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e-ISSN: 2651-5318
Journal Homepage: <http://dergipark.org.tr/joeeep>



Araştırma Makalesi • Research Article

The Effect of Policy Rate and Inflation Rate on the Credit Volume: 2003-2023 The Case Of Türkiye

Politika Faizi ve Enflasyon Oranlarının Kredi Hacmi Üzerindeki Etkisi: 2003-2023 Türkiye Örneği

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MAKALE BİLGİSİ

Makale Geçmişi:

Başvuru tarihi: 16 Eylül 2023
Düzeltilme tarihi: 21 Ekim 2023
Kabul tarihi: 28 Ekim 2023

Anahtar Kelimeler:

Kredi Hacmi
Politika Faizi
Enflasyon
ARDL Sınır Testi

ARTICLE INFO

Article history:

Received: Sep 16, 2023
Received in revised form: Oct 21, 2023
Accepted: Oct 28, 2023

Keywords:

Credit Volume
Policy Rate
Inflation
ARDL Bounds Test

ÖZ

Çalışmada Türkiye ekonomisinde para politikası uygulamaları kapsamında 2003Q1-2023Q6 dönemi için, politika faizi, enflasyon ve banka mevduatlarının kredi hacmi ile arasındaki uzun dönemli ilişki ARDL Sınır Testi yöntemi ile analiz edilmiştir. İlgili değişkenler arasındaki eşbütünleşik ilişkinin varlığının tespiti amacıyla uygulanan ARDL sınır testi analiz sonuçlarına göre; politika faiz oranı ve enflasyon oranı değişkenlerinin katsayılarının negatif değer almaları ilgili değişkenlerin banka kredileri değişkenini ters yönde etkilediğini, banka mevduatlarının katsayısının pozitif değer alması ise ilgili değişkenin mevduat bankaları kredilerini pozitif yönde etkilediğini ve değişkenler arasında uzun dönemli eşbütünleşik bir ilişki olduğu tespit edilmiştir. Diğer bir ifade ile banka mevduatlarında ki %1'lik bir artış kredi hacmini %0,94 arttırırken, enflasyon oranı ve politika faiz oranında ki %1'lik bir artış kredi hacmini sırasıyla, %0,75 ve %0,32 azaltmaktadır. Ayrıca VAR Granger nedensellik analizi ile bankacılık mevduatları ile krediler arasında karşılıklı nedensellik ilişkisi tespit edilmiş, mevduat ve kredilerinde enflasyon değişkenini tek yönlü etkilediği sonucuna ulaşılmıştır.

ABSTRACT

In the study, the long-term relationship between policy interest, inflation and bank deposits and credit volume was analyzed using the ARDL Bounds Test method for the period 2003Q1-2023Q6 within the scope of monetary policy practices in the Turkish economy. According to the analysis results of the ARDL bounds test applied to determine the existence of a cointegrated relationship between the relevant variables; It has been determined that if the coefficients of the policy interest rate and inflation rate variables take negative values, the relevant variables adversely affect the bank loans variable, and if the coefficients of bank deposits take positive values, the relevant variable affects deposit banks loans positively, and there is a long-term cointegrated relationship between the variables. In other words, a 1% increase in bank deposits increases the loan volume by 0.94%, while a 1% increase in the inflation rate and policy interest rate reduces the loan volume by 0.75% and 0.32%, respectively. In addition, with VAR Granger causality analysis, a mutual causality relationship between banking deposits and loans was determined, and it was concluded that deposits and loans affect the inflation variable unidirectionally.

1. Introduction

Lately, there has been radical changes in the world economy in terms of both financial and real production structures. In this perspective, the diversifying production structure and the increase in the number of financial instruments require new political tools to increase the effectiveness of monetary and fiscal policies in the economies of the countries. The

tend of change and macroeconomic problems are increasing in countries that cannot keep up with this wind. In this context, market interventions by policymakers with new political tools has been unavoidable. Therefore, traditional monetary and fiscal policies and instruments begin to leave their place to new generation political tools over time.

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Atf/Cite as: Varsak, S. (2023). The Effect of Policy Rate and Inflation Rate on the Credit Volume: 2003-2023 The Case Of Türkiye. *Journal of Emerging Economies and Policy*, 8(2), 424-432.

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Within the search for solutions to the economic and financial changes in the world economy and the macroeconomic problems that have risen in this context, the increased volume of financial markets and the new generation monetary policy applications in this direction have gained importance. The decisions taken about monetary policy and the impact speed of the relevant policy are increasing their importance in the search for solutions to macroeconomic problems. The rapid development and volume growth of financial markets, especially after 1980, led to decisions that the effectiveness of monetary policy could be increased through credit volume.

Monetary policies usually affect production and thus macroeconomics through monetary transmission channels. According to Mishkin (1995), the monetary transmission mechanism is an important determinant in determining the correct monetary policy, eliminating imbalances between production and inflation, and determining the exchange rate regime. Thus, the direction and speed at which monetary policy will affect the real economy and the general level of prices has increased its importance in the recent economic literature. Monetary policy is thought to affect macroeconomic variables through three different channels. Successively these channel are; The credit channel is the interest rates channel and the asset price channel. The effectiveness of the relevant channels may vary from country to country or even over time in the same country. However, monetary policy management is not obliged to use only one of these tools. Several digital transmission channels can be activated at the same time. At this point, it should be investigated which channel is more effective and the speed of the effect of monetary policy on macroeconomic imbalances is important for the improvement of social welfare in a shorter time.

According to Bernanke & Gertler (1995), contractionary monetary policy practices will cause interest rates and short-term backup structures to be maintained for a long time, and this will increase the demand for medium-term credit. This will be an expanding factor of the credit channel. According to Nilsen (2002), it was concluded that the change in macroeconomic variables with the implemented monetary policy led to the narrowing of the credit channel and the contraction in the credit volume, and that the investment expenditures of companies dependent on banks for credit demand decreased due to cost changes.

In this context, the study tested whether there is a long-term relationship between the policy interest rate, inflation rate and bank deposits and credit volume in the Turkish economy for the period 2003Q1-2023Q6. In this respect, the study examined the effects of changes in macroeconomic variables on the loan volume and analyzed the factors that negatively/positively affect the loan volume. Based on this, the hypothesis that the 2003-2023 period in the Turkish economy, the CBRT policy interest rate and inflation negatively affected the credit volume of the Turkish banking system was tested within the scope of the dynamic ARDL

estimation method and VAR analysis. This study differs from other studies due to the width of the period included in the analysis and the VAR analysis performed in addition to the ARDL boundary test application.

2. Literature Review

Zeynalova (2023) examined the relationship between credit volume and money supply in the Azerbaijani economy. Quarterly data were analyzed with FMOLS, DOLS and Granger causality tests for the period 2006:01-2021:09. It has been stated that the causality relationship between money supply and domestic credit volume is unidirectional and that the increase in domestic credit volume causes an increase in money supply (Zeynalova, 2023: 1).

Caetité et al (2022) analyzed the effects of monetary policy changes on the deposits of selected banks operating in Brazil. The study examined the hypothesis that changes in monetary policy affect bank deposits in an environment with high interest rates. In the study where regression analysis was performed, the data for the selected benches were examined on the basis of quarterly data covering the period 1999-2018. The results expressed in the study; that the relationship between term deposits and loans is in the same direction, that the increase in the target interest rate developed in the study led to a decrease in the total deposit balance, that increases in policy rates reduced bank deposits and bank loans, that the effects of monetary policy changes differed from the concentration observed on deposits by banks privately and locally and that the intensity of the effects increased in regions where concentration was high (Caetité, et al., 2022: 14-15).

In their study, Fabiani et al (2022) investigated how capital controls and local macroeconomic policy practices have rein in the increase in credit supply of selected banks operating in Colombia by strengthening the local bank credit channel. Regression analysis was conducted in this study to analyze quarterly data from the period of 2005-2008. Regression analysis was perform in the study, quarterly data were analyzed in the period of 2005-2008. The results expressed in the study; are that capital controls strengthen the credit channel of banks that raising statutory provisions for domestic deposits reduces the supply of credit for riskier firms instead of strengthening the credit channel of banks, and that capital controls increase the efficiency of the credit channel of monetary policy by stopping the commercial lending strategies of local banks (Fabiani et al., 2022: 23).

In their study, Dang and Huynh (2022) analyzed the effect of monetary policy changes in the country on banks' liquidity creations through a total of 391 observations from 31 banks operating in Vietnam. In the study, selected data for the period of 2007-2019 were examined annually by GMM method. The results expressed in the study; With the expansionary monetary policy pursued by the Central Bank by lowering policy interest rates, banks can expand their liquidity creations, all banks are not equally affected by monetary policy practices, monetary policy is more effective

in a market where competition is high liquidity creations of banks with high funding through deposits are more affected by monetary policy changes, the market power and that funding structures play an important role and that banks' dependence on non-deposit funding weaken the transmission of monetary policy by creating liquidity by these banks (Dang and Huynh, 2022: 13-14).

In their study, Nguyen and Dinh (2022) investigated the asymmetric effect of the capital of commercial banks operating in Vietnam on monetary policy and the connection of bank credit supply. In the study, selected data on commercial banks operating in Vietnam was analyzed by GMM method to cover the period of 2007-2020. The results expressed in the study; expansionary monetary policy practices will be effective if there is a large capital in the banking sector, banks with an average level of capital are neutral to monetary policy, banks with an average level of capital are not statistically significant in credit growth, and banks with relatively weak capital cannot benefit much from restrictive monetary policy practices compared to banks with strong capital (Nguyen and Dinh, 2022: 28-29).

Schaffer and Segev (2022) aimed to replicate empirical results related to the deposit channel in a narrow framework in their study. In the study, selected data on nine banks qualified as credit card experts were analyzed to cover the period 1997-2013. The data selected in the study were applied to the DSS data set. The results expressed in the study; that increase in the federal fund rate lead to a significant outflow of deposit for bank branches in relatively dense markets, that this outflow of deposits causes a contraction in lending, and that deposit channels can explain the transfer of monetary policy through bank balance sheets (Schaffer and Segev, 2022: 456-457).

In their study, Boukhatem and Djelassi (2022) investigated the differences in the monetary transmission mechanisms of traditional and Islamic banks through the data of selected banks operating in Saudi Arabia. In the study, quarterly data for the period 2008-2020 were analyzed by panel VAR approach. The results expressed in the study; Islamic bank deposits react negatively to restrictive monetary policy, non-Islamic banks react positively to restrictive monetary policy practices, Islamic finance react negatively to oil price shocks unlike traditional loans, but Islamic banks are positive about the reactions of deposits to oil shocks, traditional banks are negative, the sensitivity of the financing of deposits of Islamic banks to changes in the monetary base and that Islamic banks have an important role in transferring monetary policy decisions to the real economy through the balance sheet (Boukhatem and Djelassi, 2022: 16-17).

Fungáčová et al. (2022) investigated the effect of bank activity on the bank credit channel in the Chinese economy. In the study, data on selected banks operating in the Chinese economy were analyzed to cover the period of 2006-2017. Unbalanced panel analysis was performed in the study. The results expressed in the study; the spread of shadow banking activities (especially when bank efficiency have no effect on

the effectiveness of monetary policy transmission), bank efficiency can affect the credit channel in some cases, bank efficiency supports the transfer of monetary policy for banks with low deposit and loan rates, and for banks with high deposit and loan ratios, high bank efficiency acts as a shortening factor in monetary policy transfer, 2012-2016 period and the effect of bank activity on the credit channel increased (Lerola et al., 2022: 20-21).

Doğanalp (2022) examined the functioning of the credit channel and the interest channel in the Turkish economy. Real GDP, money supply, domestic loans, price level, lending interest rate and exchange rate data were analyzed quarterly with the VAR method for the period 2004:Q1-2021Q3. The results show that there is a two-way causality between all variables except domestic loans and M1, and the Granger cause of real GDP, credit volume and price stability is the interest rate (Doğanalp, 2022:2).

In their study, Toro and Emmanuel (2020) investigated the impact of monetary policy practices on the performance of commercial banks operating in Nigeria. Selected data on the deposit banks identified in the study were analyzed to cover the period of 2006-2018. In the study, an ex-facto research design was adopted. The results expressed in the study; that the purpose of monetary policy is the control and mobilization of funds and that monetary policy is aimed at making a positive and constructive role for the economy through activities to control elements such as unemployment and inflation on commercial banks in the country (Emmanuel et al., 2020: 495-496).

Jorge and Sá (2019) investigated the generality of the deposit channel in their study. In the study, they analyzed whether the deposit channel of selected banks operating in the USA especially in the period of 2009-2017 was followed by a low interest rate policy as a monetary policy. The results expressed in the study; that the deposit channel is generally not general as it is generally silent in a low-interest rate environment and that deposits can be expected to be directed to banks as deposits will become relatively more attractive in a low-interest policy environment (Jorge and Sá, 2019: 4).

In their study, Said and Bashir (2018) aimed to analyze the effects of monetary policy practices on the credit channel of selected banks operating in Malaysia. In the study, selected data for the period of 2008-2015 were examined by GMM method. The results expressed in the study; that the relationship between banks' term deposit rates and policy rate is statistically significant, that term deposits affect the average interest rate, that risk-weighted securities adversely affect the average interest rate of banks' term deposits, and that the characteristics of banks affect the average interest rate on loans (Said and Bashir, 2018: 450-451).

Adeniyi et al. (2018) investigated the relationship between credit creation by deposit banks operating in Nigeria and the monetary policy interest rate. In the study, annually selected data for the period 1981-2016 were analyzed with the Toda

and Yamamoto non-causal Granger model. Results expressed in study; that there is no long-term relationship between the variables examined in the study, that structural changes in monetary policy positively affect the advances and loans of deposit banks in the country, that the money supply, liquidity ratio and cash reserve ratio in a broad sense do not cause loans and advances by deposit banks in the country during the period in question, and that structural changes in monetary policy have a significant impact on the advances and loans of deposit banks (Adeniyi et al., 2018: 733)

Kolçak, Akyol and Ağırkaya (2018) investigated the relationship between consumer loans and macroeconomic variables in the Turkish economy. Consumer loans, inflation, BIST100 index, consumer confidence index and industrial production index data were analyzed with the ARDL method for the period 2013:01-2017:02. The findings indicate that there is a negative relationship between consumer loans and inflation in the long term, and a positive relationship between stock prices, economic growth and confidence index.

In a separate study, Drechsler et al (2017) examined how the Federal Reserve's monetary policy changes impacted the deposits of specific banks operating in the United State. The study aimed to investigate whether there was an effect on bank deposits resulting from these monetary policy changes. The study conducted regression analysis to examine- the data on selected banks operating in the USA from 1994 to 2014. The results showed that when the Federal Reserve increases the fund rate branches with higher customer density experience greater deposit outflows compared to those with lower customer density. Moreover, the study found that the deposit channel can fully explain transmission of monetary policy through banks' balance sheets (Drechsler et al., 2017: 44).

Ibarra (2016) investigated the effect of monetary policy implemented in Mexico on credit channel and output. In the study, vector autoregressive (VAR) model was applied on selected data for the period of 2004-2013. The results expressed in the study; that restrictive monetary policy practices reduce the amount of credit, that restrictive monetary policy practices increase the difference between lending and deposit interest rates, that the importance of the credit channel in the economy for constrictive shocks is greater than for expansionary shocks and that the reaction of firms' loans to a monetary shock is greater than the reaction of households' loans (Ibarra, 2016: 3478).

Karahan and Uslu (2016) examined the relationship between loans and current account deficit. The current account data of the Turkish economy and the loans provided to the private sector by deposit banks were analyzed with the ARDL method and Kalman Filter for the period 2005:Q1-2015:Q3. In the study, it was stated that the current account deficit and credit volume are related, the credit volume positively affects the current account deficit variable in the long and short term, and according to the Stay Filter, the effect of

credit volume on the current account deficit decreased during the global financial crisis (Uslu 2016:1).

Martinez et al (2015) investigated whether there was a delay in the adjustment of deposit and loan interest rates due to changes in the monetary policy practice of selected banks operating in Mexico. In the study, selected data were analyzed to cover the period of 2001-2013. The results expressed in the study; that there is a statistically significant but positive relationship between the reference interest rate and the borrowing and lending rates, that the average lending rate has about four and a half months to adjust to the equilibrium after the movements in the reference interest rate, that the adjustment rate is different if the interest rate for the deposit rate is below or above the equilibrium level, and that the deposit interest in question comes to equilibrium above the average level of about 1, It is 32 months and below the equilibrium level it is about 3.22 months (Martinez et al 2015: 1165-1166).

In his study, Skikiewicz (2013) examined the effect of changes in interest rates in Poland on the deposits of households in the country in domestic currency. In the study, monthly data for the period of 2004-2013 were analyzed with time series. The results expressed in the study; that the interest rate is an important determinant for the deposits of households in the country in zlotys, that changes in deposit interest rates affect deposits in zloty in a similar way, and that the interest rates of new deposits perform better than interest rate on unpaid deposits in estimating the milestones of households' deposits in zloty (Skikiewicz, 2013: 105).

In their study, Aydın and Deniz (2012) investigated the effects of monetary and fiscal policies on the growth of private sector loans in Türkiye. Regression analysis was performed in the study. In the study, the quarterly data of all banks operating in Türkiye in the said period for the period of 2002-2008 were analyzed. The results expressed in the study; that restrictive monetary policy practices significantly reduce lending practices in banks that are limited in terms of liquidity, that monetary and fiscal policy practices is especially impressive in terms of loans in domestic currency, that restrictive policy practices lead banks to give more short-term loans, and that the effects of policy practices on loans in foreign currency are limited (Aydın and Deniz, 2012: 102-103). In another study, Erdoğan and Yıldırım (2009) investigated the macroeconomic functioning of the interest rate channel in the Turkish economy. Turkish economy data between 1995:01 and 2007:09 were analyzed with the VAR method. The study concluded that the interest rate channel is effective in the monetary transmission mechanism.

3. Data Set and Methodology

In the study examining the effects of policy interest rate, deposits and inflation rate on the credit volume in the Turkish economy, the loans provided by the deposit banks operating in Turkey (LogKredi) and the total deposits of the deposit banks (LogMevduat), the inflation rate of the

Turkish economy (LogTüfe) and the Central Bank of the Republic of Turkey (The direction and degree of the relationship between the CBRT and the policy rate (LogPolt) were examined with monthly data between the periods 2003-2023. Relevant data was obtained from the database provided to users by the CBRT electronic data distribution system. In addition, LogCredtit and LogDeposit values, among the variables included in the analysis, were defined in dollar exchange rate for the relevant observation period and their logarithmic values were used in the study. ARDL Bounds Test and VAR Granger Causality analysis were applied to the relevant data with the Eviews 12 package program. In the application of time series methods, it is important to determine the stationarity levels of the variables to be analyzed by examining the unit root test results. In this study, Phillips-Perron unit root test was used to determine the stability levels of the data. Following the unit root test, the direction and degree of the relationship between the variables were investigated by the ARDL boundary test and VAR Granger Causality method.

The ARDL method, which is one of the time series methods, is a method developed in the late 1990s to investigate the long-term relationships between variables that are stationary at the level or in the first differences, and therefore not stationary in the second differences. The ARDL method can be used to investigate the short- and long-term relationships between the analyzed variables. In addition to the fact that the test results obtained by the method are objective and effective, the fact that the method can provide effective results in small samples are some of the advantages of this method (Pesaran, et al 2001).

In this context, the model estimated in the study:

$$\Delta \text{LogCREDIT}_t = \alpha_0 + \sum_{i=1}^p \delta_i \Delta \text{LogCREDIT}_{t-i} + \sum_{i=0}^q \phi_i \Delta \text{LogDEPOSIT}_{t-i} + \sum_{i=1}^r \theta_i \Delta \text{LogCPI}_{t-i} + \sum_{i=1}^z \vartheta_i \Delta \text{LogPOLT}_{t-i} + \gamma_0 \text{LogCREDIT}_{t-1} + \gamma_1 \text{LogDEPOSIT}_{t-1} + \gamma_2 \text{LogCPI}_{t-1} + \gamma_3 \text{LogPOLT}_{t-1} + \varepsilon_t \quad (1)$$

In Equation 1: the symbols $\gamma_0, \gamma_1, \gamma_2$ and γ_3 represent the long-term coefficients, while the same symbols $\lambda_i, \phi_i, \eta_i$ and ϑ indicate the short-term coefficients. The symbol Δ represents the first-degree difference operator, α_0 corresponds to the intercept term of the regression model, and finally, ε_t represents the white noise error term of the model.

In the null hypotheses of the ARDL boundary test of cointegration, it is posited that there is no cointegration ($H_0: \gamma_0 = \gamma_1 = \gamma_2 = \gamma_3 = 0$), whereas in the alternative hypotheses, it is asserted that cointegration is present ($H_1: \gamma_0 \neq \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq 0$). If the F-statistic value exceeds the upper bound at a specific significance level, we must accept the alternative hypothesis. Conversely, if the F-statistic value is smaller than the lower bound at that significance level, it means we cannot reject the null hypothesis. However, if the F-statistic value falls between the lower and upper bounds, we are unable to reach a conclusion. We derived the short-term and long-term

coefficients by estimating the error correction model provided below:

$$\text{LogCREDIT}_t = \beta_0 + \sum_{i=1}^p \lambda_i \Delta \text{LogCREDIT}_{t-i} + \sum_{i=0}^q \phi_i \Delta \text{LogDEPOSIT}_{t-i} + \sum_{i=0}^r \eta_i \Delta \text{LogCPI}_{t-i} + \sum_{i=0}^z \omega_i \Delta \text{LogPOLT}_{t-i} + \pi \text{ECM}_{t-1} + \varepsilon_t \quad (2)$$

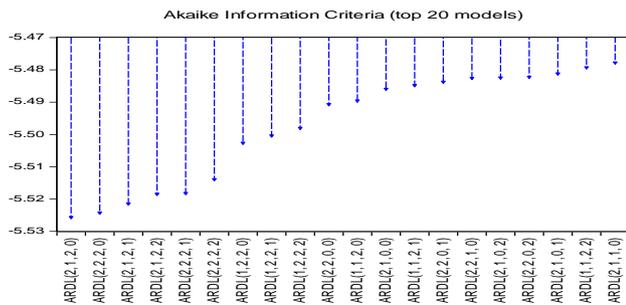
Equation 2: the symbols : $\lambda_i, \phi_i, \eta_i$ and ω_i are used to represent the dynamic coefficients, while ECM stands for the error correction term within the model. The symbol π , on the other hand, signifies the speed of adjustment term, which is required to have a statistically significant negative value."

Table 1. Phillips-Perron Unit Root Test Results

Variables	Model	PP Test (P-value)	PP Test (P-value) 1.Diff
LogCredtit	Intercept	-1.977 (-0.297)	-11.177 (0.000)
	Trend & Intercept	-0.648 (-0.975)	-11.245 (0.000)
	None	0.628 (-0.851)	-11.155 (0.000)
	Intercept	-1.845 (-0.358)	-14.888 (0.000)
LogDeposit	Trend & Intercept	-2.010 (-0.592)	-14.925 (0.000)
	None	1.381 (-0.958)	-14.658 (0.000)
	Intercept	-4.166 (-0.001)	-12.734 (0.000)
LogPolt	Trend & Intercept	-3.670 (-0.026)	-12.890 (0.000)
	None	-2.935 (-0.003)	-12.702 (0.000)
	Intercept	9.433 (-1.000)	-5.087 (0.000)
LogCpi	Trend & Intercept	7.337 (-1.000)	-7.031 (0.000)
	None	7.701 (-1.000)	-3.999 (0.000)

As can be seen from Table 1, of the variables used in the analysis, only the policy interest rate is stable at the variable level. All variables other than the policy interest rate were found to be stable in their first difference. According to the unit root test results, the analysis was performed by ARDL boundary test method due to the fact that the data were not stable in the second difference. The Akaike information criterion was used to determine the optimal delay required in the application of the ARDL boundary test method. The optimal latency result determined according to the Akaike information criterion are given in Table 2.

Table 2. Optimal Lag Length According to Akaike Information Criterion



According to the values in Table 2, the optimal delay determined according to the Akaike information criterion was selected as ARDL (2,1,2,0). In this context, the applications performed by ARDL analysis were carried out according to the selected optimal delay. Table 3 shows the results of the ARDL boundary test. According to the results of the ARDL boundary test, the F-Statistic was determined as 15.29151. The F-Statistic value exceeded the upper bound critical values of I (0) and I(1) by 10%, 5%, and 1% significance levels. In this case, the existence of a long-term relationship between the LogCredit variable, which is the dependent variable, and the LogDeposit, LogCPI and LogPolt variables, which are the independent variables, was determined. Therefore, it was determined that the analyzed variables were cointegrated.

Table 3: ARDL Boundary Test Results

F-Statistic : 15.29151

Significance	Critic Values	
	I (0) Limit	I (1) Limit
10%	2.474	3.312
5%	2.92	3.838
1%	3.908	5.004

Table 5. Short-term and Diagnostic Test Results

Variable	Coefficient	t-statistic	Prob Value
C	0.172	8.965	0.000
DLOG(CREDIT(-1))	0.100	3.539	0.001
DLOG (DEPOSIT)	0.855	28.090	0.000
DLOG(CPI)	-0.178	-1.996	0.047
DLOG(CPI(-1))	0.346	3.920	0.000
CointEq(-1)*	-0.034	-8.818	0.000
EC = LOG(CREDIT) - (0.9417*LOG(DEPOSIT) - 0.7588 *LOG(CPI) - 0.3262*LOG(POLT) + 0.0064*@TREND)			
Diagnostic Tests			Test Value (Prob)
Breusch-Godfrey Serial Correlation LM Test			0.811 (-0.446)
Heteroskedasticity Test Arch			2.556 (-0.111)
Ramsey Reset Test			3.443 (-0.034)

In addition, VAR Granger Causality analysis was performed among the variables included in the analysis in the study,

With the determination that the analyzed variables are cointegrated, long-term coefficients and short-term coefficients and diagnostic test results are included in Table 4 and Table 5, respectively. When the values in Table 4 are examined, it is observed that the probe values of LogDeposit, LogCPI, LogPolt data are 0.0036, 0.0015 and 0.0378, respectively. The results of the probe values show that the relationship between the variables is statistically significant. In addition, the fact that the coefficients of LogPolt and LogLogCPI variables receive negative values shows that the related variables take the LogCredit variable in the opposite direction, and the coefficient of the LogDeposit variable takes a positive value and that the relevant variable affects the LogCredit variable in the same direction.

Table 4. Long Term Coefficients ARDL (2, 1, 2, 0) Model

Variable	Coefficient	t-statistic	P. Values
LOG(DEPOSIT)	0.942	2.943	0.004
LOG(CPI)	-0.759	-3.211	0.002
LOG(POLT)	-0.326	-2.089	0.038
@TREND	0.006	2.613	0.010

When the values in Table 5 were examined, it was found that the cointegration coefficient for the ARDL (2, 1, 2, 0) model was negative as -0.033651. In addition, the probe value of the relevant coefficient was realized as "0". According to the diagnostic test results in the table, Ramsey Reset Test probe value was 0.0336, Heteroskedasticity Arch Test probe value was 0.1112 and Breusch-Godfrey Serial Correlation LM Test probe value was 0.4456. When the probe values of the diagnostic test results are taken into consideration, it is seen that the H1 hypothesis is accepted in statistical significance tests such as misdetermination of the model, heroskedasticity and autocorrelation.

and in this context, the optimal delay length was determined according to the Schwarz criterion within the scope of VAR

analysis. According to the results of the analysis, the optimal delay length was determined at 2 delay lengths, for which the Schwarz criterion gave the minimum value of -16.91926. After determining the optimal delay value as 2, the mutual causality relationship between the variables is reported in Table 6 respectively.

Table 6. Granger Causality Test Results

Dependent Variable (Logcredit)		
Independent Variables	Chi-square Value	Prob Value
LOG(DEPOSIT)	12.86067	0.0049*
LOG(CPI)	4.494375	0.2128
LOG(POLT)	4.979310	0.1733
Dependent Variable (Logdeposit)		
Independent Variables	Chi-square Value	Prob Value
LOG(CREDIT)	18.27690	0.0004*
LOG(CPI)	3.753726	0.2893
LOG(POLT)	1.037785	0.7921
Dependent Variable (Logcpi)		
Independent Variables	Chi-square Value	Prob Value
LOG(CREDIT)	15.34628	0.0015*
LOG(DEPOSIT)	9.116975	0.0278*
LOG(POLT)	1.217340	0.7488
Dependent Variable (Logpolt)		
Independent Variables	Chi-square Value	Prob Value
LOG(CREDIT)	3.810655	0.2826
LOG(DEPOSIT)	5.681396	0.1282
LOG(CPI)	3.915379	0.2707

In Granger causality tests, the H0 hypothesis is not the Granger cause of the independent variable-dependent variable. The H1 hypothesis is that the independent variable is the Granger cause of the dependent variable. From this point of view, in the model where the dependent variable is LogCredit among the related variables in Table 6, it is concluded that LogDeposit variable is significant at 1% significance level among the independent variables. In this context, the H0 hypothesis is rejected. As a result of the analysis, it was seen that in the model where the LogCredit variable is the dependent variable, the LogDeposit variable is the Granger cause of the LogCredit variable, but in this model, the LogCpi and LogPolt variables are not the Granger cause of the LogCredit variable.

Table 6. In the model where the LogDeposit variable is the dependent variable, the LogCredit variable is the Granger cause of the LogDeposit variable, while in the model where the dependent variable is LogCpi, the LogCredit and LogDeposit variables are the Granger cause of the LogCpi variable at significance levels of 1% and 5%, respectively. In addition, in the last model where the LogPolt variable was the dependent variable, no significant relationship was found between it and the other independent variables.

4. Conclusion

In the Turkish economy, the banking system, which grows together with the international financial markets, and the

impact of the elements of the system on macroeconomic variables are increasing in importance day by day. With the increasing efficiency of the banking and financial system and its growth in volume, banks have become an important element of monetary policies for economic management. In the Turkish banking sector, especially after 1980, the sphere of influence of the credit channel within the monetary transmission mechanisms has expanded rapidly, and this has increased the macroeconomic importance of the loan volume provided. In this context, the study analyzed the direction and degree of the impact of macroeconomic variables on credit volume in the Turkish economy. In the 2003Q1-2023Q6 period, the Phillips-Perron unit root test was used to determine the effects of policy interest (LogPolt), inflation (LogCpi) and bank deposits (LogDeposit) on the loans provided by banks (LogCredit) in the Turkish economy, and the analysis showed that the existing variables were stationary at different levels of stationarity. After determining that they were correct, the ARDL Bounds Test method was applied to the relevant variables.

As a result of analysis, negative value of the coefficients of the policy interest rate and inflation variables showed that these variables adversely affected the variable of bank loans, while the positive value of the coefficient of bank deposits showed that bank deposits positively affected the loans of deposit banks and that there was a long-term cointegrated relationship between the variables. In the other part of the analysis, VAR Granger causality analysis applied to selected variables found a mutual causality relationship between banking deposits and loans, and it was concluded that the increase in loans increased deposits and the increase in deposits increased the total amount of loans disbursed. In addition, within the scope of this analysis, it was concluded that the increases in the variables of total deposits and total loans in the Turkish banking system increased inflation. However, it was concluded that total loans and deposits, as well as inflation, were not the granger cause of the policy rate and therefore did not have areas of influence in the determination of the policy rate in the Turkish economy in the relevant period. In other words, a 1% increase in bank deposits increases the loan volume by 0.94%, while a 1% increase in the inflation rate and policy interest rate reduces the loan volume by 0.75% and 0.32%, respectively. In addition, with VAR Granger causality analysis, a mutual causality relationship between banking deposits and loans was determined, and it was concluded that deposits and loans affect the inflation variable unidirectionally. The findings also coincide with the results of the analysis of the studies by Caetit  et al. (2022), Fabiani et al. (2022) Schaffer and Segev (2022), Fung cova et al (2022), Adeniyi et al. (2018) and Ibarra (2016).

The results of the analysis summarize the economic activity in the Turkish banking sector. Within the scope of relevant monetary policy implementation the efforts of decision-makers to increase the effectiveness of the applied monetary policy and its impact on the economy and in this direction,

banking deposit and credit controls show that Turkish deposit banks are an important part of the financial system and that the macroeconomic sphere of influence is gradually expanding.

Under assumption that one of the main objectives of monetary policy is to ensure price stability, the rate of increase in the general level of prices is try to be controlled by monetary policy elements. Our study shows the increasing effect of the monetary transmission mechanism credit channel on inflation in the recent period and the long-term co-integrated relationship of the credit channel of the monetary transmission mechanism in recent period of the Turkish economy, so emphasizing once again the importance of economic management to use the monetary transmission mechanism credit channel suppressing inflation.

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