Global Social Sciences Bulletin (GSSB)
Yıl / Year: **2025**, Cilt / Volume: **2**, Sayı / Issue: **2**, ss / pp: **216-232**

Main Causes of Non-Performing Loans in Banks Operating in the Turkish Republic of Northern Cyprus and the Possible Outcomes of the Follow-Up Process[1]

Kuzey Kıbrıs Türk Cumhuriyeti'nde Faaliyet Gösteren Bankalarda Takibe Giden Kredilerin Ana Nedenleri ve Takip Sürecinin Muhtemel Sonuçları

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Makale Başvuru Tarihi: 16.10.2025
Makale Kabul Tarihi: 26.12.2025
Makale Türü: Araştırma Makalesi

Anahtar Kelimeler:

Takipteki Krediler,

Bankacılık,

Risk Yönetimi,

Panel Veri Analizi.

ÖZET

Kuzey Kıbrıs Türk Cumhuriyeti'nde faaliyet gösteren bankalarda takibe giden kredilerin ana nedenlerinin ve takip sürecinin muhtemel sonuçlarının ortaya konulduğu bu araştırmada, 25 bankanın 2006-2021 verileri kullanılarak takibe düşen kredilerin dinamikleri ve etkileyen faktörler incelenmiştir. İki farklı model bağlamında Robust ve Driscoll-Kraay Robust analiz teknikleri kullanılarak analizler yapılmıştır., Bu doğrultuda Driscoll-Kraay Robust modelinin üstün özellikleri tespit edilerek bu model benimsenmiştir. Gerçekleştirilen panel veri analizi sonuçlarına göre, aktif likiditesi , Net Faiz Marjı, Sermaye Yeterlilik Rasyosu, GSYH'nın Reel Büyüme Oranı ve Tüketici Fiyat Endeksi değişkenlerinin takibe düşen krediler üzerinde anlamlı bir etkisi olmadığı görülmüştür. Buna karşın kurlardaki artış, takibe düşen kredilerin oranını azaltmış; Aktif Karlılık ve kurlardaki artışlar, takibe düşen krediler için ayrılan özel provizyonların oranını düşürmüştür. Takibe düşen kredilerin oranındaki artışın toplam gelirler üzerinde olumlu, toplam giderler üzerinde görece düşük bir etkisi olduğu; özel provizyon oranındaki artışın ise toplam gelirleri artırdığı tespit edilmiştir.

Keywords:

Non-Performing Loans (NPLs),

Banking,

Risk Management,

Panel Data Analysis,

ABSTRACT

This study investigates the dynamics of the non-performing loans (NPLs) in banks operating in the Turkish Republic of Northern Cyprus, using data from 25 banks for the period 2006-2021. The research focuses on the main causes of NPLs and the potential outcomes of the follow-up process. Two different robust models, Robust and Driscoll-Kraay Robust, were analyzed, and the superior features of the Driscoll-Kraay Robust model were identified and adopted. According to the panel data analysis results, variables such as Total Liquid Assets/Total Assets, Net Interest Margin, Capital Adequacy Ratio, Real GDP Growth Rate, and Consumer Price Index do not have any significant impact on NPLs. However, increases in exchange rates have reduced the ratio of NPLs, while increases in both Return on Assets and exchange rates have lowered the ratio of specific provisions for NPLs. It was found that an increase in the ratio of NPLs has a positive effect on total income and a relatively low effect on total expenses, while an increase in the specific provision ratio boosts total income.

Önerilen Alıntı (Suggested Citation): KAYAALP, Ertuğrul (2025), "*Main Causes of Non-Performing Loans in Banks Operating in the Turkish Republic of Northern Cyprus and the Possible Outcomes of the Follow-Up Process*", **Global Social Sciences Bulletin**, S.2(2), ss.216-232.

1 This study is based on the Master's thesis entitled "*The Main Reasons for Non-Performing Loans in Banks Operating in the Turkish Republic of Northern Cyprus and the Possible Outcomes of the Debt Collection Process*," prepared by the author under the supervision of Prof. Dr. Eralp BEKTAŞ and accepted by Eastern Mediterranean University in 2024..

1. INTRODUCTION

The term "*non-performing loan*" is a crucial indicator that helps banks manage their credit risk. A non-performing loan refers to a situation where a loan or credit card debt extended by a bank to a customer is overdue on its payment schedule. This period is typically 90 days or longer, and non-performing loans are usually given to risky or problematic customers. Increased credit risk for banks affects the cost of funds and the financing preferences of companies, altering investment decisions and firm value.

Therefore, accurately measuring creditworthiness and meticulously analyzing credit processes are paramount. However, macroeconomic conditions, exchange rate fluctuations, interest rates, and capital adequacy ratios are among the significant factors determining banks' credit risk. This study aims to examine the dynamics of non-performing loans and the factors affecting credit risk in banks operating in the Turkish Republic of Northern Cyprus. Using data from 25 banks between 2006 and 2021, this study reveals the significant macroeconomic and microeconomic factors influencing credit risk in the banking sector.

The main hypothesis of this study is to determine whether macroeconomic factors and bank-specific variables have a significant effect on non-performing loan ratios. To this end, panel data analysis was performed using two different models: Robust and Driscoll-Kraay Robust analysis techniques.

The analyses revealed that the Driscoll-Kraay Robust model is superior to the other model due to its robust predictive ability and, in particular, its capacity to correct error terms by considering cross-sectional dependence. Therefore, this model was adopted. In light of the findings, it was determined that variables such as asset liquidity, net interest margin, capital adequacy ratio, real GDP growth rate, and consumer price index did not have a statistically significant effect on non-performing loans.

However, it was observed that increases in exchange rates reduced non-performing loan ratios, while increases in return on assets and exchange rates decreased the special provisions allocated for non-performing loans. Furthermore, it was found that an increase in the non-performing loan ratio had a positive effect on total revenues and a relatively low effect on total expenses. It was determined that the increase in the special provision rate also increased total revenues. These findings indicate that TRNC banks need to monitor exchange rate movements and asset profitability dynamics more closely in order to improve their credit risk management strategies and adopt more effective policies.

2. THEORETICAL FRAMEWORK

2.1. Non-Performing Loans, Their Causes, and Precautionary Measures

The non-performing loan ratio in banks' loan portfolios is considered an important indicator of banks' financial health. Banks with high NPL ratios often need additional resources to better manage their credit risks, which can increase banks' costs. Therefore, NPL ratios can have a significant impact on banks' profitability and financial stability (Yağcılar and Demir, 2015:223).

Banks usually create a special department or unit to manage non-performing loans. This department works to collect or collect non-performing loans and tries to ensure that these loans are repaid as soon as possible. Collecting non-performing loans is important for banks to improve their financial performance and enhance their risk management (Yüksel, 2016:43). In some countries, high levels of non-performing loans can have a significant impact on banks' financial stability and economic growth. In particular, non-performing loan ratios often rise during periods of financial crisis, which can put banks at risk of insolvency. Therefore, banks usually adopt strict lending policies to keep NPL ratios low and continuously monitor their loan portfolios (Zahidli, 2019).

The most common reason for non-performing loans is unexpected declines in the borrower's income. These declines are often caused by internal or external changes in general economic conditions. Especially in times of economic recession, the problem of non-repayment of existing loans becomes more common with the decrease in loan supply and demand. Endogenous factors, such as uncontrolled and excessive risks and rapid growth initiatives or operational failures of companies, can also lead to loan repayment problems. Such situations lead to poor loan repayment performance and, as a result, to non-performing loans. Factors such as economic recession and mismanagement decisions by businesses can adversely affect the financial condition of borrowers, which can lead to loan repayment difficulties. Therefore, it is important to analyze these effects on loan

repayments, both at the individual and macroeconomic level, in order to improve the effectiveness of credit risk management. On the other hand, some operational problems that weaken a bank's collection capability, such as disruptions in collection processes, inadequate personnel resources, technological infrastructure deficiencies or ineffective debtor tracking systems, may cause loans to become non-performing (Yücememiş Tanınmış and Sözer, 2011:51).

In the formation of credit problems, management and financial planning mistakes of loan recipients can play an important role as well as failures in the functioning of banking systems (Kavcıoğlu, 2003). Banks' deliberate provision of misleading information, operational difficulties resulting from uncontrolled growth, lack of effective internal control systems, and imbalances in the use of financial leverage are common problems arising from loan buyers. Such situations can cause loans to become non-performing and pose risks for lending banks. Both internal and external factors have a major impact on the non-performing status of loans. Internal factors (*for example, problems in the borrower's cash flow management, improper financial planning, inadequate risk management strategies or unforeseen operating expenses*) include problems and shortcomings in the lending and repayment processes. These generally refer to situations that are within the control of the borrower. External factors arise from causes beyond the control of the borrower. These factors are usually exogenous, such as broad economic conditions, sectoral fluctuations or macroeconomic changes. The interaction of these two groups of factors plays a decisive role in the performance of loans (Sipahi, 2003).

Regarding internal factors, the mistakes made by banks during the loan review and utilization phase include making mistakes in the selection of the segment and the firm to be lent to, insufficient evaluation of the firm's financial position and risk profile, incomplete review of financial statements, hasty and coercive behavior of the bank management, insufficient detailed information about the firm, and incomplete or incorrect collateral received in case of non-repayment of the loan (Lök, 2018:198-199). Political, technological and economic factors and factors arising from the natural environment may also cause loans to become non-performing. Environmental factors such as unfavorable developments in the national and world economy, financial and political crises, firms' inability to keep up with technological developments, problems in energy and raw material resources and natural disasters can lead to non-repayment of loans. According to Yüksel (2016), non-performing loans are a situation that occurs due to the borrower's inability to pay or not making payments regularly. This is an important factor for minimizing credit risks as it can reduce the profits of lending institutions. The most common reasons for non-performing loans include the borrower's inability to pay, payment delays, exceeding the credit limit, outdated personal information and fraud (Yüksel, 2016:44).

The management of non-performing loans is critical for banks to maintain their financial health. This management process includes the steps of identifying, classifying, managing and reducing non-performing loans. Effective management of non-performing loans is essential to protect the bank's profitability and reputation (Selimler and Taş, 2019:289). This process includes steps such as restructuring loans, establishing payment plans and providing support to customers (Abdioğlu and Aytekin, 2016:549).

The process of monitoring non-performing loans involves banks' efforts to collect the loans that need to be provisioned as soon as possible by following up the loans due to non-payment of loan payments on time and non-collection of expected payments. This process consists of initiating the follow-up process, communication with the customer, collection procedures, debt restructuring and loan collection (Abdioğlu and Aytekin, 2016:548-550). In the process of monitoring non-performing loans, it is important for banks to manage collection processes by taking into account the financial status and loan payment plans of their customers. Effective management of this process helps banks to protect their financial health and provide better service to their customers (Selimler, 2015:134). Measures to be taken regarding non-performing loans include using stricter criteria in the loan evaluation process, developing early warning systems, accelerating loan collection processes, obtaining professional support and implementing double signature practices. These measures can help banks reduce their credit risks and lower their non-performing loan ratios (Koyuncu and Saka, 2011:115-117). Banks may use more stringent criteria to better analyze the financial situation of their customers in the loan allocation process. These criteria may include customers' loan payment history, income, employment status and other financial indicators. In this way, banks can reduce the risk of non-performing loans by making more accurate decisions in the loan allocation process.

Early warning systems enable early detection of non-performing loans and early communication with customers. In this way, it may be possible to find solutions together with customers before the loans become fully non-performing. Using technological solutions to speed up loan collection processes is also an effective strategy. These solutions can include automated collection systems, software that communicates directly with

debtor customers, and tools that facilitate the management of non-performing loans. Banks can seek professional support for the collection of non-performing loans. This support is particularly necessary for the collection of large debts. Banks can manage this process more effectively by collaborating with professional organizations such as lawyers and collection companies. They can also reduce the risk of non-performing loans by applying double signature in the loan allocation process. This practice requires more people to approve credit allocation decisions and thus helps to prevent wrong decisions.

2.2. Literature Review Summary

In the literature, studies have examined the effects of macroeconomic variables and internal bank factors on non-performing loans in different countries and periods. For example Bercoff et al. (2002), Fofack (2005), Khemraj and Pasha (2009), Saka (2010), Espinoza and Prasad (2010), Nkusu (2011), Vatansever and Hepşen (2013), Tanaskovic and Jandric (2015), Akinlo and Emmanuel (2014), Demirel (2015), Yüksel (2016), Us (2020), Çıplak and Kılıç (2021) and Varlık (2023) have analyzed the effects of macroeconomic and intrabank factors on non-performing loans. In these studies, the effects of variables such as bank size, asset growth, interest rates, exchange rates, and economic growth on non-performing loans are analyzed.

Bercoff et al. (2002) found a positive effect of bank size and a negative effect of asset growth in Argentina. Fofack (2005) finds a positive effect of real effective exchange rate and real interest rate and a negative effect of GDP per capita in Sub-Saharan African countries. Khemraj and Pasha (2009) find a positive relationship between interest rates and real exchange rate and non-performing loans and a negative relationship with GDP in Guyana.

Saka (2010) finds a negative relationship between non-performing loans and domestic loans in Turkey. Espinoza and Prasad (2010) and Nkusu (2011) find that non-performing loans increase when macroeconomic indicators deteriorate. Vatansever and Hepşen (2013) find that variables such as confidence index, loan-to-asset ratio and debt ratio have no effect on non-performing loans in Turkey, while industrial production index, BIST100 and inefficiency ratio of banks have a negative effect.

Tanaskovic and Jandric (2015), Akinlo and Emmanuel (2014) and Demirel (2015) analyze the effects of economic growth and exchange rate on non-performing loans in the short and long run. Yüksel (2016) finds that the factors affecting the non-performing loan ratio of banks are positively related to the dollar exchange rate and negatively related to growth. Us (2020) and Çıplak and Kılıç (2021) analyzed the effects of variables such as inflation and exchange rate on non-performing loans. Varlık (2023), on the other hand, finds that credit growth and real GDP growth slow down the NPL, while an increase in loan interest rates leads to an increase in the NPL.

In studies on Asian countries, Ranjan and Dhal (2003), Das and Ghosh (2007), Swamy (2012), Prasanna et al. (2014) and Banerjee and Murali (2017) analyzed the relationship between non-performing loans in the banking sector and interest rates, economic growth and macroeconomic variables. Ranjan and Dhal (2003) find a positive relationship between interest rates and non-performing loans. Das and Ghosh (2007) found that variables such as economic growth rate and bank operating expenses have a significant effect on NPL ratios. Swamy (2012) finds a positive relationship between return on assets and non-performing loans and a negative relationship with the size of the bank. Prasanna et al. (2014) find that variables such as GDP growth and savings rate have a negative relationship with NPLs, while interest rates and total expenditure rates have a positive relationship. Banerjee and Murali (2017) find that the real exchange rate, net capital inflows and output gap have a negative impact on NPLs.

Studies such as Ahmad and Bashir (2013), Curak et al. (2013), Skarica (2014), Mileris (2012), Polat (2018), Radivojevic et al. (2019), Lee and Rosenkranz (2019), Beaton et al. (2016), Wang et al. (2023), Algeri et al. (2023) and Anastasiou et al. (2019) have analyzed the effects of economic indicators and financial variables on non-performing loans by comparing the perspectives of different countries. Ahmad and Bashir (2013) find negative effects of GDP growth, interest rate and inflation in Pakistan. Curak et al. (2013) and Skarica (2014) found a positive relationship between inflation, real interest rate, equity/assets ratio and non-performing loans in Southeastern Europe and Central-Eastern Europe. Mileris (2012) found that variables other than the banking sector such as consumption, inflation and unemployment have an impact on the amount of non-performing loans. Polat (2018) analyzed the effects of variables such as GDP, inflation and unemployment on non-performing loans in Turkey and Saudi Arabia. Radivojevic et al. (2019) find that inflation rate, unemployment rate and firm-level financial indicators such as firm size and capital structure do not have a significant effect on

non-performing loans. Beaton et al. (2016) find that an increase in the growth rate and foreign direct investment rate have a negative impact on non-performing loans in the Eastern Caribbean Monetary Union. Wang et al. (2023) analyze the mitigating effects of Fintech investments on non-performing loan risks. Algeri et al. (2023) find that the loan recovery capacity of small cooperative banks is affected by the policies of neighboring banks. Anastasiou et al. (2019) analyzed the effects of variables such as unemployment, income tax and economic growth on non-performing loans in the Eurozone.

Messai and Jouini (2013), Mylonas and Magginas (2017) and Hassan et al. (2019) aimed to reveal the micro and macro determinants of non-performing loans. Accordingly, Messai and Jouini (2013) find positive effects of unemployment, poor credit quality and real interest rates on non-performing loans in Italy, Greece and Spain. Mylonas and Magginas (2017) find negative effects of GDP growth rate on non-performing loans and positive effects of unemployment rate in Greece. Hassan et al. (2019) find that loan monitoring ratio and loan growth rate have significant effects on non-performing loans in Pakistan.

2.3. The Status of Non-Performing Loans in the Turkish Republic of Northern Cyprus

2023 When the credit market in the TRNC is analyzed in September 2023, business loans have the largest share with TL 56,308.8 million, while consumer loans are in second place with TL 14,519 million. This large share of business and consumer loans in total loans reveals the important role of both types of loans in the economy.

Table 1. Distribution of Loans by Type (Million TL)

Loan Types	2022		2023		
	September	December	March	June	September
Commercial Loans	36.259,2	40.001,4	42.455,2	54.307,9	56.308,8
Consumer Loans	8.606,6	9.376,5	10.617,0	13.483,3	14.519,0
Credit Cards	1.504,1	1.770,5	1.939,4	2.520,1	2.910,6
Discount and Participation Notes	901,9	1.115,8	1.172,7	1.787,2	1.854,2
Other Investment Loans	286,9	290,1	95,1	173,9	170,5
Import Loans	0,9	2,6	1,1	1,4	1,4
Fund-Sourced Loans	55,3	55,7	56,9	74,6	79,9
Specialized Loans	113,4	234,0	393,8	464,4	434,3
Export Loans	13,0	10,0	25,0	43,0	40,5
Loans Sourced from the Central Bank of TRNC	0,0	0,0	0,0	0,0	0,0
Loans Extended via the Central Bank of TRNC	0,0	0,0	0,0	0,0	0,0
Securities Purchase Loans on Behalf of Customers	0,1	0,1	0,0	0,0	0,0
Export-Guaranteed Investment Loans	329,9	336,5	344,9	253,3	272,0
Other Loans	885,7	754,2	811,4	758,5	1.544,8
Total Loans	48.956,9	53.947,4	57.912,5	73,867,6	78.136,0

Source: KKTCMB (CBTRNC),.2023, http://www.kktcmerkezbankasi.org/tr/node/4894

In the third quarter of 2023, gross loans increased by 5.54% to TL 78,136 million. In the one-year period, an increase of TL 30,023.3 million was observed. This growth in loans demonstrated the vitality and expansion of the credit market. In the third quarter of 2023, TL 28,795.2 million of total loans were denominated in Turkish Lira (TL) and TL 49,340.8 million in foreign currency (FX). TL and FX loans increased by 5.97% and 5.67%, respectively. The market share of state-owned banks decreased slightly from 17.97% to 17.46%, and that of private banks from 52.48% to 52.47%. The market share of branch banks increased from 16.74% to 16.83%.

In the third quarter of 2023, loans of TL 100 thousand and above accounted for 91.26% of total loans. Loans between TL 51-100 thousand accounted for 2.82%, TL 11-50 thousand for 2.62% and TL 0-1 thousand for 2.03%. Loans between TL 1-10 thousand have the lowest share of 1.27%. Short-term loans increased by 71.24% to TL 23,003.3 million, while medium and long-term loans increased by 55.2% to TL 55,132.7 million. These increases indicate that both short-term liquidity needs and long-term financing requirements have increased.

As of September 2023, 84.93% of loans were extended to the private sector and 15.07% to the public sector. Public sector loans increased by 10.48% to TL 11,778 million, while private sector loans rose by 4.99% to TL 66,358 million. In the one-year period, public sector loans increased by 32.93% and private sector loans by

65.49%. 2023 Non-performing loans, which were TL 2,778.2 million at the end of June, decreased by 0.81% to TL 2,755.6 million in September. However, they increased by 44.17% yoy.

The share of state-owned banks in total assets decreased from 7.86% to 7.8%, while the share of privately owned banks dropped from 75.4% to 75.37%. The share of branch banks increased from 16.74% to 16.83%. Total assets of TL 200,147.1 million, total gross loans of TL 80,891.6 million, NPLs of TL 2,755.6 million and special provisions of TL 1,498.5 million reveal the overall health and size of the Northern Cyprus banking sector.

Table 2. Summary of the Financial Status of Banks in the Turkish Republic of Northern Cyprus

Banks	Total Assets (Million TL)	Total Gross Loans (Million TL)	Non-Performing Loans (Million TL)	Specific Provisions (Million TL)
State-Managed Banks	36227.1	14125.9	214.9	213.1
Privately Owned Banks	87414.2	42445.0	2077.0	1033.1
Branch Banks	76505.8	24320.7	463.7	252.3

Source: KKTCMB (CBTRNC), 2023, Banks' Financial Reports, https://www.kktcmerkezbankasi.org/tr/bankalarinmaliraporlari

The NPL conversion ratio, which had been declining since March 2020, started to rise in September 2022. After reaching 4.89% in December 2022, the ratio declined again to 4.49% in March 2023, 3.62% in June and 3.41% in September 2023. This decline indicates an improvement in the management and collection of receivables. While the ratio of special provisions to NPLs was 52.59% in June 2023, this ratio increased to 54.38% in September. This increase indicates that banks allocated more financial resources for non-performing loans and adopted a more prudent approach in risk management.

3. RESEARCH METHODOLOGY

The purpose of this study is to analyze the credit risks and the causes of non-performing loans by analyzing the data of 25 banks operating in the TRNCbetween 2006 and 2021. In the application part of the study, the data of 25 banks operating in the TRNC for the years 2006-2021 were utilized and Panel data analysis was used in order to realize the efficiency ratio predictions for these banks. The banks and the variables included in the study are given in Table 3 and Table 4. The analysis of the data obtained in the study was carried out statistically with 95% reliability (*significance level 0.05*) through the STATA package program. In line with this framework, the following hypotheses were tested;

H1: In banks operating in the Turkish Republic of Northern Cyprus, a deterioration in the cost structure (an increase in the total expenses/total income ratio) increases the ratio of non-performing loans.

H2: An increase in banks' profitability (higher return on assets and net interest margin) reduces the ratio of specific provisions for non-performing loans to total loans.

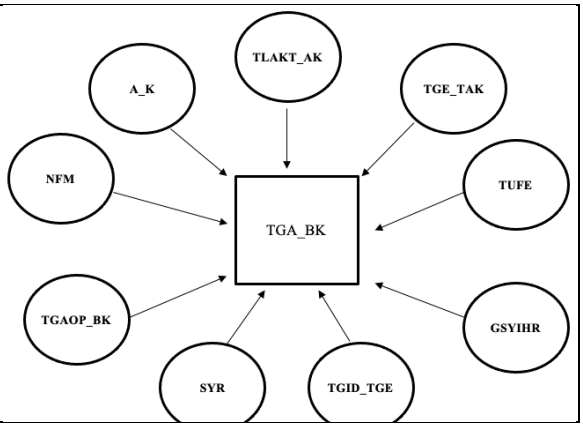
H3: When considered jointly, changes in macroeconomic indicators (real GDP growth rate and CPI) and the exchange rate indicator (basket exchange rate) have a statistically significant effect on banks' non-performing loan ratios and the specific provision ratios for these loans.

Table 3. Banks Included in the Scope

1	T.C. Ziraat Bankası A.Ş.	**14**	Nova Bank Ltd.
2	T. Halk Bankası A.Ş.	**15**	Creditwest Bank Ltd.
3	Türk Ekonomi Bankası A.Ş.	**16**	Denizbank Ltd.
4	HSBC Bank A.Ş.	**17**	Yakındoğu Bank Ltd.
5	T.Garanti Bankası A.Ş.	**18**	Şekerbank Kıbrıs Ltd.
6	T. İş Bankası A.Ş.	**19**	Akfinans Bank Ltd.
7	ING Bank A.Ş.	**20**	Kıbrıs Kapitalbank Ltd.
8	K. Vakıflar Bankası Ltd.	**21**	Universal Bank Ltd.
9	K.T. Koop Merkez Bnk Ltd.	**22**	Continental Bank Ltd.
10	Türk Bankası Ltd.	**23**	Viyabank Ltd.
11	Limasol T. Koop Bnk Ltd.	**24**	Albank Ltd.
12	Asbank Ltd.	**25**	Highrise Bank Ltd.
13	K. İktisat Bankası Ltd.		

Table 4. Variables and Model

1	**TGA_BK**	Non-Performing Loans / Gross Loans
2	**A_K**	Return on Assets
3	**TLAKT_AK**	Total Liquid Assets / Total Assets
4	**TGE_TAK**	Total Revenues / Total Assets
5	**NFM**	Net Interest Margin
6	**TGAOP_BK**	Specific Provisions for NPLs / Gross Loans
7	**TGID_TGE**	Total Expenses / Total Revenues
8	**SYR**	Capital Adequacy Ratio
9	**GSYIHR**	Real GDP Growth Rate
10	**SEP_KUR**	End-of-Month Weighted Basket Exchange Rate
11	**TUFE**	Consumer Price Index – CPI (%)



Accordingly, the research was conducted using panel data analysis method. Panel data analysis creates a multidimensional data set that includes both cross-sectional and time series dimensions (Baltagi, 2008). In the study, Chow Test is applied to determine whether there is a structural break in the model and Hausman Test is applied to choose between fixed and random effects models. In addition, Durbin-Watson Test, Levene and Brown-Forsythe Tests were used to check for autocorrelation and heteroskedasticity.

The Driscoll-Kraay robust random effects model is used as the main model. This model examines the impact of variables such as month-end exchange rates, liquid assets, net interest margin, capital adequacy ratio, real GDP growth rate and CPI on non-performing loans. The model provides a qualified solution to the problems of cross-sectional dependence and heterogeneity.

- **Linear Panel Data Models**

Panel data comprises observations of N economic units over T time periods. Linear panel data models can be expressed as follows;

$$Y_{it} = \beta_{0it} + \beta_{1it}X_{1it} + \cdots + \beta_{kit}\beta_{kit} + u_{it} \text{ or } Y_{it} = \beta_{0it} + \sum_{k:1}^{K}\beta_{kit}X_{kit} + u_{it}$$

In this model, i represents the economic units, and t denotes time. β_{0it} is the intercept term, $\beta_{\mathrm{k}it}$ is the vector of parameters, and $X_{\mathrm{k}it}$ is the matrix of explanatory variables (Büyüköztürk et al., 2008). Panel data models are generally classified into two main categories: fixed effects models and random effects models.

- **Classical Model**

The classical model is based on the assumption that the coefficients are homogeneous across all units and time periods, and it is expressed as follows;

$$Y = X\beta + u$$

This model is estimated using the Ordinary Least Squares (OLS) method. In cases of heteroskedastic or autocorrelated error terms, the Generalized Least Squares (GLS) method is employed (Demirtaş, 2009).

- **Fixed Effects Model**

The Fixed Effects Model is based on the assumption that the coefficients may vary depending on the interaction between units or over time, and it is expressed as follows (Büyüköztürk et al., 2008);

In the model expressed as

$$Y_{it} = \beta_{0it} + \beta_{1it}X_{1it} + \cdots + \beta_{kit}X_{kit} + u_{it}$$

the components are defined as follows:

$$\beta_{0it} = \bar{\beta} + \mu_i\,,\ \beta_{1it} = \beta_1,\ \ \beta_{2it} = \beta_2,\ \ \ \beta_{3it} = \beta_3, \ldots\ldots\ \beta_{kit} = \beta_k$$

μ_i = unit effects that are constant over time

u_{it} = error term

With this model, general relationships and trends are analyzed without accounting for unit and/or time effects. However, if it is assumed that unit and/or time effects exist, it would be more appropriate to use fixed or random effects models. Fixed effects models take into account the specific effects of each unit or time period, while random effects models assume that these effects are random (Tatoğlu, 2005).

- **Random Effects Model**

The Random Effects Model assumes that the differences between units are random and is expressed with the following formulation (Kök and Şimşek, 2006);

$$Y_{it} = \beta_{0it} + \beta_{1it}X_{it} + \ldots + \beta_{kit}X_{kit} + (v_{it}\ \mu_{it})$$

v_{it} = total errors

μ_{it} = represents unit error, unit differences, and variation between units that is constant over time.

In the analysis of Random Effects Models, the two-component structure of the error term plays a significant role. In these models, the first component, denoted as μ_{it}, represents an effect that remains constant across all time periods for each cross-sectional unit i(1, 2, ..., N). The other component, v_{it}, refers to the remaining part of the error terms, which are uncorrelated with each other and with the independent variables over time. A fundamental assumption of these two error components is that the component representing cross-sectional effects, μ_{it}, and the component containing the remaining error terms, v_{it}, are independent of each other. Furthermore, both error components are assumed to be independent from any observed value of the model's independent variables. This is crucial in the estimation of the Random Effects Model because such independence increases the reliability of the model's estimates and ensures broader validity in the interpretation of its results (Büyüköztürk et al., 2008).

4. TEST RESULTS

4.1. Model Analysis and Chow Test Results

Within the scope of panel data analysis, the Pooled Ordinary Least Squares (POLS) model was initially used, and the significance of the coefficients was evaluated with Prob<0.05. The Chow Test examined the presence of structural breaks in the model through four different combinations.

Table 5. Chow Test Results

Test No	Chow Test	P-Value>F	Degrees of Freedom	Structural Break
Chow Test 1	8.09	0.0000	(192, 200)	Present
Chow Test 2	4.03	0.0000	(192, 200)	Present
Chow Test 3	6.68	0.0000	(238, 152)	Present
Chow Test 4	4.47	0.0000	(238, 152)	Present

According to the results presented in Table 5, the Chow test statistics are significant in all model combinations ($p < 0.01$), indicating the presence of structural breaks in the data and showing that the pooled OLS approach is not appropriate for testing hypotheses H1, H2 and H3. Therefore, in order to choose between models that can account for unobserved bank–level heterogeneity, namely fixed effects and random effects models, the Hausman test was applied.

- ***Hausman Test and Selection of the Random Effects Model*:** The Hausman test was employed to determine whether the difference between the fixed and random effects estimators is systematic, and thus which model provides a more consistent framework for testing hypotheses H1–H3. Since the resulting p–value was greater than 0.05, it was concluded that there is no statistically significant difference between the fixed and random effects estimators; in other words, the random effects estimator can be treated as consistent. In line with this finding, the random effects model was adopted, and the relationships between non-performing loans and cost structure (H1), profitability indicators (H2), and macroeconomic/exchange rate variables (H3) were analysed within the random effects framework.
- ***Random Effects Model Assumptions and Cross-Sectional Dependence*:** Following the selection of the random effects model, additional diagnostic tests were conducted to assess whether the model assumptions are suitable for testing H1–H3. First, cross-sectional dependence across banks was examined using the Breusch–Pagan, Pesaran, Friedman and Frees tests. In all tests, the null hypothesis of "*no cross-*

sectional dependence" was rejected, indicating that the error terms are correlated across banks and that the panel exhibits cross-sectional dependence. This result suggests that common shocks in exchange rates and macroeconomic conditions (*i.e. variables covered under H3*) may affect bank balance sheets in a similar way, and that standard errors from classical estimators may be biased.

- ***Multicollinearity Analysis*:** Within the random effects framework, variance inflation factors (VIF) and correlation coefficients were examined to determine whether the bank–specific ratios included under H1 and H2 (cost structure, profitability, income/asset ratios, etc.) and the macroeconomic variables under H3 are excessively correlated with one another. All VIF values being below 5 and all pairwise correlation coefficients remaining below the 0.90 threshold indicate that there is no serious multicollinearity problem in the model, and that the relationships defined in H1–H3 can be estimated in a distinguishable and reliable manner.
- ***Durbin–Watson Autocorrelation Test Results*:** To detect the presence of serial correlation in the residuals, the Durbin–Watson (DW) test was applied, and in all four model combinations the DW statistics were found to be below 2. These findings imply rejection of the null hypothesis of "*no autocorrelation*" and point to positive autocorrelation in the error terms. Consequently, it was deemed necessary to use an estimator that adjusts for this time–series dependence when testing hypotheses H1–H3, by making the inference robust to serial correlation.

Table 6. Autocorrelation Test Results

Combination	DW Value	Autocorrelation
1	0.8746	Positive autocorrelation
2	1.6987	Positive autocorrelation
3	0.9534	Positive autocorrelation
4	1.7401	Positive autocorrelation

Since the DW values are below 2 in all combinations, the null hypothesis "*H0: There is no autocorrelation in the model*" was rejected. Accordingly, it was concluded that the model contains autocorrelation, and the alternative hypothesis H1 was accepted.

- ***Heteroskedasticity Test*:** To determine whether heteroskedasticity exists in the model, the Levene and Brown-Forsythe tests were applied. According to the results of these tests, the p-values for both the Levene and Brown-Forsythe statistics were found to be 0.000.

4.2. Determination of the Final Model and Interpretation of Findings

As a result of the analyses conducted, it was determined that the model to be used in panel data analysis should be the Robust Random Effects Model due to the presence of cross-sectional dependence, autocorrelation, and heteroskedasticity problems. Two robust models (*Robust and Driscoll/Kraay Robust*) were examined, and based on Hoechle's (2007) study – stating that the Driscoll-Kraay method accounts for cross-sectional dependence in panel data and provides reliable results by robustifying the standard errors – the Driscoll-Kraay Robust Random Effects Model was adopted due to its superiority.

Table 7. Combination No. 1

TGA_BK	Coefficient	Drisc / Kraay Std. Err.	t	P>|t|	[95% conf. interval]	
TLAKT_AK	0.0817	0.0994	0.82	424	-0.130	0.2936
NFM	0.3573	0.1853	1.93	73	-0.037	0.7522
TGID_TGE	0.0944	0.0077	12.32	0.0	0.078	0.1107
SYR	0.0249	0.0960	0.26	798	-0.179	0.2295
GSYIHR	-0.1834	0.1173	-1.56	139	-0.433	0.0666
SEP_KUR	-0.7718	0.2624	-2.94	0.01	-1.331	-0.212
TUFE	0.0968	0.1135	0.85	407	-0.145	0.3387
_cons	1.5088	4.1764	0.36	723	-7.393	10.411
sigma_u **sigma_e** **rho**	6.9135 10.8335 0.2894	(fraction of variance due to u_i)				

In combination no. 1, the variables *'TGID_TGE'* and *'SEP_KUR'* are statistically significant (P>|t| < 0.05). '*TGID_TGE'* has a positive effect, while *'SEP_KUR'* has a negative effect. The variable *'NFM'* is at the threshold of significance (P>|t| = 0.073). Other variables ('*TLAKT_AK', 'SYR', 'GSYIHR', 'TUFE'*) and the constant term (*_cons*) are not significant. The overall fit of the model is high, indicating that the independent variables jointly have a significant effect on the dependent variable. However, the explanatory power of the model is at a moderate level ($R^2 = 0.2403$).

Table 8. Combination No. 2

TGAOP_BK	Coefficient	Drisc / Kraay Std. Err.	t	P>|t|	[95% conf. interval]	
A_K	-0.2872	0.1016	-2.83	13	-0.504	-0.071
TLAKT_AK	0.0254	0.0201	1.26	225	-0.017	0.069
TGID_TGE	-0.0038	0.0034	-1.12	282	-0.011	0.0035
SYR	-0.0134	0.0208	-0.64	531	-0.058	0.031
GSYIHR	-0.0478	0.0432	-1.11	286	-0.140	0.044
SEP_KUR	-0.2130	0.0808	-2.64	19	-0.385	-0.041
TUFE	0.0259	0.0230	1.13	277	-0.023	0.075
_cons	2.5312	0.8322	3.04	8	0.757	4.305
sigma_u **sigma_e** **rho**	1.2186 2.6594 0.1735	(fraction of variance due to u_i)				

In combination no. 2, the variables *'A_K'* and *'SEP_KUR'* are found to be significant (P>|t| < 0.05). Both *'A_K'* and 'SEP_KUR' have a negative effect. The other variables ('*TLAKT_AK', 'TGID_TGE', 'SYR', 'GSYIHR', 'TUFE'*) are not significant. The constant term (*_cons*) is significant. The overall fit of the model is high, indicating that the independent variables collectively have a significant effect on the dependent variable. However, the explanatory power of the model is low ($R^2 = 0.1003$).

Table 9. Combination No. 3

TGA_BK	Coefficient	Drisc / Kraay Std. Err.	t	P>|t|	[95% conf. interval]	
A_K	-0.4346	0.359	-1.21	245	-1.20	0.331
TLAKT_AK	0.0118	0.047	0.25	804	-0.088	0.111
TGE_TAK	1.2051	0.334	3.6	3	0.492	1.918
NFM	-1.0190	0.594	-1.72	107	-2.285	0.247
TGID_TGE	0.0715	0.018	3.96	1	0.033	0.110
SYR	0.0772	0.051	1.52	0.15	-0.031	0.186
GSYIHR	-0.1154	0.069	-1.67	116	-0.263	0.032
SEP_KUR	-0.1869	0.298	-0.63	0.54	-0.822	0.448
TUFE	-0.0001	0.117	-0.0	999	-0.250	0.250
_cons	-4.5552	1.565	-2.91	11	-7.891	-1.220
sigma_u **sigma_e** **rho**	4.4323 9.8819 0.1675	(fraction of variance due to u_i)				

In combination no. 3, the variables *'TGE_TAK'* and the constant term (*_cons*) are significant. *'TGE_TAK'* has a positive effect. The constant term is negative and significant. The other variables *('A_K', 'TLAKT_AK', 'NFM', 'TGID_TGE', 'SYR', 'GSYIHR', 'SEP_KUR', 'TUFE'*) are not significant. The model's random effects indicate that 16.74% of the variance is due to differences between groups.

Table 10. Combination No. 4

TGAOP_BK	Coefficient	Drisc / Kraay Std. Err.	t	P>|t|	[95% conf. interval]	
A_K	-0.5377	0.0832	-6.46	0.0	-0.7150	-0.3604
TLAKT_AK	0.0207	0.0130	1.59	133	-0.0070	0.0484
TGE_TAK	0.2891	0.0399	7.25	0.0	0.2041	0.3741
NFM	0.2830	0.1117	2.53	23	0.0449	0.5210
TGID_TGE	-0.0139	0.0026	-5.26	0.0	-0.0195	-0.0083
SYR	-0.0342	0.0150	-2.28	38	-0.0661	-0.0022
GSYIHR	-0.0098	0.0227	-0.43	672	-0.0582	0.0386
SEP_KUR	0.0497	0.0636	0.78	446	-0.0858	0.1853
TUFE	-0.0191	0.0226	-0.84	411	-0.0674	0.0291
_cons	-0.7485	0.3080	-2.43	28	-1.4051	-0.0920
sigma_u **sigma_e** **rho**	.9150 2.2342 0.1436	(fraction of variance due to u_i)				

In combination no. 4, the Wald chi2 statistic was found to be 871.05 with a p-value of 0.0000, indicating that the independent variables of the model collectively have a significant effect on the dependent variable. The explanatory power of the model is high (R^2 = 0.5255), and the variables *'A_K', 'TGE_TAK', 'NFM'*, and *'TGID_TGE'* are statistically significant. *'A_K'* has a negative effect, while *'TGE_TAK'* and *'NFM'* have positive effects. Accordingly, within the scope of panel data analysis, various financial indicators affecting credit risk in the banking sector were examined, and the following findings were obtained;

The coefficient for *'TGID_TGE'* is negative and has a low p-value, indicating a negative effect.

Other variables such as *'SYR'*, *'GSYIHR'*, *'SEP_KUR'*, and *'TUFE'* were not found to be statistically significant.

The constant term (*_cons*) has a statistically significant negative value.

Sigma_u and sigma_e represent within-group and between-group variances, respectively, and the rho value indicates that approximately 14.36% of the variance in the model is due to differences between groups.

Table 11. Summary Presentation of All Model Coefficients

Combination No. 1							
Variable	**POLS**	**Random**	**Fixed**	**Robust**	**Dr_Kraay**	**Adjusted ~ W**	**Theil**
TLAKT_AK	-0.0315	0.0817	0.117	0.0817	0.0817	0.07292	0.07267
NFM	0.3435	0.3573	0.349	0.35734	0.3573	0.4637	0.4606
TGID_TGE	0.1028	0.0944	0.091	0.0944	0.0944	0.0678	0.06851
SYR	0.0046	0.0249	0.029	0.0249	0.0249	0.01937	0.02022
GSYIHR	-0.1905	-0.1834	-0.181	-0.1834	-0.1834	-0.03399	-0.03516
SEP_KUR	-0.8518	-0.7718	-0.752	-0.7718	-0.7718	-0.3584	-0.3680
TUFE	0.1284	0.0968	0.088	0.09679	0.0968	0.0052	0.0067
_cons	4.2880	1.5088	0.751	1.5088	1.5088	2.7339	2.7059
Combination No. 2							
A_K	-0.2247	-0.2872	-0.3085	-0.2872	-0.2872	-0.3268	-0.3174
TLAKT_AK	-0.0059	0.0254	0.0416	0.02539	0.02539	0.02541	0.02731
TGID_TGE	-0.0052	-0.0038	-0.0033	-0.0038	-0.0038	-0.0052	-0.0047
SYR	0.0196	-0.0134	-0.0296	-0.01336	-0.01336	-0.01485	-0.01618
GSYIHR	-0.0634	-0.04777	-0.0410	-0.0478	-0.0478	-0.0291	-0.03372
SEP_KUR	-0.2193	-0.2130	-0.2113	-0.2130	-0.2130	-0.1748	-0.1864
TUFE	0.0310	0.0259	0.0236	0.0259	.0259397	0.01624	0.0189767
_cons	2.7803	2.5312	2.3944	2.5312	2.5312	2.6591	2.6006
Combination No. 3							
A_K	-0.6338	-0.4346	-0.3634	-0.4346	-0.4346	-0.4876	-0.4899

TLAKT_AK.	-0.0524	0.01183	0.05205	0.01183	0.01183	0.05692	0.0556
TGE_TAK	1.2901	1.2051	1.1712	1.2051	1.2051	0.9480	0.9563
NFM	-1.2983	-1.0190	-0.8198	-1.0190	-1.0190	-0.5406	-0.5542
TGID_TGE	0.06911	0.07152	0.0700	0.0715	0.0715	0.0578	0.0583
SYR	0.08098	0.07721	0.07624	0.0772	0.07721	0.0213	0.0233
GSYIHR	-0.1021	-0.1155	-0.1190	-0.1154	-0.1154	-0.0327	-0.0340
SEP_KUR	-0.2093	-0.1869	-0.1538	-0.1869	-0.1869	-0.0768	-0.0828
TUFE	0.01055	-0.0001	-0.01087	-0.0001	-0.0001	-0.0094	-0.0090
cons	-2.4224	-4.5552	-5.9739	-4.5552	-4.5552	-3.2250	-3.2720
Combination No. 4							
A_K	-0.5412	-0.5377	-0.5329	-0.5377	-0.5377	-0.5549	-0.5510
TLAKT_AK	0.0158	0.0207	0.0243	0.0207	0.0207	0.01839	0.01892
TGE_TAK	0.2685	0.2891	0.2960	0.2891	0.2891	0.2883	0.2881
NFM	0.3299	0.2830	0.2405	0.2830	0.2830	0.3070	0.3022
TGID_TGE	-0.0148	-0.0139	-0.0133	-0.0139	-0.01389	-0.01421	-0.0142
SYR	-0.0243	-0.0342	-0.0401	-0.0342	-0.03419	-0.03374	-0.0337
GSYIHR	-0.0126	-0.0098	-0.0086	-0.0098	-0.0098	-0.0085	-0.0088
SEP_KUR	0.0483	0.0497	0.0435	0.0497	0.0497	0.05331	0.0522
TUFE	-0.0185	-0.0191	-0.0185	-0.0191	-0.0191	-0.0158	-0.0165
_cons	-0.6894	-0.7485	-0.6780	-0.7485	-0.7485	-0.7975	-0.7839

The panel data analysis results obtained using the Driscoll-Kraay robust random effects model were derived through the examination of various financial indicators affecting credit risk in the banking sector, and the following conclusions were reached.

- In combination no. 1, the coefficients for the variables TLAKT_AK (Total Liquid Assets / Total Assets, p=0.424), NFM (*Net Interest Margin, p=0.073*), SYR (*Capital Adequacy Ratio, p=0.798*), GSYIHR (*Real GDP Growth Rate, p=0.139*), and TUFE (*Consumer Price Index %, p=0.407*) are not statistically significant, while all other coefficients and the overall model are found to be statistically significant.
- In combination no. 2, the coefficients for the variables TLAKT_AK (*Total Liquid Assets / Total Assets, p=0.225*), TGID_TGE (*Total Expenses / Total Revenues, p=0.282*), SYR (*Capital Adequacy Ratio, p=0.531*), GSYIHR (*Real GDP Growth Rate, p=0.286*), and TUFE (*Consumer Price Index %, p=0.277*) are not statistically significant, while all other coefficients and the overall model are found to be statistically significant.
- In combination no. 3, the coefficients for the variables A_K (*Return on Assets, p=0.245*), TLAKT_AK (*Total Liquid Assets / Total Assets, p=0.804*), NFM (*Net Interest Margin, p=0.107*), SYR (*Capital Adequacy Ratio, p=0.150*), GSYIHR (*Real GDP Growth Rate, p=0.116*), SEP_KUR (*End-of-Month Basket Exchange Rate, p=0.540*), and TUFE (*Consumer Price Index %, p=0.999*) are not statistically significant, while all other coefficients and the overall model are found to be statistically significant.
- In combination no. 4, the coefficients for the variables TLAKT_AK (*Total Liquid Assets / Total Assets, p=0.133*), GSYIHR (*Real GDP Growth Rate, p=0.672*), SEP_KUR (*End-of-Month Basket Exchange Rate, p=0.446*), and TUFE (*Consumer Price Index %, p=0.411*) are not statistically significant, while all other coefficients and the overall model are found to be statistically significant.

5. CONCLUSION

The overall findings of the study indicate that, for banks operating in the TRNC over the period 2006–2021, non-performing loans are, as expected, more closely linked to banks' own profitability and income–expense structure than to broad macroeconomic indicators such as aggregate economic growth and inflation. The analyses suggest that in periods when expenses rise relative to income and efficiency deteriorates, the likelihood of experiencing problems in loan collection increases. Conversely, banks with higher profitability tend to set aside lower provisions for problem loans and exhibit a relatively healthier loan portfolio. An increase in banks' total income-generating capacity may, however, lead to an expansion in credit and a higher risk appetite, which can in turn enlarge the stock of non-performing loans in subsequent periods. On the other hand, the fact that the

real GDP growth rate and inflation are not statistically significant implies that, in the TRNC context, credit risk is shaped more by banks' balance sheet structures, cost management, and business strategies than by macroeconomic aggregates. The finding that the exchange rate sensitivity indicator is inversely related to problem loans in some models points to a more complex risk transmission mechanism operating through banks' foreign currency position management, collateral structures and the composition of their loan portfolios, rather than through the level of the exchange rate itself. Compared with the literature, these results partly overlap with international evidence while also reflecting the specific conditions of the TRNC banking sector. In contrast to the strong link between macroeconomic growth, financial cycles, banking crises and problem loans documented by Pesola (2001) and by Salas and Saurina (2002), the insignificance of the real GDP growth rate and CPI in this study suggests that, in a small and externally dependent economy, banks' own balance sheet strategies may be more decisive than headline macro indicators.

The findings of Ranjan and Dhal (2003), Espinoza and Prasad (2010) and Badar et al. (2013), which emphasise the positive relationship between interest rates, monetary policy conditions and non-performing loans, are partially supported here by the significant effects of the net interest margin (NFM) and return on assets (A_K) particularly on provisioning ratios; profitability and interest margins shape credit quality indirectly through pricing behaviour and risk management capacity. From the exchange rate perspective, the evidence of Khemraj and Pasha (2009) on the pressure exerted by the real effective exchange rate and interest rates on problem loans, as well as the findings of Çıplak and Kılıç (2021) and Sevinç (2021) highlighting the exchange rate–unemployment–NPL nexus, confirm the existence of an exchange-rate-sensitive risk channel in those models of this study where SEP_KUR is significant.

However, the negative sign of the coefficient suggests that, in the TRNC, foreign-currency-denominated loans may be more heavily concentrated in collateralised exposures or in selected customer segments with lower default risk, so that exchange rate movements do not always translate mechanically into higher credit risk. Overall, the results do not reject the macro-financial vulnerability channels emphasised in the literature, but they do indicate that, in the TRNC context, credit quality should be interpreted primarily through bank-level profitability, cost structure and asset quality rather than macroeconomic conditions alone.

In light of these results, several key recommendations can be formulated for policymakers and bank senior management. First, regulatory authorities, when monitoring credit risk, should complement broad macro indicators with greater emphasis on micro indicators such as banks' income–expense ratios, return on assets and balance sheet composition, and should define threshold values, early warning indicators and stress scenarios for these ratios within supervisory processes. For bank management, the positive relationship between the total expenses/total income ratio (TGID_TGE) and the ratio of non-performing loans (TGA_BK) underlines the need to control operational costs, undertake efficiency-oriented restructuring, and strengthen risk-based pricing policies. Although banks with higher profitability enjoy lower provisioning ratios in relative terms and thus a short-term advantage in balance sheet performance, this necessitates a qualitative review of loan portfolios and, where appropriate, a shift towards more prudent provisioning policies. In the exchange rate channel, the findings related to SEP_KUR call for close monitoring of banks' foreign currency positions, collateral structures and sectoral credit allocation policies, and for the introduction of caps on concentrations of exchange rate risk within the macroprudential framework.

Finally, for future research, the use of more detailed micro data sets covering loan type (household/corporate, SME, sectoral), collateral structure, credit scoring outcomes and labour market variables such as unemployment would allow the determinants of non-performing loans in the TRNC to be identified more precisely, thereby supporting the development of more targeted policy tools for both banks and regulators.

AUTHORS' DECLARATION:

Bu makale Araştırma ve Yayın Etiğine uygundur. Beyan edilecek herhangi bir çıkar çatışması yoktur. Araştırmanın ortaya konulmasında herhangi bir mali destek alınmamıştır. Makale yazım ve intihal/benzerlik açısından kontrol edilmiştir. Makale, "*en az iki dış hakem*" ve "*çift taraflı körleme*" yöntemi ile değerlendirilmiştir. Makalede kullanılan ölçek için yazar tarafından ölçeğin orjinal sahibinden izin alındığı beyan edilmiştir. Yazar, dergiye imzalı "*Telif Devir Formu*" belgesi göndermiştir. Mevcut çalışma için mevzuat gereği etik izni alınmaya ihtiyaç yoktur. Bu konuda yazarlar tarafından dergiye "*Etik İznine Gerek Olmadığına Dair Beyan Formu*" gönderilmiştir. Yazar, çalışmanın tüm bölümlerine ve aşamalarına tek başına katkıda bulunmuştur. / This paper complies with Research and Publication Ethics, has no conflict of interest to declare, and has received no financial support. The article has been checked for spelling and plagiarism/similarity. The article was evaluated by "*at least two external referees*" and "*double blinding*" method. For the scale used in the article, it is declared by the authors that permission was optained from the original owner of the scale. The author(s) sent a signed "*Copyright Transfer Form*" to the journal. There is no need to obtain ethical permission for the current study as per the legislation. The "*Declaration Form Regarding No Ethics Permission Required*" was sent to the journal by the authors on this subject. The author contributed to all sections and stages of the study alone.

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