

Does Exchange Rate Volatility Affect the Bank Lending Channel?

Döviz Kuru Oynaklığı Banka Kredi Kanalını Etkiliyor mu?

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ABSTRACT

The bank lending channel is one of the most debated channels of the transmission mechanism, especially in Turkey. According to many studies, exchange rate volatility is a good indicator of macroeconomic, financial and political instability. This study tests whether the bank lending channel is affected by exchange rate volatility in Turkey. Thus, we aim to obtain an important finding on why the bank lending channel works weakly in Turkey. To test this hypothesis, the Vector Auto Regression (VAR) model is used for the period January 2011- September 2023. Evidence from the impulse response function suggests that exchange rate volatility has a negative impact on loans, while variance decomposition results show that exchange rate volatility has a high power to explain the change in loans. Credit may not always respond to expansionary (contractionary) monetary policy in an increasing (decreasing) direction. In periods of high exchange rate volatility (political, financial, macroeconomic instability), banks may not increase lending even in a low interest rate environment. This is because when exchange rate volatility is high, banks avoid taking risks under uncertainty. Therefore, for the bank lending channel to work more effectively, macroeconomic, financial and political stability should be ensured in addition to monetary policy.

Keywords: exchange rate volatility, bank lending channel, monetary transmission channel, financial stability, var model

Jel Code: E50, E51, E59

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Submitted / Başvuru : 15.08.2023

**Revision Requested /
Revizyon Talebi :** 26.11.2023

**Last Revision Received /
Son Revizyon :** 16.01.2024

Accepted / Kabul : 19.01.2024



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ÖZ

Banka kredileri kanalı aktarım mekanizmasının, özellikle Türkiye’de, en çok tartışılan kanallardan birisidir. Döviz kuru oynaklığı ise pek çok çalışmaya göre makro ekonomik, finansal ve politik istikrarsızlığı yansıtması açısından iyi bir göstergedir. Bu çalışmada Türkiye’de banka kredileri kanalının döviz kuru oynaklığından etkilenip etkilenmediğini test edilmektedir. Böylelikle banka kredi kanalının Türkiye’de neden zayıf çalıştığına dair önemli bir bulgu elde etmek istenmektedir. Bu hipotezi test etmek için Vector Auto Regression (VAR) modeli 2011 Ocak – 2023 Eylül dönemi için kullanılmıştır. Etki tepki fonksiyonundan elde edilen bulgular döviz kuru oynaklığının krediler üzerinde negatif bir etkiye sahip olduğunu gösterirken, varyans ayrıştırma sonuçları döviz kuru oynaklığının kredilerdeki değişimi açıklamak için yüksek bir güce sahip olduğunu göstermektedir. Genişlemeci (daraltıcı) para politikasına krediler her zaman artan (azalan) yönde tepki vermeyebilmektedir. Döviz kuru oynaklığının yüksek olduğu (politik, finansal, makroekonomik istikrarsızlığın olduğu) dönemlerde düşük faiz ortamında bile bankalar kredileri artırmayabilmektedir. Çünkü döviz kuru oynaklığının yüksek olduğu dönemlerde bankalar belirsizlik altında risk almaktan kaçınmaktadırlar. Dolayısıyla banka kredileri kanalının daha etkili çalışması için para politikasının yanında makroekonomik finansal ve politik istikrarın da sağlanması gerekmektedir.

Anahtar Kelimeler: döviz kuru oynaklığı, banka kredileri kanalı, parasal aktarım mekanizması, finansal istikrar, var modeli

Jel Sınıflaması: E50, E51, E59

1. Introduction

Monetary transmission channels, especially the credit channel, have long been discussed among economists and policymakers. The discussion related to the effectiveness of bank lending channels and the strength of monetary policy on bank lending channels varies from country to country and time to time. On the other hand, the importance attributed to the stability of financial markets, asset prices, and financial intermediation has increased since the 2007-2008 global financial crisis. This situation has changed the dimension of debate related to the bank lending channel as well.

The early studies on bank loans implied that, contrary to the classical view of money, the transmission mechanism also operates with regard to the loans banks give. These studies frequently analyzed the relationship between bank loans and GDP (Bernanke, 1986; Bernanke & Blinder, 1988, 1990; Ramey, 1993; Bernanke & Gertler, 1995). Then studies regarding the bank lending channel referred to how much credit is affected by monetary policy. For example, Lown and Morgan (2002) argued credit standards to better explain fluctuations in credit than monetary policy. Similarly, Berkemans (2005) stated with regard to explaining credit that monetary policy is effective in the short run, while macroeconomic variables such as output, inflation, and commodity price are more influential in the long run. Similar studies have been conducted for developing countries. For instance, Wrobel and Pawlowska (2002) investigated the impact of monetary policy on bank lending using bank-level data for Poland’s economy. Their findings showed monetary policy to affect the bank lending channel more than individual and short-term credit, consistent with the findings of Kashyap and Stein (1994). Moreover, Ramlogan (2007) claimed the credit channel to be the most effective channel in Trinidad and Tobago due to the real sector depending on credit there.

The views on bank lending after the 2007-2008 financial crisis have emphasized bank-specific behaviors to be decisive in banks’ lending process. Altunbas and Gambacorta (2010) investigated 3,000 banks in the European area using bank-level data. They suggested relatively more risk-free banks (those with healthier capital structure that use less leverage) create loans more easily and are less affected by market risk. Furthermore, they claimed the importance banks give to market risk perception to be increasing. Similarly, Gambacorta (2011) stated banks’ capital, risks, and liquidity positions to have an impact on credit supply and therefore argues that financial stability and monetary policy should be addressed together.

Many studies have submitted that the bank lending channel had not worked through monetary policy since the 2007-2008 financial crisis. For example, Saprissa and Tamesvary’s (2019) study covering the 1980-2008 period for the US economy argued the impact of monetary policy on bank loans to be stronger during periods of recovery. Moreover, their study claimed the bank lending channel to have not worked since 2007. Salachas et al. (2017) compared the implementation of conventional and unconventional monetary policies for six developed countries and their 480 commercial banks, using the generalized method of moments (GMM) and separating the 2001-2013 period into two sub-periods. Their result showed that prior to the crisis, conventional monetary policy (central bank rate) had been important for bank loans; after the crisis, however, unconventional monetary policy (asset purchases) had become more influential on bank loans than interest rates.

Meanwhile, Heider et al. (2019) examined a period of negative policy rates in the eurozone. They argued a negative policy rate to not affect loan supply, as banks are unwilling to pass these negative rates to their depositors. However, they also stated negative interest rates to be able to negatively affect financial stability.

Azofra et al.'s (2018) study on developing countries showed monetary policy to work through the credit channel in countries with more developed financial systems. In addition, they indicated monetary policy to have not been influential on the credit supply either before or after the crisis for countries with less developed financial systems. Choi's (2017) study regarding developing countries stated an increase in the USA's financial uncertainty to shrink the supply of developing countries' credit.

After the 2007-2008 financial crisis, the view that bank-specific characters, financial systems, and financial stability rather than monetary policy are also able to drive bank loans became more tangible. When considering this situation, the question arises as to whether the credit channel is directly affected by financial stability or uncertainty, macroeconomic stability, or other external factors. Due to the Central Bank of the Republic of Türkiye (CBRT) having created its policy framework by taking into account financial stability since 2011, Türkiye serves as a good example for answering this question.

Many central banks such as the CBRT began considering financial stability after the 2007-2008 financial crisis when designing monetary policy. The CBRT has added financial stability to its target since 2011 (Ozatay, 2011). The novel policy framework is designed by considering the structure of the Turkish economy and has two main targets. The first of these is to slow short-term capital inflows and the second is to limit credit growth. Basci and Kara (2011) indicated the main reason for choosing these targets to be that short-term capital inflow facilitates access to credit and separates domestic and foreign demand by creating an appreciation pressure on the Turkish lira. They stated the economy's dependence on short-term capital inflows for financing the current account deficit to have also increased macroeconomic and financial fragility. The CBRT has been using new monetary policy tools since 2011 in order to overcome financial instability.

Some studies have shown exchange rate volatility to be closely related to financial and macroeconomic stability. For example, Jehan and Hamid (2017) stated exchange rate volatility to negatively affect short-term and long-term capital inflows. They also claimed that a developed financial system reduces the harmful impact on capital inflows. Meanwhile, Krol (2014) argued macroeconomic uncertainty to increase exchange rate volatility. Likewise, Bush and Lopez Noria (2021) investigated the impact of uncertainty on the Mexican peso. Their findings showed both global and domestic uncertainty to have a positive impact on the Mexican peso.

In addition, many studies have shown the CBRT's new policy tools to reduce exchange rate volatility. For example, Oduncu et al. (2013) suggested the new policy tool that had been designed to ensure financial stability to decrease exchange rate volatility. Degerli and Fendoglu's (2015) study also supports these findings. Moreover, Basci (2009) claimed the reason for lower Turkish lira volatility compared to other developing countries during the crisis to have been the strong structure of the Turkish financial system.

Many of the studies mentioned above show the bank lending channel to affect output. Therefore, a central bank's ability to influence the bank lending channel increases its capacity to influence macroeconomic variables. As a result, obtaining new evidence on the functioning of the bank lending channel will help the CBRT formulate better policies.

However, the above-mentioned studies also revealed the power of monetary policy to affect the bank lending channel to weaken from time to time and under different circumstances. However, these studies do not explain why the CBRT's influence on the bank lending channel has weakened. The bank lending channel is thought to be affected by macroeconomic uncertainty, as well as political and financial instability. This is because banks will be reluctant to lend during periods of high economic and financial uncertainty.

This study aims to test the hypothesis that the bank credit channel is affected by macroeconomic uncertainty and financial and political instability. The various studies mentioned above have stated exchange rate volatility to reflect macroeconomic, financial, and political instability. Therefore, in order to test this hypothesis, the current study will use the vector autoregression (VAR) model to test the effect of exchange rate volatility on the bank lending channel. The reason for choosing the VAR model is that it will help investigate the effect of exchange rate volatility on banks' lending tendencies without using a theoretical background rather than testing the effect of the bank lending channel on macroeconomic variables such as output. Policy implications will be made in light of the obtained results. Therefore, the study aims to utilize the atheoretical structure of the VAR model.

The finding of a significant relationship between the bank lending channel and exchange rate volatility is expected to contribute to the understanding of why the bank lending channel works weakly in Türkiye and why the bank lending channel weakens under different economic conditions. In addition, such a finding is expected to provide information about the reason why the bank lending channel works through banks' idiosyncratic characteristics, as has been found in micro-scale studies. The current study is also expected to provide new findings regarding the extent to which the central bank can control the bank lending channel when making policy.

This paper is structured as follows: Section 2 provides a literature review, Section 3 provides the data set and

econometric model used in this paper, Section 4 presents the empirical results, and Section 5 includes concluding remarks.

2. Literature Review

A large literature exists on the bank lending channel in Türkiye. Because this study examines the impact of monetary policy on the bank lending channel, it includes studies that have examined the interaction between monetary policy variables such as interest rates and the bank lending channel rather than those that have examined the impact of the bank lending channel on macroeconomic variables. Studies on the impact monetary policy has on the bank lending channel in Türkiye have shown the monetary policy to have limited impact on the bank lending channel at both the macro and micro levels.

As one of the first studies to examine this relationship, Cavusoglu (2002) investigated the 1988-1999 period and analyzed the effect of monetary policy on the bank lending channel using the generalized method of moments (GMM). The study found no significant effect on loans from the reserve requirement ratio, which was taken as a monetary policy variable. Ozsucu and Akbostancı (2012) conducted a similar study, analyzing the effect of monetary policy on the bank lending channel using bank-level data. Their study compared two different periods, 1988-2001 and 2002-2009. While their findings indicated the existence of a bank lending channel in both periods, the study argued the bank lending channel to have strengthened after the 2001 crisis, with macroeconomic stability, the regulation of the financial system, and the consolidation of the banking sector having been achieved. Such a finding is also important for the current study, because macroeconomic stability and financial stability have increased with the structural reforms implemented after the 2001 crisis. Therefore, the finding that such a structural transformation has a positive impact on the bank lending channel strengthens the hypothesis this study examines. After the 2001 crisis, another study showing the bank lending channel to work through monetary policy was the study by Kılınc and Kılınc (2020), which used the VAR model for the 2003Q1-2018Q4 period. Their study analyzed the relationship loans to the non-financial sector have with interest rates, M2, exchange rate, industrial production index, and inflation. The negative response of loans to interest rates in the period under study indicated the bank lending channel to operate through monetary policy.

Meanwhile, studies analyzing the interaction of monetary policy with the bank lending channel have often argued the effect of monetary policy to be weak and the bank lending channel to be driven by bank-specific characteristics.

For example, Sengonul and Thorbacke (2005) investigated the impact monetary policy has on the bank lending channel in Türkiye for the period of 1997-2001 using panel data techniques. Their findings suggested banks with more liquidity to be less affected by tight monetary policy compared to banks with less liquidity. A similar study was conducted by Meral (2015). Covering the 2002Q4-2008Q4 period, Meral's study showed banks with stronger capital to be less sensitive to interest rate changes. Another study suggesting that bank-specific characteristics affect the bank loans channel more than monetary policy variables such as interest rates was conducted by Adanur and Nargelecekenler (2018). Their study covered the period of 1998Q1-2001Q and observed the liquidity level of banks to affect credit supply more than monetary policy does. Ozsucu (2002) investigated the effect of unconventional monetary policy instruments implemented after 2010 on the bank lending channel. The study argued the new monetary policy instruments to affect the bank lending channel, but bank-specific characteristics to be determinant with regard to credit supply.

Micro-level studies have suggested the bank lending channel to work through banks' optimization behavior. In addition, monetary policy variables have been argued to have a limited effect on the bank lending channel. Meanwhile, macro-level studies have shown the impact of monetary policy on the bank lending channel to be limited; however, these did not take bank-specific characteristics into account. For instance, Belke and Kaya (2017) examined the bank lending channel over the period between January 2003-December 2016 using the VAR model. Their findings supported the presence of a bank lending channel. However, their study also argued banks' lending tendency to shifts to riskier assets in times of moral hazard, such as the 2008 crisis, and resultantly the bank lending channel to weaken under such circumstances. Elsewhere, Ocal and Kar (2021) examined the impact of monetary policy on the bank lending channel during periods of expansion and contraction using the Markov switching vector autoregression (MS-VAR) model for the period between January 2005-December 2019. While they observed monetary policy to have been effective on the bank lending channel during the expansion period, they also observed the bank lending channel to have not worked during the contraction period. The fact that the bank lending channel does not work during the contraction is highly relevant to the subject of this study. In recessionary periods, the increase in macroeconomic uncertainty and the weakening of financial stability often become more pronounced. Therefore, the fact that the bank lending channel does not work during the recession supports the presence of the problem mentioned in the introduction of this study. Similarly, Canbazoglu and Gunes (2011) showed the bank lending channel to be weak in Türkiye. Their study comparatively analyzed the bank lending channel in Argentina and Türkiye for the period of 2003:1-2010:8. The findings from their study, which used

the VAR model to separately estimate for the two countries, showed the interest rate channel to be effective in Türkiye and the bank lending channel to be effective in Argentina. According to their study, the reason why the bank lending channel is more effective in Argentina is that Argentina had a long period of hyperinflation.

Studies analyzing the impact of monetary policy on the bank lending channel show the channel to work weakly both at the micro and macro levels. However, studies have shown the bank lending channel to work weakly through monetary policy, but they did not provide any empirical interpretation as to the reasons. This paper tests the argument as to why the bank lending channel does not work. The findings from this study are expected to fill the gap in the literature regarding the reasons for the weak bank lending channel in Türkiye. Moreover, this is the first study to examine the relationship between exchange rate volatility and the bank lending channel.

3. Methodology and Data

Macroeconomic relationships have complex and small-scale structures. In such cases, explaining these relationships with a single equation may not be the appropriate method. In addition, determining which variable is endogenous or exogenous can be troublesome at times. For these cases, Sims (1980) proposed a multi-variable multi-dimensional method in which all variables are accepted as being endogenous. Accordingly, the simple bivariate VAR model can be represented as follows (Enders, 2015, pp. 285–309):

$$a_t = \delta_{10} - \delta_{12}x_t + \gamma_{11}a_{t-1} + \gamma_{12}x_{t-1} + \varepsilon_{a,t} \quad (1)$$

$$x_t = \delta_{20} - \delta_{21}a_t + \gamma_{21}a_{t-1} + \gamma_{22}x_{t-1} + \varepsilon_{x,t} \quad (2)$$

where $\varepsilon_{a,t}$ and $\varepsilon_{x,t}$ represent error terms that have a constant variance and normal distribution. δ_{10} and δ_{20} represent constants, and δ_{ii} and γ_{ii} represent the unknown coefficients. The system shown above is retrospective, because both a_t and x_t are affected by their own and the other's past values. On the other hand, the ordinary least-squares (OLS) method is not used to estimate the system, because both a_t and x_t also affect their own present values. In such a case, because the error terms and explanatory variables are related, OLS estimates would suffer from simultaneous equation bias. The above system can be shown as the following matrix:

$$\begin{bmatrix} 1 & \delta_{12} \\ \delta_{21} & 1 \end{bmatrix} \begin{bmatrix} a_t \\ x_t \end{bmatrix} = \begin{bmatrix} \delta_{10} \\ \delta_{20} \end{bmatrix} + \begin{bmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \end{bmatrix} \begin{bmatrix} a_{t-1} \\ x_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{a,t} \\ \varepsilon_{x,t} \end{bmatrix} \quad (3)$$

Or

$$Bf_t = \Gamma_0 + \Gamma_1 f_{t-1} + \varepsilon_t \quad (4)$$

$$\text{where } B = \begin{bmatrix} 1 & \delta_{12} \\ \delta_{21} & 1 \end{bmatrix}, f_t = \begin{bmatrix} a_t \\ x_t \end{bmatrix}, \Gamma_0 = \begin{bmatrix} \delta_{10} \\ \delta_{20} \end{bmatrix}, \Gamma_1 = \begin{bmatrix} \gamma_{11} & \gamma_{12} \\ \gamma_{21} & \gamma_{22} \end{bmatrix}, \varepsilon_t = \begin{bmatrix} \varepsilon_{a,t} \\ \varepsilon_{x,t} \end{bmatrix}. \text{ The classical VAR} \quad (5)$$

form can be achieved by multiplying Equation 4 by B^{-1} :

$$f_t = A_0 + A_1 f_{t-1} + \varepsilon_t \quad (6)$$

$$\text{where } A_0 = B^{-1}\Gamma_0, A_1 = B^{-1}\Gamma_1 \text{ and } \varepsilon_t = B^{-1}\varepsilon_t$$

Because VAR models do not include contemporaneous effects, the coefficients frequently are not commented on. However, VAR models have some features such as impulse response function and variance decomposition, which allow the dynamic structure of external shocks to be shown and the relationship among the residuals to be examined.

VAR models are one of the widely used methods in studies related to transmission channels. Because VAR models include impulse response function and variance decomposition, this study can also benefit from it. Therefore, the VAR model of the current study can be expressed as shown in the form of Equation 5, where f_t is the vector of the endogenous variables in the study. The variables used in the model are shown in Table 1.

All variables in the model are taken from the CBRT's Electronic Data Delivery System. The study covers the period from January 2011, when the CBRT started to implement its financial stability target, to September 2022. Because the

Table 1. Variables in the Model

Variable	Process	Abbreviation
Real Effective Exchange Rate Volatility	$\sqrt{\frac{1}{m} \sum_{i=1}^m (LR_{t+i-1} - LR_{t+i-2})^2}$	VOL
Weighted Average Cost of Funding	Level	INT
Total Deposits of Banking Sector	Log	DEP
Interest Rate of Consumer Loan	Level	INTC
Total Credit of Banking Sector	Log	CREDIT

CBRT has followed unconventional policies regarding credit and exchange rates, the ending period of study is limited to this date. The exchange rate volatility variable expressed in the first line of Table 1 has been calculated based on the method used in the studies of Kennen and Rodrik (1986), Chowdhury (1993), and Kasman (2003). This method obtains the volatility of the relevant variable by fixing the standard deviation based on the moving average. Due to this study using monthly data, the coefficient m has been taken as 12. Although volatility calculations such as the ARCH and GARCH models are found in the literature, these techniques were not chosen here because the study does not conduct a volatility modeling and accordingly does not want to make too many changes to the data. Meanwhile, the study has preferred the real exchange rate over the nominal exchange rate because it is used more frequently in the literature and because the real effective exchange rate is a more comprehensive variable.

4. Empirical Findings

Whether the variables have a unit root or not is important with regard to the time series analysis. If the variables include a unit root, the estimates and policy inferences may be misleading. To avoid this situation, whether the variables have unit roots or not has been tested with the augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. Table 2 indicates the results from the unit root tests.

Table 2. Unit Root Test Results

Variable	ADF		PP	
	Level	First Difference	Level	First Difference
Credit	0.9560	0.0000**	0.9478	0.0000**
Deposit	1	0.0000**	1	0.0000**
INT	0,0592*	0,0147*	0.3420	0.0000**
INTC	0,1605	0.0000**	0,4443	0.0000**
VOL	0,0000*	0.0000**	0,0000*	0.0000**

Note: All test results are shown as probabilities. * reflects a 5% prob., and ** reflects a 1% prob.

The null hypothesis of both tests is that the series has a unit root. The null hypothesis has been rejected for the variables of Credit, Deposit, INT, and INTC that were subjected to the ADF and PP tests. When the first difference is taken for the four variables, the variables are seen to be stationary. The ADF and PP tests indicate the null hypothesis to be accepted for the volatility (VOL) series. Therefore, Credit, Deposit, INT, and INTC are $I(1)$, and VOL is $I(0)$.

Due to the variables not being stationary at the same level, the study does not investigate their long-term relationships. In order to benefit from the features of the VAR model, such as impulse response function and variance decomposition, the study uses the unrestricted VAR model, in which the included variables are stationary, as suggested in the studies of Sims (1980), Engle and Granger (1987), Johansen (1988), and Johansen and Juselius (1990).

The second stage of the VAR model involves determining the appropriate lag length. The lag that minimizes the values of such information criteria as LogL, LR, FPE, AIC, SC, and HQ has been chosen as the appropriate lag for the VAR model. Table 3 shows the lag length of the VAR model.

Table 3. Optimal Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	1309,785	NA	1,79E-15	-19,76947	-19,66027	-19,72509
1	1403,352	178,6281	6,32E-16	-20,80836	-20,15318*	-20,54213*
2	1441,966	70,79351	5,15E-16	-21,01464	-19,81348	-20,52654
3	1471,259	51,4846	4,85E-16	-21,07969	-19,33254	-20,36973
4	1509,418	64,17614*	4,00e-16*	-21,27906*	-18,98593	-20,34724
5	1522,674	21,28996	4,84E-16	-21,10112	-18,262	-19,94744
6	1544,774	33,81977	5,15E-16	-21,05719	-17,67208	-19,68163
7	1565,862	30,67237	5,61E-16	-20,9979	-17,06681	-19,40049
8	1592,276	36,41984	5,69E-16	-21,01933	-16,54225	-19,20005

The suitable lag length that has been made for minimizing the LR, FPE, and AIC information criteria was chosen as four. Table 4 presents the autocorrelation test results for the VAR(4) model.

Table 4. Autocorrelation Test Results

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	16,81823215	25	0,8883	0,667412555	(25,395.3)	0,8884
2	28,12384561	25	0,3022	1,131825675	(25,395.3)	0,3026
3	24,46845178	25	0,4925	0,98025475	(25,395.3)	0,4929
4	34,49528737	25	0,0977	1,399295638	(25,395.3)	0,0980
5	19,04153783	25	0,7951	0,757725022	(25,395.3)	0,7954

Table 4 shows the LM autocorrelation test results. The null hypothesis of the LM autocorrelation test is that no correlation is present for any lag. According to the LM test results, the null hypothesis is accepted up to five lags for the VAR(4) model. Another stage of the VAR model selection criteria involves whether the characteristic roots of the model are stable or not. If the characteristic roots remain within the unit circle, the selected model is stable, with Figure 1 showing that the characteristic roots remain within the unit circle.

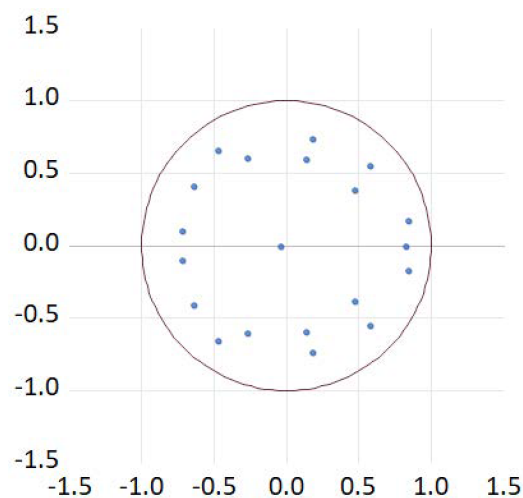


Figure 1. The characteristic roots of the VAR(4) model.

4.1. Impulse Response Functions

The impulse response function expresses the response from one endogenous variable in the system to a one standard deviation shock in the error of another exogenous variable in the VAR model. Figure 2 presents the impulse response function of the VAR model.

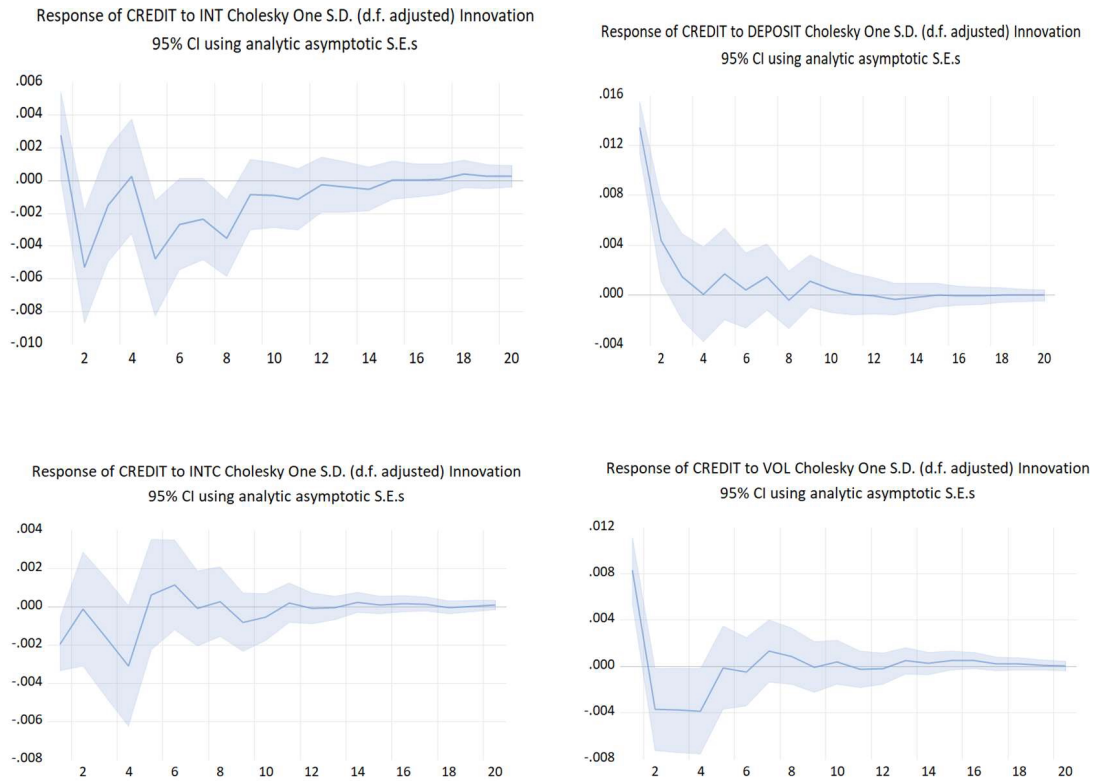


Figure 2. Impulse response functions of the VAR model.

Figure 2a shows the response of loans to a one-unit standard deviation shock in the error term of the INT variable. The effect is negative in the second period, as well as in the fifth and seventh periods. This result is consistent with the theory that an increase in policy rate will lead to a decrease in credits. Therefore, even if the effect is weak, the bank lending channel can be said to work through monetary policy. Figure 2b shows the response from loans to a one-unit standard deviation shock to deposit. Initially, the response of loans to the shock was positive and statistically significant. At the same time, the response of loans to deposits persisted until the end of the third period and then disappeared. When a bank's deposits increase, their tendency to lend is expected to increase. The result obtained in Figure 2b is also in line with expectations. The response of loan rates to bank loans is shown in Figure 2c. The response of loans to credit interest rates is negative and loses its statistical significance at the end of the second period. Because loan demand will decrease when loan rates increase, a negative response regarding loans appears plausible.

Figure 2d tests whether exchange rate volatility has a significant effect on loans. The response of loans to a shock in exchange rate volatility was negative and statistically significant from the second to the fifth period. An increase in the exchange rate volatility reduces credits in the short run. This result suggests that loans are affected by exchange rate volatility.

4.2. Variance Decomposition

Variance decomposition expresses how much of the change in the variance of one of the variables in the VAR model is caused by other variables and itself. Table 5 shows the variance decomposition results of the VAR model regarding credits.

The 20-period variance decomposition for loans is presented in Table 5, with deposits being the variable that explains the change in loans at the highest rate. An approximately 55% change in loans in the first period was explained by deposits. At the end of the 20th period, the explanatory power of deposits had become about 38%. While interest rate

Table 5. Variance Decomposition with Regard to Credit

Period	VOL	INT	DEPOSIT	INTC	CREDIT
1	21,23156339	2,342053681	55,2154679	1,183280795	20,02763424
2	20,15107528	8,629607873	48,33100741	0,939281248	21,94902819
3	22,45764438	8,730741866	46,45165316	1,482592371	20,87736822
4	24,11969495	8,138690985	43,22033599	3,4529757	21,06830237
5	22,75098952	12,27606449	41,34785682	3,335562427	20,28952674
6	22,39305323	13,46536756	40,65423549	3,535557536	19,95178618
7	22,31048233	14,28386552	40,28292845	3,468643109	19,65408058
8	21,87520765	16,28840656	39,26215388	3,390576328	19,18365559
9	21,69408577	16,28677091	39,17739839	3,489057336	19,35268759
10	21,66033988	16,39209501	39,11407471	3,533539424	19,29995097
11	21,59554656	16,57479633	38,97678265	3,528332022	19,32454244
12	21,57226498	16,56159921	38,92033561	3,524543002	19,42125719
13	21,58358206	16,56380124	38,87720406	3,519479939	19,4559327
14	21,55584739	16,58202624	38,80994798	3,523069266	19,52910912
15	21,58054656	16,56599776	38,77170931	3,521019138	19,56072722
16	21,61363218	16,55508309	38,74659443	3,523365658	19,56132464
17	21,61484648	16,54955821	38,73206383	3,525393562	19,57813792
18	21,61387639	16,57253878	38,71506856	3,524089927	19,57442634
19	21,61272169	16,58296774	38,7081734	3,523649483	19,57248768
20	21,60956574	16,59261623	38,70206568	3,524651622	19,57110072

explains about 2% of the change in loans in the first period, this ratio had increased and reached about 16% by the end of the 20th period. The reflection of the change in interest rate on lending cost and conditions was observed to occur over time. The reason for this is believed to be the set of new policies the central bank had started to implement after 2010. As the financial stability target started to be taken into account, the central bank started to use the short-term interest rate effectively within the corridor. The fluctuation of the short-term interest rate within the corridor delayed the effect of the AOFM variable on loans over time.

Loan rates' explanatory power over changes in loans ranged from 1% in the first period to approximately 3% by the end of the 20th period. Loan rate is the variable with the lowest explanatory power for explaining a change in credits in the model. After deposits, exchange rate volatility has the highest explanatory power for a change in loans. Exchange rate volatility explained about 21% of the change in loans in the first period, 24% in the fourth period, and about 21% by the end of the 20th period.

5. Conclusion

This study has investigated whether the bank lending channel is affected by exchange rate volatility. For this purpose, the study constructed a VAR model covering the period from January 2011-2023. The results obtained from the VAR model have shown exchange rate volatility to have a significant negative impact on loans.

The fact that the bank lending channel is negatively affected by exchange rate volatility suggests that macroeconomic uncertainty and financial and political instability also affect the bank lending channel. This implies that financial and macroeconomic stability are complementary with regard to central bank policymaking. This is because in the absence of macroeconomic or financial stability, the central bank will not be able to use its policy instruments effectively. Therefore, the negative impact of exchange rate volatility on the bank lending channel lends support to studies that have suggested the bank lending channel to function weakly in Türkiye. On the other hand, the findings also clarify the results of studies that have suggested the bank lending channel to be more affected by banks' optimization behaviors than by a central bank's policies. When exchange rate volatility increases, banks behave with greater optimization, as the central bank cannot effectively signal the bank lending channel.

This study's findings suggest that the central bank's ability to make more effective policy parallels the achievement of macroeconomic and financial stability. Therefore, monetary policy cannot be considered separate from other macroeconomic, financial, and political conditions. Ensuring financial and macroeconomic stability will pave the way for the CBRT to have a healthier impact on the economy.

Hakem Değerlendirmesi: Dış bağımsız.

Çıkar Çatışması: Yazarlar çıkar çatışması beyan etmemişlerdir.

Finansal Destek: Yazarlar finansal destek beyan etmemişlerdir.

Peer Review: Externally peer-reviewed.

Conflict of Interest: Authors declared no conflict of interest.

Financial Disclosure: Authors declared no financial support.

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How cite this article / Atıf biçimini

Buyun, B. (2024). Does exchange rate volatility affect the bank lending channel? *İktisat Politikası Araştırmaları Dergisi - Journal of Economic Policy Researches*, 11(1), 51–61. <https://doi.org/10.26650/JEPR1343548>