, the mean VIF value decreases. The results of the multicollinearity test performed by removing the MA variable are given in Table 5.3.

Tablo 5.3: VIF Test Results

Variables	VIF	1/VIF
kfo	2.16	0.463160
km	2.00	0.499262
ka	1.89	0.528304
fgg	1.77	0.565162
npl	1.43	0.700587
Mean VIF	1.85	

$p < 0.05$

When the VIF test results are examined, it is seen that the variables do not have a multicollinearity problem since the VIF values of the variables are below 5.

5.3.Hausman Test Results

The Hausman test should be performed to decide whether the panel data test will be performed with random effects if there are no fixed effects (Torres-Reyna, 2007). In the study, Hausman test is performed separately for each of the three models in order to decide whether to use the fixed effects or random effects method.

The Hausman Test result for the model in which the return on assets ratio (ROA) is the dependent variable is given in Table 5.4.

Tablo 5.4: Hausman Test results for the ROA variable

	Coefficients		
	(b) fe	(B) re	(b-B) difference
npl	-0.1018418	-0.0699510	-0.0311891
ka	-0.0070321	-0.0246504	0.0176183
km	-0.0192228	-0.0128679	-0.0063548
fgg	0.0115288	0.0104873	0.0010415
kfo	0.0004229	0.0003630	0.0000598
chi2(5) =	4.06		
Prob > chi2 =	0.3981		

p<0.05

Since the probe value is greater than 0.05, panel data analysis should be performed using the random effects method. The Hausman Test result for the model in which the return on equity (ROE) is the dependent variable is given in Table 5.5.

Tablo 5.5: Hausman Test results for the ROE variable

	Coefficients		
	(b) fe	(B) re	(b-B) difference
npl	-1.1285790	-0.6609428	-0.4676364
ka	-0.1790056	-0.2164320	0.0372376
km	-0.1174686	-0.0995733	-0.0178940
fgg	0.0737556	0.0585612	0.0151944
kfo	0.0039267	0.0025570	0.0013697
chi2(5) =	5.46		
Prob > chi2 =	0.3628		

p<0.05

Since the probe value is greater than 0.05, panel data analysis should be performed using the random effects method. The Hausman Test result for the model in which the net profit margin (NCM) is the dependent variable is given in Table 5.6.

Tablo 5.6: Hausman Test results for the NKM variable

	Coefficients		
	(b) fe	(B) re	(b-B) difference
npl	-1.0589680	-0.9837950	-0.0751725
ka	-0.1710305	-0.2995698	0.1285393
km	-0.1155793	-0.0890196	-0.0265597
fgg	0.0834430	0.0709990	0.0124440
kfo	0.0009231	0.0007125	0.0002105
chi2(5) =	6.90		
Prob > chi2 =	0.228		

p<0.05

Since the probe value is greater than 0.05, panel data analysis should be performed using the random effects method.

5.4. Autocorrelation Test Results

The spurious regression seen between the variables may cause the model to have high explanatory power. VIF test was performed to avoid multicollinearity problem. The fact that the banks in the sample and especially the time series consist of only 10 years of data makes unit root tests difficult. In the case of a time series with a long frequency, it is possible to investigate the existence of a cointegration relationship between the variables. Since unit root tests are not performed due to the fact that panel cointegration tests will not be performed, another factor to be done in practice is the presence of autocorrelation. The autocorrelation test is about whether the variables are arranged in any order, in other words, whether they take consecutive values. The existence of a relationship between error terms may negatively affect the significance of the model (Gujurati, 2004).

Thus, the hypotheses were developed regarding the existence of autocorrelation in the models of the study are given below.

H0: There is no autocorrelation in the error term (white noise).

H1: There is autocorrelation in the error term.

Durbin-Watson and Baltagi-Wu LBI autocorrelation test results for the three models within the scope of the application are given in Table 5.7.

Table 5.7: Autocorrelation Test Results

ROA	ROE	NKM
Durbin-Watson = 0.933655	Durbin-Watson = 1.050428	Durbin-Watson = 0.92462064
Baltagi-Wu LBI: 1.219574	Baltagi-Wu LBI: 1.3192655	Baltagi-Wu LBI: 1.252718
Prob> chi2 = 41.53	Prob> chi2 = 43.50	Prob> chi2 = 63.42
Wald chi2(7)= 0.0000	Wald chi2(7)= 0.0000	Wald chi2(7)= 0.0000

$p<0.05$

When the autocorrelation test results of the models developed for the dependent variables ROA, ROE and NKM were examined, it was determined that there was no autocorrelation according to the results of Durbin Watson and Baltagi-Wu LBI tests.

5.5. Varying Variance Analysis

One of the most used methods in statistical and econometric studies is regression analysis. After deciding which fixed effects or random effects methods to use in panel data models, it is necessary to examine whether there is varying variance. It is the assumption that the variances of the error terms in the panel data model, expressed with varying variance, do not change. In case of changing variance, in order to keep the coefficients consistent and to prevent the deviation of the standard errors, it is necessary to perform panel data analysis by performing tests that predict robust standard errors, which are expressed as robust (Ün, 2018: 75). In cases where panel data random effects model is used, it is seen that heteroscedasticity is tested with Levene Brown and Forsythe Test for varying variance test (Tatoğlu, 2018: 235-236).

The hypotheses created for the 3 models of the study regarding the existence of varying variance are given below.

H0: There is varying variance in the model.

H1: There is no varying variance in the model.

The results of the Levene, Brown and Forsythe Test, which were conducted to test the developed hypotheses in the ROA model, are given in Table 5.8.

Table 5.8: Varying Variance Test Results

No	Mean	Standard Deviation	Frequency
1	0.0004295	0.0055126	10
2	0.0016828	0.0079682	10
3	-0.0011565	0.0036426	10
4	0.0001118	0.0023884	10

5	0.0003480	0.0035880	10
6	-0.0001549	0.0020987	10
7	-0.0003187	0.0065438	10
8	0.0005578	0.0041794	10
9	-0.0011935	0.0021646	10
10	0.0000263	0.0024062	10
11	0.0003052	0.0041789	10
12	-0.0008747	0.0047850	10
Total	2.23E-11	0.0043425	120
W0=		6.4712042	df(11, 108)
W50=		2.9853173	df(11, 108)
W10=		5.8632258	df(11, 108)

p<0.05

When the results of Levene, Brown and Forsythe Test W0, W10 and W50 were examined, the ho hypothesis was accepted that the p value was lower than 0.05. It has been determined that there is varying variance in the model. The results of Levene, Brown and Forsythe Tests, which were conducted to test the developed hypotheses in the ROE model, are given in Table 5.9.

Tablo 5.9: Varying Variance Test Results on ROE model

No	Mean	Standard Deviation	Frequency
1	-0.0099849	0.0358534	10
2	0.0075183	0.0575625	10
3	0.0007663	0.0321547	10
4	-0.0022813	0.0171526	10
5	0.0136358	0.0404744	10
6	-0.0089415	0.0172728	10
7	-0.0037598	0.0543148	10
8	-0.0081184	0.0312562	10
9	-0.0131513	0.0219333	10
10	0.0094993	0.0287404	10
11	0.0029721	0.0346406	10
12	-0.0043914	0.0378756	10
Total	1.671e-10	0.03545414	120
W0=	4.1839485	df(11, 108)	Pr > F = 0.00003762
W50=	2.4393056	df(11, 108)	Pr > F = 0.00931602
W10=	3.8117925	df(11, 108)	Pr > F = 0.00012212

p<0.05

When the results of Levene, Brown and Forsythe Test W0, W10 and W50 were examined, the ho hypothesis was accepted that the p value was lower than 0.05. It has been determined that there is varying variance in the model. The results of the Levene, Brown and Forsythe Test, which were conducted to test the developed hypotheses in the NKM model, are given in Table 5.10.

Tablo 5.10: Varying Variance Test Results on NKM model

No	Mean	Standard Deviation	Frequency
1	0.0007089	0.0399556	10
2	0.0124967	0.0633452	10
3	-0.0100939	0.0186671	10

4	0.0041334	0.0201402	10
5	0.0061868	0.0349323	10
6	-0.0020515	0.0192891	10
7	-0.0061610	0.0602720	10
8	0.0010213	0.0293033	10
9	-0.0116404	0.0168372	10
10	0.0027036	0.0219598	10
11	0.0070343	0.0475709	10
12	-0.0043382	0.0537525	10
Total	-8.93E-11	0.0379038	120
W0 =	4.2833614	df(11, 108)	Pr > F = 0.00002751
W50=	2.6014710	df(11, 108)	Pr > F = 0.00563384
W10=	3.8647465	df(11, 108)	Pr > F = 0.00010324

$p < 0.05$

When the results of Levene, Brown and Forsythe Test W0, W10 and W50 were examined, the ho hypothesis was accepted that the p value was lower than 0.05. It has been determined that there is varying variance in the model.

5.6.Panel Regression Test Results
According to the Hausman test results, it was determined that the random effects method should be used in all three models. Considering the existence of autocorrelation with varying variance, it is stated that the tests given in Table 5.11 below should be performed (Torres-Reyna, 2007).

Tablo 5.11: Panel Data Analysis

Model	ROA	ROE	NKM
Autocorrelation	Not present	Not present	Not present
Varying Variance	Present	Present	Present
Tests	Huber, Eicker and White Estimator	Huber, Eicker and White Estimator	Huber, Eicker and White Estimator

$p < 0.05$

All models are analyzed using the panel data random effects method. Since there is a problem of varying variance in 3 different models, it should be analyzed by removing this effect. Therefore, methods that include resistant standard errors in the analysis are used. Since there is varying variance in ROA, ROE and NKM models, analysis is made with the random effects method using the Huber, Eicker and White Estimator (Ün, 2018: 95-98).
The panel data analysis results of the model in which the return on assets ratio (ROA) is the dependent variable are given in Table 5.12.

Tablo 5.12: ROA Panel Data Analysis Results

r2 =	0.3685			
No. Observations =	120		Wald chi2(5)=	105.64
Size =	12		Prob > chi2 =	0.0000
roa	Coefficeint	Robust Standard Eror	z	P > | z |
npl	-0.069951	0.049482	-1.41	0.157
ka	-0.024650	0.018789	-1.31	0.190

km	-0.012868	0.004085	-3.15	0.002
fgg	0.010487	0.001876	5.59	0.000
kfo	0.000363	0.000090	4.02	0.000
Continuous	0.021222	0.013769	1.54	0.123
sigma_u	0.001928			
sigma_e	0.004562			
rho	0.151466			

The explanatory power of the model was 36.85%, and the model was statistically significant. When the P values of the independent variables are examined, it is seen that the KM, FGG and KFO variables are significant. NPL and KA variables were insignificant.

The return on assets ratio is very important in terms of evaluating the effective use of the assets of the banks. The return on assets ratio shows how much profit the bank makes for one lira of assets. As assets are used effectively and efficiently, the return on assets ratio also increases. Return on assets ratio is an important indicator in evaluating the performance of banks. It is thought that banks' non-performing loans may have an effect on profitability. However, as a result of the analysis, a statistically significant relationship was not found between NPL, that is, the ratio of non-performing loans to total loans and return on assets. The increase in the share of total loans in assets is expected to increase the return on assets ratio. However, as a result of the analysis, no statistical significance was found between the KA variable, which shows the ratio of total loans to total assets, and the return on assets.

There is a 1.2% negative relationship between the PF variable, which expresses the ratio of total loans to total deposits, and the return on assets ratio. When the ratio of loans to deposits decreases by 1%, the return on assets ratio increases by 1.2%, or when the ratio of loans to deposits increases by 1%, the ROA is expected to decrease by 1.2%. There is a 1% positive relationship between the FGG variable, which expresses the ratio of interest income to interest expenses, and the return on assets. As the ratio of interest incomes to interest expenses increases, the asset profitability ratio increases, and as the ratio of interest income to interest expenses decreases, the asset profitability ratio decreases. The fact that interest income is higher than interest income is thought to be due to the more efficient use of assets. Statistically, there is a very small significant relationship between the return on assets ratio and the loan interest rate in the same direction. The increase in the loan interest rate has a positive effect on the return on assets of the bank. Otherwise, if the loan interest rate decreases, there may be a decrease in the return on assets ratio.

As a result of the analysis, no statistically significant relationship was found between non-performing loans and return on assets ratio. Anggriani and Muniarty (2020) found that non-performing loans do not have a partially significant effect on return on assets. It is possible to come across in the study of Ahmad and Bashir (2013) that there is a positive relationship between non-performing loans and return on assets in the literature. Fofack (2005), Kırui (2013), Islam (2018), Kılınç et al. (2018), Kingu (2018), Panta (2018), Psaila, Spiteri and Grima (2019), Alshebmi et al. (2020), Saritas et al. (2016), Gülhan and Uzunlar (2011) and Bapat (2018) found a negative relationship between non-performing loans and return on assets in their studies.

The panel data analysis results of the model in which the return on equity ratio is the dependent variable are given in Table 5.13.

Tablo 5.13: ROE Panel Data Analysis Results

r2 =	0.3709			
No. Observations =	120		Wald chi2(5)=	55.22
Size =	12		Prob > chi2 =	0.0000
roa	Coefficeint	Robust Standard Error	z	P > | z |
npl	-0.660943	0.327116	-2.02	0.043
ka	-0.216243	0.098790	-2.19	0.029
km	-0.099573	0.037082	-2.69	0.007
fgg	0.058561	0.020135	2.91	0.004
kfo	0.002557	0.000928	2.76	0.006
Continuous	0.255379	0.068034	3.75	0.000
sigma_u	0.010314			

sigma_e	0.036767			
rho	0.072954			

The explanatory power of the model was 37.09%, and the model was statistically significant. When the P values of the independent variables were examined, it was determined that all variables were significant.

The return on equity ratio shows how efficiently the equity capital of banks is used. In addition to the deposits they collect, banks also extend their own resources as loans. It can increase the efficiency of the banks by converting the previous years' profits in their own resources into investments again. Therefore, net profit is of great importance in the increase of own resources. The most important source of income for banks is interest income. Collected deposits, syndicated loans and banks' equity are provided as loans to those who request funds. The higher the collection of loans, the higher the profit and profitability of the bank.

It has been determined that there is a 66% negative significant relationship between NPL, which expresses the ratio of non-performing loans to total loans, and return on equity. With the increase in non-performing loans, the profitability of equity capital will decrease; It is seen that the profitability of equity capital will increase with the decrease in non-performing loans.

A negative significant relationship of 21% was found between the KA variable, which expresses the ratio of total loans to total assets, and the return on equity ratio. It is expected that the increase in the share of total loans in assets will decrease the return on equity, or the decrease in the share of total loans in assets will increase the return on equity.

It has been determined that there is a 9.9% negative relationship between the PF variable, which expresses the ratio of total loans to total deposits, and the return on equity. The increase in the share of total loans in deposits decreases the return on equity capital, while the decrease in the share of total loans in deposits is expected to decrease the rate of return on equity.

It has been determined that there is a positive relationship of 2 per thousand between the loan interest rate and the return on equity capital. An increase in the loan interest rate is expected to increase the return on equity ratio or a decrease in the loan interest rate is expected to decrease the return on equity ratio. The relationship between them is in the same direction and it is a very low rate.

In the studies conducted, Ahmad and Bashir (2013), Nyarko-Baasi (2018) and Bapat (2018) found a negative relationship between non-performing loans and ROE; Bhattarai (2017), on the other hand, found a positive relationship between non-performing loans and ROE.

The panel data analysis results of the model in which the net profit margin is the dependent variable are given in Table 5.14.

Tablo 5.14: NKM Panel Data Analysis Results

r2 =	0.4657			
Number of observations =	120		Wald chi2(5)=	68.19
Number of Companies =	12		Prob > chi2 =	0.0000
nkm	Katsayı	Robust Std. Hata	z	P > | z |
npl	-0.983795	0.357827	-2.75	0.006
ka	-0.299570	0.193466	-1.55	0.122
km	-0.089020	0.038503	-2.31	0.021
fgg	0.070990	0.021024	3.38	0.001
kfo	0.000713	0.000822	0.87	0.386
Sürekli	0.319762	0.149942	2.13	0.033
sigma_u	0.192544			
sigma_e	0.039806			
rho	0.189605			

p<0.05

The explanatory power of the model was 46.57%, and the model was statistically significant. When the P values of the independent variables are examined, it is seen that the NPL, KM and FGG variables are significant. KA and KFO variables were insignificant.

Net profit margin is a frequently used performance indicator in commercial enterprises. For example, it shows how much net profit is obtained in exchange for sales of 100 liras. Considering that it would be beneficial to find the variables affecting the net profit margin by developing a different model, which is not seen in the literature, among non-commercial financial institutions, it is determined that neither profit margin has a significant relationship with only three variables. When the analysis results are examined, it is seen that the NPL variable, which shows the ratio of non-performing loans to total loans, affects the net profit margin negatively by 98%. Therefore, it is determined that non-performing loans have a significant effect on the net profit margin. According to the analysis findings, the increase in NPL decreases the net profit margin; The decrease in NPL increases the net profit margin.

It has been determined that there is a significant 8.9% negative relationship between the PF variable, which shows the ratio of total loans to total deposits, and the net profit margin. Increasing the ratio of total loans to total deposits, decreasing the bank's net profit margin; The decrease in the ratio of loans to total deposits is expected to increase the net profit margin of the bank.

It has been determined that there is a positive 7% significant relationship between the ratio of interest income to expenses, which is another significant variable in the model, and the net profit margin. It is expected that the net profit margin of the bank will increase as the ratio of the bank's interest income to its expenses increases. Because the increase in interest income, which is the main income source of the bank, higher than its expenses directly increases the net profit. It is recommended that the bank follow policies that increase interest income and decrease interest expenses in order to increase its net profit.

There was no statistically significant relationship between the KA variable, which is the ratio of total loans to total assets, and the net profit margin. It is expected that the increase in the total of loans within the bank's assets will increase the net profit margin. There was no statistically significant relationship between loan interest rate and net profit margin. Although the amount of loans used decreases with the increase in the loan interest rate, it is possible for banks to make more net profits. Loan interest rates directly affect the loan amount used.

Although there are not many studies in the literature that analyze the relationship between non-performing loans and net profit margin, Akter and Roy (2017) found a negative relationship between non-performing loans and net profit.

6. Conclusion

Banks, one of the important actors of the money market, are very important institutions in ensuring and maintaining financial stability. Banks provide the necessary financing to individuals, businesses and governments to finance consumption and investment expenditures. This service, which banks provide by lending, is important for the growth, development and development of the economy. Loan interest rates are one of the important factors that affect banks' deposit collection and lending. The rise in interest rates causes an increase in the interest that banks will give to depositors. Thus, banks pay high interest rates on deposits. It has to pay the principal borrowed from its customers to its customers in due time. Customers will not want to use loans because banks with high deposit interest will keep the interest rates higher while extending loans. The decrease in credit use also causes a decrease in consumption and investment. In addition, the rate of return on loans extended by banks with high interest rates may decrease. When banks cannot collect the loans they have made, they turn into losses. As non-performing loans increase, the profit and profitability of banks may be adversely affected. When considered as accounting records, a provision is made for uncollectible receivables, the process is started for the collection of receivables and when the process is completed, the provision for the receivables is canceled. However, when it is not possible to collect the receivables, the provision for the receivables is recognized as an expense and deducted from the profit. Especially in periods when the economy is stagnant, the low rate of return on loans may reduce the total profits of banks. This situation reduces the profit of the entire banking sector throughout the country, and even causes some banks to lose their own resources as a result of high deposit interest rates. Therefore, banks need to establish an effective credit management system.

It is very important to examine the effect of banks' non-performing loans on their profitability. Non-performing loans are the non-performing loans of banks. The increase in the share of non-performing loans in total loans indicates that non-performing loans have increased. The average of 12 banks' non-performing loans for the period of

2012-2021 is 3.71%. Approximately 4 lira of the average 100 lira loans of the banks in the sample constitutes non-performing loans. The high level of non-performing loans may reduce the probability of collection of loans. The return on assets ratio is very important in terms of evaluating the effective use of the assets of the banks. The return on assets ratio shows how much profit the bank makes for one lira of assets. As assets are used effectively and efficiently, the return on assets ratio also increases. Return on assets ratio is an important indicator in evaluating the performance of banks. The average return on assets of the 12 banks in the sample over a 10-year period varies between 10 per thousand and 22 per thousand. It is determined that the return on assets ratio of banks has followed a decreasing trend since 2012 and has been realized as 13 per thousand in the last four years. It is thought that banks' non-performing loans may have an impact on profitability. As a result of the analysis, no statistically significant relationship was found between NPL, that is, the ratio of non-performing loans to total loans and return on assets. There is a 1.2% negative relationship between the PF variable, which expresses the ratio of total loans to total deposits, and the return on assets ratio. When the ratio of loans to deposits decreases, the return on assets ratio increases. There is a 1% positive relationship between the FGG variable, which expresses the ratio of interest income to interest expenses, and the return on assets. As the ratio of interest incomes to interest expenses increases, the return on assets increases.

The return on equity ratio shows how efficiently the equity capital of banks is used. The average return on equity of the 12 banks in the sample over a 10-year period varies between 9% and 18%. Just like the return on assets ratio of banks, the decline that started from 2012 continued until 2017 and increased in 2018. In the 2018-2022 period, it varies between 12% and 15%. The increase in the amount of own resources or the decrease in the amount of net profit may be effective in the decrease of the ratio. Therefore, net profit is very important in the increase of own resources, and the interest income, which constitutes the net profit, should also increase. Because the most important source of income for banks is interest income. Collected deposits, syndicated loans and banks' equity are provided as loans to those who request funds. The higher the collection of loans, the higher the profit and profitability of the bank. In the study, a significant negative correlation of 66% was found between the ratio of non-performing loans to total loans and the return on equity. It is thought that the profitability of equity capital will decrease with the increase in non-performing loans. A negative significant relationship of 21% was found between the KA variable, which expresses the ratio of total loans to total assets, and the return on equity ratio. The decrease in the share of total loans in assets is expected to increase the return on equity. It has been determined that there is a 9.9% negative relationship between the PF variable, which expresses the ratio of total loans to total deposits, and the return on equity. With the decrease in the share of total loans in deposits, the return on equity is expected to increase.

Net profit margin is a performance indicator that is frequently used in commercial enterprises and has been used in this study to evaluate the financial performance of banks. The average of the net profit margin of the 12 banks in the sample over a 10-year period varies between 9% and 20%. The net profit margin of the banks started to decrease as of 2012, just like the return on equity and return on assets ratios, and the decrease continued until 2017. Although it increased slightly in 2018 and 2019 from 2017, it was around 10% in 2020 and 2021. In order to increase the net profit margin of the banks, it is thought that it would be beneficial to take improvement measures to increase the interest income. It is observed that the ratio of non-performing loans to total loans affects the net profit margin negatively by 98%. Therefore, it is determined that non-performing loans have a significant effect on the net profit margin. The increase in non-performing loans reduces the net profit margin. It has been determined that there is a positive 7% significant relationship between the ratio of interest incomes to interest expenses, which is another significant variable in the model, and the net profit margin. It is expected that the net profit margin of the bank will increase as the ratio of the bank's interest income to its expenses increases. Because the increase in interest income, which is the main income source of the bank, higher than its expenses directly increases the net profit. It has been determined that there is a significant 8.9% negative relationship between the PF variable, which shows the ratio of total loans to total deposits, and the net profit margin. The increase in the ratio of total loans to total deposits is expected to decrease the net profit margin of the bank.

When the profitability ratios of the banks are examined, it has the highest profitability ratio since 2012, while the ratios started to decrease as of 2013 and continued until 2017. Although it has started to rise since 2017, they have not reached the high rates as in 2012. It is necessary to examine the factors that reduce the income of banks in the period of 2012-2021. The reasons for the decrease in interest incomes and the increase in interest expenses should be investigated. It is recommended to examine the relationship between the increase in the assets and equity of the

banks and the total deposit volume and the total loan given. In the model where loan interest rates are meaningless, the effect of macroeconomic indicators on the profitability of the bank can be investigated.

Non-performing loans should be monitored, as loans and real sector investments will decrease if NPLs increase. In times of economic recession, banks may choose to follow appropriate credit policies for the country's economy instead of pursuing profit. In order to reduce their non-performing loans, banks can determine strong strategies and establish long-term prudent systems and policies within the bank. In addition, one of the most effective ways to get rid of the negative effects of non-performing loans on bank balance sheets; The way of transferring non-performing loans to AMCs can be followed. The fact that companies take precautions against exchange rate risk and banks with low interest income are more selective towards their loan customers can be among the measures that can be taken for problem loans. Banks that cannot collect their loan payments may encounter liquidity problems, causing depositors to not be able to collect their money whenever they want, leading to loss of reputation and distrust in the banking sector. Since the study emphasizes the importance of non-performing loans on bank profitability, it is expected to contribute to the literature.

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