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POLITICAL INSTABILITY AND MONETARY TRANSMISSION MECHANISM INTERACTION IN TÜRKİYE

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A r t i c l e I n f o

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Abstract

One of the most important channels of the monetary transmission mechanism, which has many transmission channels, is the interest rate channel. In the functioning process of the interest rate channel, the central bank aims to change various aggregates in the real economy in line with monetary policy objectives by setting short-term interest rates and affecting medium and long-term interest rates. For this process to function effectively, political stability in the relevant country is of great importance. In Turkey, which has frequently experienced periods of political instability from the past to the present, the impact of political instability on the interest rate channel is quite significant and clear. Therefore, this study analyses the interaction between political instability processes and the functioning of the interest rate channel in the Turkish economy by using econometric methods and tests. The findings of the study reveal that the interest rate channel works in the Turkish economy and political instability processes affect the interest rate channel.

TÜRKİYE'DE SİYASİ İSTİKRARSIZLIK VE PARASAL AKTARIM MEKANİZMASI ETKİLEŞİMİ

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Özet

Birçok aktarım kanalına sahip olan parasal aktarım mekanizmasının en önemli kanallarından biri faiz oranı kanalıdır. Faiz oranı kanalının işleyiş sürecinde, merkez bankası kısa vadeli faiz oranlarını belirleyerek, orta ve uzun vadeli faiz oranlarını etkileyip reel ekonomideki çeşitli büyüklükleri para politikası hedefleri doğrultusunda değiştirmeyi hedefler. Bu sürecin etkin bir şekilde işlemesi için ilgili ülkede siyasi istikrarın varlığı büyük önem taşımaktadır. Geçmişten günümüze sık sık siyasi istikrarsızlık dönemleri yaşamış olan Türkiye'de, siyasi istikrarsızlığın faiz oranı kanalı üzerindeki etkisi oldukça önemli ve belirgindir. Bu nedenle, bu çalışma, Türkiye ekonomisinde siyasi istikrarsızlık süreçleri ile faiz oranı kanalının işleyişi arasındaki etkileşimi ekonometrik yöntemler ve testler kullanarak analiz etmektedir. Çalışmada elde edilen bulgularla faiz oranı kanalının Türkiye ekonomisinde işlediği ve siyasi istikrarsızlık süreçlerinin faiz oranı kanalını etkilediği ortaya konulmaktadır.

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INTRODUCTION

The interaction between the monetary sector and the real sector must be healthy and stable in order for an economy to function in a healthy manner, to achieve stable growth and development targets and to increase social welfare. If there are problems and imbalances in the relations between the monetary sector and the real sector in a country, it means that there is a high probability of financial and real crises that will harm the development objectives of the country. At this point, the importance of the monetary transmission mechanism emerges. The monetary transmission mechanism can be briefly defined as the mechanism by which changes in the monetary sector affect the real sector. One channel of the monetary transmission mechanism that operates through different channels is the interest rate channel. The interest rate channel is the process by which short-term nominal interest rates, which change as a result of the monetary policies implemented by the central bank, affect real aggregates through medium and long-term interest rates within a certain time lag.

Given that the Turkish economy is characterized by various structural and financial vulnerabilities, the monetary transmission mechanism should also function effectively in order for economic activities to function efficiently. The importance of the interest rate channel is more critical for the Turkish economy. The reason for this is that the financial system in the Turkish economy operates predominantly through the banking system. The banking system is directly linked to the interest rate channel due to its structure. One of the most important reasons for this situation for the Turkish economy is that capital markets are not very deep and developed. Households and the private sector do not carry out many transactions based on capital markets in their financial activities. This is a factor that increases the dependence on the interest rate channel through the banking system.

Political instability increases risk and uncertainty in an economy and negatively affects predictability, which is an important variable in investors' decisions. This situation also has negative effects on the success of the policies to be implemented by the central bank. Even if the central bank lowers interest rates to increase investments, entrepreneurs may hesitate to invest in an environment of increased political instability. In this context, it can be stated that the effective functioning of the interest rate channel is closely linked to political factors and political stability/instability. In other words, Turkey's political conjuncture and political stability have the potential to significantly affect the functioning of the interest rate channel. The investment, saving, and consumption decisions of economic agents are heavily influenced by the economic activities and indicators signaled by the interest rate channel as well as non-economic political developments. This makes it difficult for the Central Bank of the Republic of Turkey (TCMB) to effectively implement monetary policy through the interest rate channel. In other words, political instability disrupts the functioning of the interest rate channel, which is the predominant channel used by monetary policy and the monetary transmission mechanism, leading to a decline in the effectiveness of monetary policy in Turkey. In this context, the aim of this study is to analyze the interaction between the monetary transmission mechanism and the interest rate channel, which are very important for the Turkish economy, and political instability, and to make policy recommendations accordingly. No study analyzing the interaction between political instability and the interest rate channel was found in the literature review. Therefore, it can be stated that the contribution of this study to the literature can fill this gap in the literature. In this study, firstly, the concepts of political instability, monetary transmission mechanism and interest rate channel are analysed and the theoretical framework is presented. Then, the literature review and especially the studies on the efficiency of the interest rate channel in Turkey are presented. Then, VAR analysis is conducted to reveal the functioning of the interest rate channel in Turkey, taking into account the interaction between political instability and the interest rate channel. In the last part of the study,

based on the empirical findings, the nature of the interaction between political instability and the interest rate channel in Turkey is explained, important interactions are identified and policy recommendations are made.

THEORETICAL FRAMEWORK AND LITERATURE REVIEW

The monetary transmission mechanism can basically be defined as the mechanism through which a change in the monetary sector affects the real sector. Although Bernanke and Gertler (1995) state that it is difficult to determine the effects of monetary policy on the economy in a holistic manner and that there is no consensus on what the transmission channels are, the literature generally analyses the interest rate channel, the credit channel, the equity channel and the exchange rate channel. However, it should be noted that it would be erroneous to think that these channels are independent of each other. Nevertheless, since the study is specifically related to the interest rate channel in the Turkish economy, only the theoretical explanations on the interest rate channel are included in the study.

The most conventional transmission channel within the monetary transmission mechanism is the interest rate channel. This channel is also called the standard Keynesian monetary transmission channel. The interest rate channel changes the marginal cost of borrowed money and the changed marginal cost determines the economic activities of consumers such as their propensity to hold cash, consumption expenditure and saving. The changing marginal cost of borrowed money through the interest rate channel also affects producers' decisions such as investment expenditure, saving and consumption expenditure. An expansionary monetary policy reduces real interest rates and thus the cost of capital. The decrease in the cost of capital increases investment expenditures, which in turn leads to real effects by increasing aggregate demand, leading to an increase in aggregate output and GDP (Cotarelli and Courelis, 1994). Consumers and firms make economic decisions based on real interest rates rather than nominal interest rates. For example, when the central bank lowers short-term nominal interest rates, short and long-term real interest rates will also fall as nominal prices will be sticky. This will increase both consumption and investment expenditures (Mishkin, 1995). Therefore, the RGDP will increase.

The success of economic policy implementation depends not only on economic but also on political conditions. In this context, a factor that may be effective in the good functioning of the interest rate channel is political stability. The existence of political stability enables entrepreneurs to predict the future more accurately and leads to more long-term and permanent economic activities (İnsel, 1991).

There are different approaches to the definition of political stability or instability. According to some approaches, the main causes of political instability are weaknesses and variability in governance. According to some approaches, social turmoil and political pressure or conflict situations are the main determinants of political instability (Alesina and Perotti, 1993).

In order to understand the concept of political stability correctly, it is first necessary to define the concept of stability correctly. According to the Turkish Language Association (TDK), stability is defined as ‘continuing in the same way, continuity’, while instability is defined as the absence of stability. At this point, political instability can be defined as an environment of instability or changing structural conditions in the political sphere (Şanlısoy, 2020). In democratic regime types, political instability is mostly addressed under the following topics: Polarisation of the Parliament, coalition governments, voter instability, administration and timing of elections, and frequency of government changes (Eren and Bildirici, 2001).

Political instability leads to weakness in the legal order, making it difficult to secure property rights. The existence of concerns regarding the protection of property rights creates a difference between the

marginal productivity of capital and the returns that investors can obtain. This difference negatively affects the investment decisions of entrepreneurs (Şanlısoy, 2020). In addition, political instability creates an environment of uncertainty about the future, which may lead to a decrease in the expected return on investments and thus a decrease in investments (Leahy and Whited, 1996; Asteriou and Price, 2001).

There is a large literature on the transmission channels of the monetary transmission mechanism. Some of the studies contributing to the literature have analysed the impact channels separately, while others have tried to determine the effects of different channels simultaneously. In the literature review, in line with the main objective of this study, studies analysing the interest rate channel are included. No study on the interaction between political instability and the interest rate channel was found in the literature review. In this context, it can be stated that the contribution of this study to the literature is to fill this gap in the literature.

Since the second half of the 1980s, monetary policies have gained momentum in the use of economic policies. Studies on the determination of the real effects of these policy implementations have also started in this context. However, it can be stated that a rapid development in the literature started with the development of VAR analysis by Sims (1980), which will be used in this study and is suitable for monetary transmission mechanism analyses.

Sims (1992), one of the pioneering studies in this field, found that the interest rate channel works for G7 countries and a positive shock in interest rates decreases industrial production in these countries. Similarly, Taylor (1995) finds that the interest rate channel of the monetary transmission mechanism works for the US, Germany and Japan. Taylor (1995) found that the interest rate channel is a strong channel and that changes in interest rates affect investment and consumption behaviour. A similar view is expressed by Iwata and Wu (2006) for Japan, Örnek (2009) and Akkaya and Keskin (2023) for Turkey. Bilan and Kryshko (2007) found that the interest rate channel works for Ukraine. The study also did not find any evidence that the interest rate channel has an advantage over other monetary transmission mechanisms. Chirink and Kalckreuth (2003), another study on the German case, analysed the functioning of the interest rate and credit channels and found that the interest rate channel works. As a result of the developments in VAR analysis over time, TPV-VAR models that take regime switching into account have emerged and started to be used in analyses (Tüzün et al. 2017).

In this context, Primiceri (2005) and Koop et al. (2009) for the USA; Boehl et al. (2024) for the USA; Akdeniz and Çatık (2019) for Turkey reveal that the interest rate channel works but its effects on economic variables diverge over time. Akdeniz and Çatık (2019) also examined the effects of financial conditions on the monetary transmission mechanism and concluded that they have an impact on the functioning of the monetary transmission mechanism. There are other studies that examine the monetary transmission mechanism of financial conditions in the economy. Lucca and Wright (2024) show that for the Australian economy, the central bank's bond-buying programme and quantitative easing programmes generally end up being narrower than expected. That is, although the central bank plans to lower interest rates by purchasing bonds from the market, it usually does so in smaller quantities than planned, and as a result, interest rates fall less than planned. In a study on the Swiss economy, Fuster et al. (2024) investigated the effect of reserve gradation on the monetary transmission mechanism. In order to ensure that not all banking reserves are affected by the negative interest rate policy, the Swiss central bank has made various reserve classifications and exempted some reserve classes from the negative interest rate policy. It has been found that small and medium-sized banks, especially those with limited access to the interbank market, take advantage of this

exemption, i.e., they earn extra interest income from the central bank or do not experience interest loss and thus keep their deposit rates higher. In other words, due to this exemption policy, the expected and desired decrease in deposit rates cannot be achieved (Fuster et al., 2024).

The interest rate channel may produce different results in different sectors. Choi et al. (2024) show that contractionary monetary policies generally result in more contraction in sectors with limited financing options and in trade-dependent sectors. In other words, monetary contractions cause more contraction in sectors that are highly dependent on the banking sector in terms of financing and in foreign trade-related sectors (especially importers) where the exchange rate is very important (Choi et al., 2024).

Current interest rates are also important for the efficiency of the interest rate channel. Ahmed et al. (2024) analysed the effectiveness of the interest rate channel in the monetary transmission mechanism in a low interest rate environment. According to the panel data analysis based on data from 16 developed countries, as interest rates fall, the effectiveness of central banks in creating growth and demand in the economy by lowering interest rates gradually decreases. In other words, the efficiency of the interest rate channel decreases as interest rates fall. The researchers concluded that the steepening of the IS curve in a low interest rate environment is also effective in the development of this result (Ahmed et al., 2024). In their study for the Euro area economy, Lenza and Slacalek (2024) examined the effects of the European Central Bank's (ECB) interest rate cut policies on income distribution and wealth inequality after the pandemic that started in 2020. According to the study, as a result of the ECB's expansionary monetary policy, income distribution has slightly improved, especially as low-income households find new employment and income opportunities through the interest rate channel. According to the study, the effect of this monetary expansion on wealth distribution is negligibly low (Lenza and Slacalek, 2024). Coimbra and Rey (2024) investigated the level of trade-off between the level of interest rates, financial instability and economic recovery. The study suggests that when the central bank cuts interest rates when interest rates are high, there is no trade-off between financial instability and economic recovery. In other words, while economic recovery increases, there is no increase in financial instability. However, when the same interest rate cuts are made when interest rates are low, economic recovery increases while financial instability increases, meaning that the central bank has to choose between economic recovery and financial stability (Coimbra and Rey, 2024). Almeida et al. (2024) analysed the effect of the interest rate channel on the default propensity of firms. In the study covering the US and Mexican economies, especially the 1982 Mexican Crisis was analysed. According to the study, as interest rates rise, the alternative cost of lenders' option to wait for the full payment of principal and interest increases. This is because lenders miss the opportunity to lend new loans at high interest rates for every period of time they lose. Therefore, in a high interest rate environment, lenders accept more deductions in debt repayment and prefer the settlement path more. This increases the tendency of extante borrowing companies to default on their debts. This undoubtedly harms the economy in the long run (Almedia et al., 2024).

Some studies in the literature have found that the interest rate channel does not work. Poddar et al. (2006) for Jordan, Yiding and Shuanghong (2007) for China and Razmi et al. (2015) for Thailand have found that the interest rate channel does not work. There have been various studies in the economics literature on the efficiency and functioning of the interest rate channel, which is one of the channels of the monetary transmission mechanism and the most fundamental one, in the Turkish economy. While some of these studies have concluded that monetary policy and the interest rate channel work effectively in Turkey, some studies have come to the opposite conclusion and

concluded that monetary policy and the interest rate channel do not work in Turkey. The studies that conclude that monetary policy and the interest rate channel work effectively in Turkey are summarised below:

Erdoğan and Yıldırım (2009) investigated the efficiency of the interest rate channel in Turkey between January 1995 and September 2007 using the VAR method. In the study, the effects of short-term interest rates on long-term real interest rates, investment and durable goods expenditures were analysed. In other words, the change in investment expenditures and durable goods expenditures were analysed as the real effect. In the study, it is determined that the effect of a change in short-term interest rates on investment expenditures and durable goods expenditures is short-term. In other words, according to the study, the interest rate channel is effective but short-term. In another study, Kibritçi Artar and Kibritçi Artar (2014) aimed to measure the impact of TCMB's monetary policy decisions on macroeconomic variables between January 2003 and September 2008. According to the findings of the study using VAR analysis, the impact of the TCMB's interest rate policy on real and financial variables is more limited in the short run than in the long run.

Büyükakın et al. (2009) investigated the causality relations between the interest rate channel and the general level of prices, investment expenditures and national income in Turkey by using Granger and Toda Yamamoto causality tests for the period between January 1990 and September 2007. In the study, these tests yielded different results from each other. According to the Granger causality test, a change in interest rates affects investment expenditures, general price level and national income, respectively. According to the Toda Yamamoto method, a change in interest rates affects investment expenditures and then affects national income without causing any change in the general level of prices. Saraç and Ucan (2013) aimed to measure the efficiency of the interest rate channel in Turkey between 1990Q1 and 2011Q3 periods. For this purpose, Markov Regime Change model was applied in the study. According to the findings of the study, the interest rate channel is not effective due to high inflation rates before 2002. After 2002, the interest rate channel became effective with the effect of the inflation targeting policy.

Arabacı and Baştürk (2013) aimed to determine the efficiency of the interest rate channel in Turkey between 2001 and 2008 using the VAR method. The study revealed the importance of the impact of fiscal dominance on monetary policy in general and the interest rate channel in particular. In the study, it was found that the ratio of public debt to national income was quite high, and the fiscal dominance situation emerged between 2001-2004, that is, the high level of public debt made monetary policy and the interest rate channel inefficient. In the case of fiscal dominance, when the central bank increases short-term interest rates in order to control inflation and real interest rates increase accordingly, foreign investors generally perceive that the already high public debt cannot be paid due to rising real interest rates and the default risk increases. Depending on this perception, foreign exchange outflows are realised and the national currency depreciates and the foreign currency appreciates. As a result of the appreciation in foreign exchange, inflation increases, which is called the price paradox. In other words, the central bank, which tries to reduce inflation, encounters the opposite result as a result of the interest rate hike, and inflation increases. In this study, it was found that fiscal dominance decreased due to the decline in the ratio of public debt to national income in 2004 and as a result, monetary policy and the interest rate channel worked effectively in the 2004-2008 period.

Binici et al. (2016) aimed to measure the effect of TCMB interest rates and effective interbank overnight rates on loan and deposit rates between June 2010 and December 2014. According to the

results obtained, it is observed that effective interbank overnight rates have a greater effect on banks' loan and deposit rates in general than the official TCMB rates.

Arıkan et al. (2018) investigated the functioning of the interest rate channel by taking into account the Central Bank of the Republic of Turkey's (TCMB) use of the asymmetric interest rate corridor as a policy instrument since June 2010. For this purpose, the period between May 2010 and January 2016 was analysed and VAR methodology was used as the econometric method. According to the results of the study, shocks to the lower band of the interest rate corridor have statistically and economically significant effects on the exchange rate and inflation. On the other hand, shocks to the upper band of the interest rate corridor have statistically and economically significant effects on money supply. In addition, it has been found that the credit volume can be reduced as a result of widening the lower or upper band of the interest rate corridor and thus the desired result in inflation targeting can be achieved.

Barca (2019) aimed to measure the efficiency of the interest rate channel in Turkey between January 2007 and December 2012. In the study, VAR method and Markov Regime Change VAR (MS-VAR) methods were used for comparative analysis. According to the results obtained from the VAR model, the change in interest rates affects the real economy. According to the same model, the effect of the change in interest rates on inflation is statistically significant but economically insignificant. According to the MS-VAR model, the effect of a change in interest rates on both inflation and the real economy is statistically and economically significant. In addition, in the MS-VAR model, it is determined that a positive shock to the policy interest rate is more effective on economic variables in a conjuncture with high economic uncertainties.

Kaçar (2019) aimed to determine the functioning of the interest rate channel in Turkey in the 2003-2018 period. Toda-Yamamoto causality test was used in the study. According to the results of the study, it was determined that a change in interest rates in the said time period affected fixed capital investments and then real gross domestic product. According to these findings, it can be stated that the interest rate channel of the Keynesian monetary transmission mechanism is valid in Turkey in the relevant time period.

Yılmaz (2019) researched whether the interest rate corridor policy implemented by the TCMB between January 2010 and December 2018 in Turkey is effective or not. VAR method was used in the study. It was found that the interest rate corridor policy implemented by the TCMB in the said period provided flexibility and efficiency in achieving the monetary policy objectives of the TCMB. In addition, the interest rate corridor policy was found to be effective on the exchange rate channel in the relevant period in the direction of increasing its effectiveness.

Baştav (2020) investigated the efficiency of the interest rate channel in the 2011-2018 period with Granger and Toda Yamamoto causality tests. The study concluded that the interest rate channel in Turkey in the relevant period did not function in the traditional and/or New Keynesian sense, on the contrary, aggregate demand influenced interest rates at all maturities by affecting inflation.

Poyraz et al. (2020) aimed to measure the impact of TCMB's policy rate hikes and cuts on the BIST100 index return in the period between 13 May 2010 and 20 March 2020. Event Analysis Method was used in the study. According to the findings of the study, interest rate cut decisions have an inverse and statistically significant relationship with the BIST100 index. In other words, when the TCMB cuts policy rates, BIST100 index returns increase. Interest rate hike decisions also have an inverse effect on BIST100 returns, but this effect is not statistically significant.

Turan (2020) investigated whether the interest rate channel is effective in Turkey between March 2006 and June 2019 using both linear VAR and threshold VAR methods. In the study, it was determined that the interest rate channel was partially efficient according to both methods in the period in question.

Güler (2021) aimed to measure the effect of the TCMB's policy rates on bank loan and deposit rates between January 2013 and November 2018 in Turkey. For this purpose, generalised method of moments (GMM) was used in the study. According to the findings of the study, in the relevant period, loan and deposit rates are affected by actual interest rates rather than official interest rates, and there is a partial pass-through from TCMB interest rates to bank interest rates. The study finds that Borsa Istanbul (BIST) overnight interest rates are more effective in the pricing of commercial loan and consumer loan rates, while the TCMB average funding rate is more effective in the pricing of deposit rates. According to these findings, the monetary transmission mechanism operates mostly through the interbank market rate and partly through the TCMB average funding rate. According to the results of the study, exchange rate and inflation-related developments are effective on banks' loan and deposit interest rate pricing.

Doğanalp (2022) aimed to determine the efficiency of the interest rate channel and the credit channel in Turkey for the period 2004-2021 using the VAR method. According to the findings of the study, both interest rate and credit channels are effective for the Turkish economy in the relevant period. The study also found that the interest rate variable is a Granger cause of price stability, real GDP and credit volume.

In his study, Bakkal (2022) aimed to measure the efficiency of the interest rate channel and the bank credit channel in Turkey between 2010 and 2021 and to determine the effect of the bank credit channel on the interest rate channel. For this purpose, the VAR method was used econometrically. According to the findings, both channels work partially and play a limited role in economic growth. The study also found that the bank credit channel strengthens the interest rate channel, albeit weakly.

Yılmaz and Yücememiş (2022) aim to investigate the effect of the TCMB funding rate on housing demand. For this purpose, they examined the period between January 2013 and March 2022. As a result of the cointegration analysis, when the TCMB WACC (weighted average cost of funding) increases by 1%, house sales, which represent housing demand, fall by 13.9%.

Some studies on the functioning of monetary policy and the interest rate channel in Turkey have concluded that monetary policy and the interest rate channel do not work in Turkey. Some of these studies are summarised below:

Demir (2018) aimed to analyse the effects of the interest rate channel on the real economy and inflation in Turkey between January 2006 and March 2018. For this purpose, short-term interest rate, real long-term interest rate, industrial production index and inflation rate variables were used. As a result of the VAR analysis in the study, a complete relationship between the interest rate and the real economy could not be established. In other words, it was found that the interest rate channel was not effective in the period in question.

Çalış et al. (2022) aimed to investigate the relationship between short-term interest rates and market interest rates in Turkey between 2020 and 2021. For this purpose, Granger causality test was used in the study. According to the findings, no Granger causality relationship was found between the BIST overnight repo rate and commercial, housing and consumer loan rates. However, a Granger causality relationship was found between BIST overnight repo rate and vehicle loan rates. According to the

results of the study, it is generally found that there is a problem in monetary policy pass-through and monetary transmission mechanism in the relevant time period.

In literature review, there is no study on the effect of political instability on the functioning of the monetary transmission mechanism. However, Musthafa and Suardi (2024) analysed the monetary policy and the monetary transmission mechanism in Sri Lanka in the post-civil conflict period. Accordingly, a tight monetary policy was effective in reducing inflation during the civil war and post-conflict periods. Moreover, while the interest rate and exchange rate channels in the monetary transmission mechanism were timely and effective in the post-conflict period, the credit channel was found to be lagged and weak (Musthafa et al., 2024).

EMPIRICAL APPLICATION

In this study, the efficiency of the interest rate channel in Turkey is investigated with the Vector Autoregressive Model (VAR). In this chapter, first the methodology, then the model and the data set are briefly mentioned, and then the results of the econometric analysis are presented.

Method: VAR Analysis

The existence of reciprocal interactions between economic variables has led to the development of simultaneous equation systems. However, the fact that this method has some difficulties has led to the development of VAR models by Sims (1980) to solve the problems. VAR models allow the determination of dynamic relationships without imposing any restrictions on the structural model (Keating, 1990). The fact that there is no need to decide which variables are endogenous or exogenous in VAR models and the use of the least squares method are seen as the superior aspects of the model. In addition, the inclusion of lagged values of the dependent variables in VAR models enables strong forecasts to be made for the future (Kumar et al., 1995). In the VAR approach, the phenomena are approached based on the system approach and each endogenous variable in the system is considered as a function of the lagged values of all endogenous variables in the system. A VAR model can be shown as follows.

$$y_t = A_1 y_{t-1} + \ldots + A_p y_{t-p} + \varepsilon_t \quad (1)$$

In Equation 1, yt is a vector of k endogenous variables, A1...Ap is the matrix of estimated coefficients and εt is the vector of error terms.

Model And Data Set Methodology: VAR Analysis

In this study, the efficiency of the interest rate channel, which is one of the important channels of the monetary transmission mechanism, and the effect of political instability on this channel will be investigated using monthly data for Turkey for the period 2005:09-2023:3. The vector of endogenous variables determined for this purpose is shown in Equation 2.

Y_t=(MB, TK, SUE, PRI)

In the model, the central bank policy interest rate is used to express a change in monetary policy. In order to represent long-term interest rates and as the interest rate that will be more effective on investments, the commercial loan interest rate applied by banks to firms is included in the model. In addition, the industrial production index is used to determine the effects of the monetary policy on economic activities. Finally, the political instability index was included in the model to determine the functioning of the interest rate channel of political instability, which is the main objective of the study. Table 1 below shows the variables used in the VAR model.

Table 1. Variables Used in VAR Model

Symbol	Variable	Source
lmb	Central Bank Policy Interest Rate	TCMB
ltk	Commercial Credit Interest Rate	TCMB
lsuesa	Industrial Production Index (seasonal effects eliminated)	TCMB
lpri	Political Instability Index	PRS Group

The full logarithmic model is used in the analyses. Therefore, logarithmic forms of the series are used. In addition, since the SUE has seasonal effects, the seasonal effects in the series have been eliminated by using the tramo/seats method. Descriptive statistics of the variables are presented in Table 2 below.

Table 2. Descriptive Statistics

	lmb	lpri	lsuesa	ltk
Average	2.562054	3.781247	4.518214	2.736465
Median	2.442347	3.828641	4.529626	2.751269
Maximum	3.238678	3.921973	4.974532	3.551842
Minimum	1.871802	3.433987	4.047964	2.130016
Standard Deviation	0.368813	0.113093	0.269419	0.302519
Skewness	0.344801	-1.217663	0.012030	-0.035147
Kurtosis	1.793426	3.879038	1.806674	2.627680
Jarque-Bera	16.97996	58.93508	12.52466	1.262160
Probability	(0.000206)	(0.000000)	(0.001907)	(0.532017)
Number of Observations	211	211	211	211

Empirical Findings

It can be stated that VAR analysis is the most appropriate method for investigating the effectiveness of monetary transmission mechanisms. Besides showing how monetary shocks affect the economy or their effects on different economic variables, the fact that it enables the determination of the transmission channels of these effects has brought along the frequent use of this method in the literature.

Since VAR modelling is basically a time series technique, the series should be stationary. Otherwise, spurious regression problem arises. At this point, it is important to investigate at which level the variables are stationary. Sims (1980) states that even if the series contain unit roots, their differences should not be taken. Because when the differences of the series are taken, the cointegration relations between the series may be lost, but he emphasises that an estimation at the level level will not pose a problem in terms of the consistency of the estimators, even if it leads to loss of efficiency. In this context, the stationarity analyses of the variables were performed with ADF, PP and KPSS tests and the results are shown in Table 3. According to the test results, it can be stated that the variables are stationary at the same level, I(1). Therefore, the level form of the variables were used in the analysis.

Table 3. Stationarity Analyses

		Level		1st Difference	
		Constant	Constant+Trend	Constant	Constant+Trend
lmb	ADF	-2,797399***(3)	-2,795897(3)	-10,87894*(0)	-10,85251***(0)
lpri		-3,198981**(0)	-3,247244***(0)	-14,27223*(0)	-14,47164*(0)
lsuesa		-0,700907(2)	-3,491557**(2)	-14,72212*(1)	-14,68814*(1)
ltk		-2,912025**(1)	-3,076164(1)	-8,649287*(0)	-8,633129*(0)
		Level		1st Difference	
		Constant	Constant+Trend	Constant	Constant+Trend
lmb	PP	-2,404359 (8)	-2,402339(8)	-11,32913*(6)	-11,30582*(6)
lpri		-3,866272*(13)	-3,241642***(10)	-14,32745*(8)	-14,83632*(11)
lsuesa		-0,637196(17)	-4,922682*(1)	-18,85676*(21)	-19,05431*(22)
ltk		-2,548751(6)	-2,671382(6)	-8,610045*(4)	-8,594573*(4)
		Level		1st Difference	
		Constant	Constant+Trend	Constant	Constant+Trend
lmb	KPSS	0,276606*(11)	0,273984(11)	0,053203*(8)	0,049961*(8)
lpri		1,535390(11)	0,375430(11)	0,464449**(8)	0,102637*(11)
lsuesa		1,789374(11)	0,091631*(10)	0,055485*(22)	0,049864*(22)
ltk		0,358862**(11)	0,214512***(11)	0,053312(6)	0,044270*(6)

, **, * indicate significance values of 1%, 5% and 10%, respectively.*

Since endogenous variables in the VAR model are considered as a function of all endogenous variables in the system, the optimum lag length should be determined. The results of the analysis for determining the optimum lag length are presented in Table 4. LR (Likelihood Ratio), AIC (Akaike information criterion), SC (Schwarz information criterion), FPE (Final prediction error) and HQ (Hannan-Quinn information criterion) information criteria were used to determine the optimum lag length.

Table 4. Optimum Lag Length

Lag	LogL	LR	FPE	AIC	SC	HQ
0	341.7760	NA	4.22e-07	-3.327843	-3.262558	-3.301431
1	1448.030	2158.013	9.12e-12	-14.06926	-13.74284*	-13.93720
2	1489.865	79.96110	7.07e-12	-14.32380	-13.73623	-14.08609*
3	1513.557	44.34849*	6.56e-12*	-14.39957*	-13.55087	-14.05622
4	1525.785	22.40825	6.81e-12	-14.36241	-13.25257	-13.91342
5	1535.346	17.14379	7.27e-12	-14.29897	-12.92799	-13.74433
6	1545.701	18.15890	7.70e-12	-14.24336	-12.61123	-13.58306
7	1554.866	15.71261	8.26e-12	-14.17602	-12.28276	-13.41008

8	1568.727	23.21503	8.47e-12	-14.15495	-12.00055	-13.28336

** Indicates the optimum lag length according to the relevant information criterion.*

As a result of the test, it was determined that LR, FPE and AIC values gave minimum values for lag 3, SC for lag 1 and HQ for lag 2. According to the results obtained, it was decided that it is appropriate to use the optimum lag length as 3 in the VAR model.

In VAR analysis, the order in which the series are included in the analysis is a factor that can affect the model results. In determining this order, causality tests and theoretical explanations can be utilised. In this study, based on the theoretical explanations, the variables are included in the model in the order from the most exogenous variable to the most endogenous variable.

Differently from other econometric methods, the interpretation of the coefficients obtained with the VAR model is difficult to draw conclusions from the interpretation of the dynamic relationship between variables in economic terms due to the complex structure of the model. For this reason, the relationships between variables are analysed through impulse-response functions. In general, through impulse response functions, it is decided which variable or variables can be policy instruments. However, from an economic point of view, the effect of the variable or variables on other variables is analysed by variance decomposition. With variance decomposition, the effect of a change in one of the variables, which is accepted as an endogenous variable in the analysis process, on all variables in the system is reached as separate shocks. Therefore, variance decomposition provides information about the dynamic structure of the relationships between economic variables with their mutual interactions in the analysis of their relationships. In general, each shock in the variance analysis shows the effect of each shock on the error variance of the forecasts for future periods. Regardless of the length of the forecasting period, if the forecast error variance of the forecasts is not affected, the variable or variables in question can be considered exogenous, and if an effect is observed, it can be considered endogenous. Therefore, VAR approaches have become a fundamental tool used in the analysis of monetary policies and monetary transmission mechanisms.

Analysis of impulse-response function results

The results obtained from impulse response analyses are presented in Figure 1. The significant ones in terms of the monetary transmission mechanism are interpreted. An important point to be emphasised at this point is that the effect is statistically insignificant if the dashed lines enclose the 0 line.

In the first graph, although the general trend of the response function to political instability is in the direction of decreasing, this effect does not disappear. As a matter of fact, the effect of this shock has not disappeared against a 1.5 per cent standard deviation shock. In this respect, it can be said that political instability has persistence as an important structural feature within the scope of the study. Political instability is the reaction of the central bank's interest rate decisions to a decrease in loan interest rates. However, the central bank reacts to political instability with an increase. This situation provides information that the decrease in interest rates in the period we have analysed depends on the political stability.

An important point for our study is the relationship between the interest rates of the central bank and commercial loans, where both variables first increase and then decrease in response to shocks in these variables. According to the variance decomposition results, among these variables, the central bank interest rate responds by 30% to a one unit standard deviation shock in commercial loans. This provides information that the interest rate channel in the monetary transmission mechanism works. However, the fact that the central bank interest rate responds to the political instability variable

indicates that this variable has the feature of being an exogenous variable in terms of the monetary transmission mechanism.

Consequently, it can be stated that in case of political instability, there is an increase in interest rates. As of the 5th month, the effect disappears. The possible reason for this reaction may be that an increase in political instability leads to an increase in both the risk premium of the country in general and the risk premiums of the companies accordingly. As a result of the increase in the country's risk premium in general, the tendency of net hot money inflows to Turkey from abroad decreases. In order to prevent this, the central bank increases interest rates in order to increase the interest yield of TL, especially for foreign investors. As the borrowing costs of banks from the central bank increase due to this increase, commercial loan interest rates rise. Another factor that increases commercial loan interest rates is the effect of the increase in political instability. As mentioned above, since political instability increases the risk premium of companies, banks demand a higher interest rate from companies that receive loans because they think that they face a higher risk of non-repayment. On the other hand, the response of the industrial production index to a one unit standard deviation shock in political instability is again in the direction of decrease for 3 months and the effect is observed to be dampened after the 3rd month. However, it should be noted that the effect here is statistically insignificant but can be interpreted as an economic sign. Therefore, it can be stated that political instability has an impact on both monetary and real sectors.

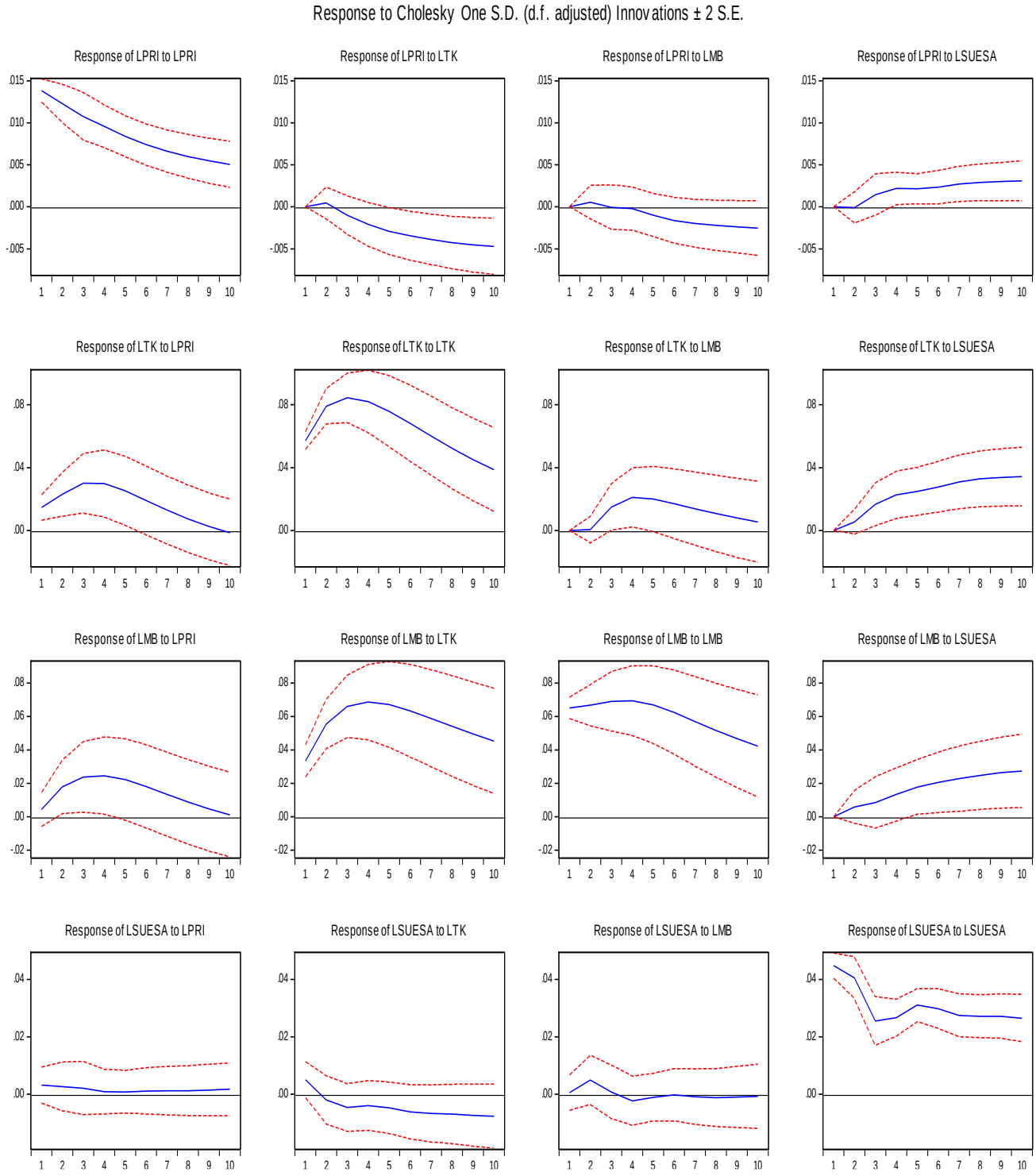

Figure 1. Impulse Response Analysis

It can be stated that despite a one unit standard deviation shock in the central bank interest rates, loan interest rates reacted in the direction of increase for 4 months and then the effect of the shock started to disappear and the effect became statistically insignificant after the 4th month. Therefore, when the central bank increases interest rates, loan interest rates also increase and accordingly, investments in the economy decrease. At this point, when the response of the industrial production index to commercial loans is also considered, the industrial production index responds to a one standard

deviation shock in the commercial loan interest rate by decreasing from the first period. After the first month, the effect becomes statistically insignificant. When the obtained results are evaluated as a whole, it can be stated that the interest rate channel works in Turkey and political instability affects the interest rates applied by the central bank.

One of the striking results is the response of political instability to central bank interest rates. When central bank interest rates are raised, political instability remains unchanged for the first five months on average, and then starts to decline. In other words, the level of political stability increases. Despite the fact that this response is not statistically significant, it is consistent with economic theory. When the central bank raises interest rates, country and corporate risk premiums, which probably increased before the rate hike, start to decline after a while. In other words, the central bank achieves its target and manages to lower the risk premiums that have risen. As a result, political instability generally decreases and general stability in the country increases.

The other important result is the response of commercial loan interest rates to the industrial production index. Increases in the industrial production index increase commercial loan interest rates starting from the first month and this effect continues throughout the periods. This result is both statistically and economically significant. As industrial production increases, capacity utilisation rates of production facilities probably increase. This requires new production investments in order to fulfil new orders. In this process, firms in the manufacturing sector increase their demand for commercial loans from banks for these investments, which pushes up commercial loan interest rates. Moreover, increases in industrial production are already indicative of a general increase in demand and acceleration in the economy. This increase in demand and economic acceleration leads to new investments not only in the manufacturing industry but also in many other sectors, which in turn leads to an increase in commercial loan demands and consequently commercial loan interest rates.

Analysis of variance decomposition

Another analysis used to understand the dynamic effect in VAR models is variance decomposition. In variance decomposition analysis, it is revealed how much of the change in a variable is explained by itself and how much is explained by other variables. Thus, the sources of the changes in the variables are determined. The results of the variance decomposition are shown in Table 5.

When the variance decomposition results of the lpri series are analysed, it is seen that this series is explained by itself in the first period, and the most affected series after itself in the 10th month is lmb with 8.154239%. According to the variance decomposition results of the lmb series, it is seen that it is affected by itself in the first period and then only by lpri in a very low amount. In the 10th month, it can be stated that the most effective variable is ltk. When the variance decomposition results of the ltk series are evaluated, it is seen that the most effective variable in the first period is lmb, followed by lpri. In the 10th month, the effect of lmb and lsuesa gradually increased. When the variance decomposition of lsuesa is analysed, it can be stated that the next most influential variable is ltk with a very small effect. In the 10th month, a similar situation is observed and it is understood that commercial loan rates have a stronger effect than the central bank rate.

Table 5. Variance Decomposition

Variance Decomposition of lpri

Period	S.E.	Lpri	lmb	ltk	lsuesa

1	0.013841	100.0000	0.000000	0.000000	0.000000
2	0.018524	99.84876	0.142305	0.006371	0.002568
3	0.021498	99.21391	0.157829	0.167152	0.461114
4	0.023732	97.71736	0.367608	0.691897	1.223137
5	0.025450	95.85575	1.062479	1.303143	1.778626
6	0.026881	93.51500	2.212304	1.920686	2.352014
7	0.028158	90.76383	3.589209	2.577124	3.069838
8	0.029331	87.83130	5.075084	3.274574	3.819042
9	0.030423	84.88380	6.618399	3.974788	4.523013
10	0.031453	81.99278	8.154239	4.654353	5.198628

Variance Decomposition of lmb

Period	S.E.	Lpri	lmb	ltk	lsuesa
1	0.073334	0.340371	99.65963	0.000000	0.000000
2	0.115146	2.538415	94.51451	2.696642	0.250437
3	0.151759	3.904095	90.87218	4.764574	0.459147
4	0.182585	4.500572	88.76563	5.889048	0.844749
5	0.207695	4.613949	87.48403	6.517385	1.384637
6	0.227612	4.469064	86.63149	6.930192	1.969252
7	0.243362	4.210354	85.95787	7.238724	2.593052
8	0.255983	3.923536	85.32852	7.471013	3.276933
9	0.266251	3.657761	84.69584	7.640091	4.006312
10	0.274728	3.437230	84.04498	7.761468	4.756325

Variance Decomposition of ltk

Period	S.E.	Lpri	lmb	ltk	lsuesa
1	0.058917	6.165321	19.53566	74.29902	0.000000
2	0.101335	7.242290	19.64048	72.81536	0.301866
3	0.137023	8.765129	25.01554	64.57080	1.648534
4	0.165310	9.272584	28.68806	59.00539	3.033970
5	0.186306	9.131483	30.47798	56.21568	4.174859
6	0.201950	8.667699	31.17927	54.70509	5.447939
7	0.213833	8.101169	31.28634	53.65595	6.956538
8	0.222957	7.563873	31.05087	52.82133	8.563920
9	0.230113	7.114230	30.60379	52.09801	10.18397
10	0.235939	6.770189	30.03258	51.39132	11.80591

variance decomposition of lsuesa

Period	S.E.	Lpri	lmb	ltk	lsuesa
1	0.045126	0.495381	0.368293	0.873078	98.26325
2	0.060910	0.458867	0.513946	0.922277	98.10491
3	0.066217	0.486144	0.483170	1.250225	97.78046
4	0.071517	0.431671	0.706420	1.193729	97.66818
5	0.078105	0.371338	0.756010	1.234151	97.63850
6	0.083806	0.339244	0.787885	1.485255	97.38762
7	0.088446	0.321513	0.898159	1.736816	97.04351
8	0.092786	0.309076	1.027851	1.950379	96.71269
9	0.096971	0.304803	1.130950	2.181553	96.38269
10	0.100839	0.310292	1.224565	2.435569	96.02957

Cholesky Ordering: lpri, lmb, ltk, lsuesa

It is important that the analysed model is significant as a whole. In other words, in terms of the stability condition of the VAR model, the model should be significant as a whole. In this context, the position of the inverse roots of the AR characteristic polynomial within the unit circle is important. As seen in Figure 2, since all the inverse roots are within the unit circle, it can be stated that the VAR model is stationary.

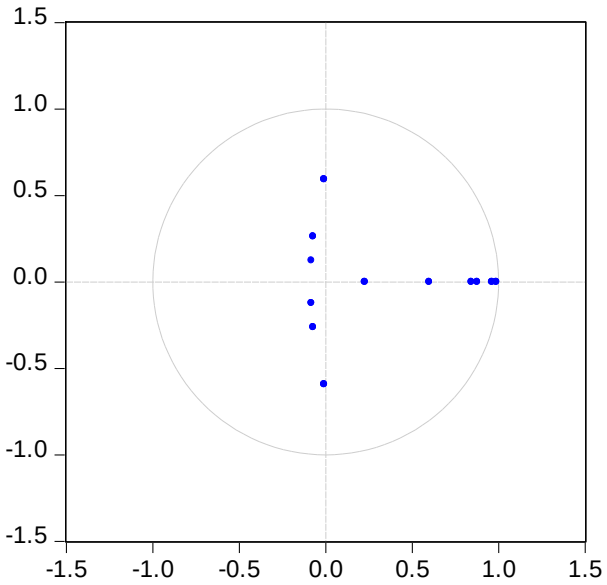

Figure 2. VAR Model Stationarity Graph

In terms of the stability of the VAR model, it is also important that it does not have the problem of autocorrelation and changing variance. For this reason, Autocorrelation - Portmanteau; White Changing Variance Tests were conducted and the results are shown in Tables 6 and 7. The test results show that the model meets the stability conditions.

Table 6. Portmanteau Autocorrelation Test

Lags	Q-Stat	Prob.	Adj Q-Stat	Prob.	df
1	1.373839	1.0000	1.380476	1.0000	16
2	5.399822	1.0000	5.445546	1.0000	32
3	29.20661	0.9853	29.60073	0.9830	48
4	43.04798	0.9795	43.71349	0.9754	64
5	51.52652	0.9944	52.40087	0.9928	80
6	69.07266	0.9827	70.46818	0.9766	96
7	88.30005	0.9521	90.36518	0.9339	112
8	98.63441	0.9747	101.1129	0.9618	128
9	113.4972	0.9715	116.6479	0.9542	144
10	126.4059	0.9767	130.2085	0.9594	160
11	148.9545	0.9315	154.0162	0.8827	176
12	160.3340	0.9535	166.0924	0.9119	192

Table 7. White Variable Variance Test

Ki Square	df	Probability
32.9879	240	0.3623

The empirical findings of the study are consistent with the related literature. In the literature, it is concluded that the interest rate channel is generally efficient. It is also observed that the interest rate channel is generally working for the Turkish economy. In addition, it has been found that political instability processes are effective on monetary transmission channels. In this context, it can be stated that the desired targets in monetary policy can be achieved not completely but to a more limited extent. Because empirically, it has been found that the central bank's targets may deviate from the initially targeted results due to political instability.

CONCLUSION

The monetary transmission mechanism, which can be defined as the mechanism of the impact of changes in the monetary sector on the real sector in a country, is quite decisive not only for economic functioning but also for the effectiveness of monetary policy. The effective functioning of the monetary transmission mechanism will make monetary policy more effective and facilitate the achievement of economic policy objectives. In countries where the monetary transmission mechanism does not function properly and effectively, there may be a disconnect between the monetary sector and the real sector, and this disconnect may lead to serious economic depressions, especially financial crises. Furthermore, due to the inefficient functioning of the monetary transmission mechanism, monetary policy will also have difficulty in achieving its objectives and the policies implemented will result in inefficiency. One of the most important channels of the monetary transmission mechanism is the interest rate channel. The interest rate channel, which can also be defined as the mechanism of the impact of changes in interest rates on the real sector, has more weight in the monetary transmission mechanism compared to other developed countries, especially in underdeveloped and developing countries where capital markets are not deep, debt, receivable, investment and saving transactions, that is, financial transactions are mostly based on interest rates. Turkey is also a developing country where the interest rate channel can be considered to have a larger share in the monetary transmission mechanism. Economic agents in Turkey base many of their financial transactions on interest rates. For this reason, the TCMB mainly uses the policy rate to influence short-term interest rates through the weighted average funding cost, which is very short-term, and tries to steer medium and long-term interest rates. This is because medium and long-term interest rates are an important determinant of investment and consumption behaviour. The interest rate channel, which represents the transmission mechanism from medium and long-term interest rates to real variables that the TCMB tries to influence, may be affected by the political conjuncture. Especially in a country like Turkey, where political instability processes are frequent, the impact of these political instability processes on the interest rate channel gains importance. Therefore, it is important to investigate the efficiency of the interest rate channel and the impact of political instability processes on the interest rate channel in the Turkish economy. For this purpose, VAR analysis method is used in this study and it is found that the interest rate channel works effectively in the Turkish economy. The study also concluded that political instability processes are effective on the TCMB's interest rate policy. Based on these results and findings, it can be stated that the interest rate channel in Turkey is negatively affected by political instability processes, and therefore, the TCMB, which is a very important element of the interest rate channel, has to take into account the political instability phenomenon while implementing interest rate policy.

In the light of these results, it can be said that the steps to be taken to ensure political stability in the country are important. Because political instability not only directly affects the real sector, but also indirectly affects the real sector through monetary transmission mechanisms as well as financial indicators. Despite the finding that the interest rate channel works in the period under consideration, it is observed that the central bank interest rate is more affected by political instability. Thus, the interest rate has become a policy instrument for ensuring political stability rather than achieving the targets set by the central bank as the main objective of interest rate policy.

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