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The Relationship Between Domestic Credit Volume and Unemployment Rate In The Turkish Economy: An Empirical Analysis

Türkiye Ekonomisinde Yurt İçi Kredi Hacmi ile İşsizlik Oranı Arasındaki İlişki: Ampirik Bir Analiz

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ABSTRACT

In this study, monthly frequency data covering the period between 2014:01 and 2022:10 were used to examine the relationship between domestic credit volume and unemployment rate in the Turkish economy. For this purpose, Vector Autoregressive Model (VAR) was used for the analysis and impact-response function and variance decomposition analyses were performed to interpret the coefficients obtained. According to the impact-response function results, shocks originating from both variables had a negative effect for a certain period and then created a positive effect before damping out. In addition, according to the variance decomposition results, approximately 85.2% of the change in domestic credit volume was explained by itself after 15 months, while approximately 14.79% was explained by the unemployment rate. Similarly, after 15 months, approximately 92.54% of the changes in the unemployment rate were explained by itself, while 7.45% was explained by domestic credit volume. Overall, it was determined that the effects of each variable on the total variability of the other variable lasted for 9 and 6 months, respectively. Finally, the Granger causality test was applied to reveal the causal relationships between domestic credit volume and unemployment rate. According to the test results, it was determined that the unemployment rate is the Granger cause of domestic credit volume. Therefore, it can be said that changes in the unemployment rate create changes in domestic credit volume.

KEYWORDS

Credit Volume, Turkish Economy, Unemployment Rate

ÖZ

Bu çalışmada, Türkiye ekonomisindeki yurt içi kredi hacmi ile işsizlik oranı arasındaki ilişkiyi incelemek için 2014:01 ile 2022:10 dönemi aylık frekanslı veriler kullanılmıştır. Bu amaçla, Vektör Otoregresif Model (VAR) kullanılarak analiz yapılmış ve elde edilen katsayıların yorumlanabilmesi için etki-tepki fonksiyonu ve varyans ayrıştırması analizleri gerçekleştirilmiştir. Etki-tepki fonksiyonu bulgularına göre, her iki değişken kaynaklı şokların belirli bir süre negatif etki yarattığı ve daha sonra pozitif etki yaratarak sönümlendiği tespit edilmiştir. Ayrıca, varyans ayrıştırması sonuçlarına göre, 15 ayın sonunda yurt içi kredi hacmindeki değişimin yaklaşık %85.2'si kendisi tarafından açıklanırken, yaklaşık %14.79'u işsizlik oranı tarafından açıklandığı görülmüştür. Benzer şekilde, 15 ayın sonunda işsizlik oranındaki değişimlerin yaklaşık %92.54'ü kendisi tarafından açıklanırken, %7.45'i yurt içi kredi hacmi tarafından açıklandığı belirlenmiştir. Toplamda, her iki değişkenin toplam değişkenliğini açıklamada birbirlerine olan etkilerinin sırasıyla 9 ve 6 ay sürdüğü tespit edilmiştir. Son olarak, Granger nedensellik testi uygulanarak yurt içi kredi hacmi ile işsizlik oranları arasındaki nedensellik ilişkileri ortaya konulmuştur. Test sonuçlarına göre, işsizlik oranlarının yurt içi kredi hacminin Granger nedeni olduğu belirlenmiştir. Bu durumda, işsizlik oranındaki değişimlerin yurt içi kredi hacminde değişim yarattığı söylenebilir.

ANAHTAR KELİMELER

İşsizlik Oranı, Kredi Hacmi, Türkiye Ekonomisi

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INTRODUCTION

One of the indicators of the economic situation of countries is the structure of employment and unemployment. In many developing countries, this is one of the fundamental problems due to a decrease in exports in economies resulting from the underdevelopment of the industrial structure, crises, and international competition, leading to unemployment problems (Yorgun, 2007: 116). Therefore, increasing employment rates and reducing unemployment rates are among the most fundamental goals for all countries. In this context, many policies and practices are put into action to develop new strategies.

In a general definition, the financial system is the system as a whole where fund suppliers and fund demanders meet through financial instruments in a legal regulatory environment. The funds provided by savers play an effective role in the transfer of transfers required for investments within this system, making them of great importance for national economies. Additionally, the level of development of the financial system also indicates the facilitation of savings turning into investments. The redirection of savings to investors at appropriate costs is only possible with the existence of a developed and sustainable financial system. With the development of the system, the diversity of financial instruments also increases, and access to the funds required by the real sector for long-term investments becomes easier. Along with a developed financial market, it is effective in increasing production levels and employment, in other words, in reducing unemployment. The impact of financial development on unemployment is expressed as the reason for the increase in unemployment during crisis periods or for the low unemployment rates in countries with a high level of financial development (Karaçayır and Karaçayır, 2016:13).

According to Mishkin (1996), with expansionary fiscal policies, there is an increase in bank deposits and reserves, and therefore, the amount of credit supply by banks also increases. The increase in credit supply ensures the functioning of the credit channel between the level of investment and consumption and the total production level. The credit approach, one of the monetary transmission mechanisms, emphasizes the importance of the credit creation function of banks and operates by affecting the assets and liabilities of banks through monetary policies (Telatar, 2002).

A well-functioning financial system in an economy supports capital accumulation by channeling small funds into large investments, thereby facilitating the adaptation and diffusion of new technological developments and contributing to economic growth and increased employment rates (Aslan and Küçükaksoy, 2006:26). An advanced financial system also helps to reduce firms' sensitivity to shocks arising from cash flow and promotes risk sharing, thus contributing to the formation of a stable economic foundation (Saint-Paul, 2007).

Changes in the volume of credit also have an impact on key macro variables in an economy, such as investment, income, and unemployment, through the monetary transmission mechanism. Exchange rates, asset prices, and interest rates are also closely related in terms of their functioning within the same transmission mechanism (Ceylan and Durkaya, 2010:21). In this context, an increase in investments and a resulting increase in employment with a decrease in unemployment is expected.

Through an advanced financial system, businesses will also choose to invest their savings within the system rather than keeping them in cash. As a result, companies that are financially strong in terms of their savings and capital structure will be less affected by crises. As a consequence of the healthy functioning of this system, businesses will have access to the necessary financial resources for new investments (Thesmar and Thoenig, 2004).

In this study, the relationship between domestic credit volume and unemployment rate in the Turkish economy is analysed using monthly data for the period 2014:01-2022:10. Vector Autoregressive Model (VAR) and Granger causality test were used to determine the relationship between domestic credit volume (private and public) and unemployment. It is considered that the study is up-to-date and will contribute to the literature in terms of the subject examined in the research and the analysis methods applied. In the following processes of the research, firstly the national and international literature review is presented, then the data set and methodology of the research are detailed. Then, empirical findings are presented and finally, the research is completed with the conclusion section.

1. LITERATURE REVIEW

This section provides a comprehensive review of various empirical studies on the relationship between financialization, financial development, credit volume, and unemployment-employment. The findings of these studies show that the impact of financialization on employment and unemployment is complex and varies across countries and over time. One study by Han (2009) analyzed the United States and found that financial disruptions increased unemployment. Another study by Gatti et al. (2012) examined the effects of labor and

financial markets on unemployment rates for 18 OECD countries and found that the effect of financial variables on unemployment is significant and depends on the structure of the labor market. The study suggested that in situations where regulations and cooperation in the labor market are strong, the effect of intermediary loans on employment is also positive. Monacelli et al. (2012) used monthly data from 1984:1-2009:3 and VAR method to examine the effect of financial liquidity on employment fluctuations in the Italian economy and found that credit shocks had a significant effect on employment. Tuğcu and Aslan (2012) studied the relationship between financial development and employment for the Turkish economy with data from 1961-2010 and found a positive interaction between the two variables. Kanberoğlu (2014) examined the effect of financial development on unemployment for the Turkish economy using data from 1985-2010 and found that the M2 money supply to GDP (Gross Domestic Product) ratio increased unemployment, while the total private sector credit to GDP ratio decreased unemployment. Göçer et al. (2015) investigated the effects of total credit volume in the banking sector on employment and economic growth in Turkey with data from 2000-2012 and found that an increase in credit volume in Turkey had a positive effect on employment and economic growth. Karaçayır and Karaçayır (2016) tested the effect of financial development on unemployment in the Turkish economy for the period 2006-2015 and found that while financial development had a short-term reducing effect on unemployment, it did not have a significant effect in the long-term. In the study by Akcan and Ener (2018), using data from 2000 to 2015, the relationship between macroeconomic variables and unemployment was examined. The study found that a one-unit shock in inflation and credit volume variables had a positive effect on the unemployment rate for more than two years. Yavuz (2019) investigated the effect of loans provided by the banking sector to the manufacturing industry on total employment for the period 2005-2017. The study found that medium-to-long-term loans provided to the manufacturing industry and total cash loans had a positive and significant effect on employment in the long-term. However, short-term cash loans had a negative and statistically significant effect on employment in the long-term.

Hatipoğlu (2019) examined the relationship between financialization and unemployment for the period 1991-2017 for eight countries (Bangladesh, Iran, Malaysia, Indonesia, Egypt, Nigeria, Turkey, and Pakistan). The findings of the study showed that financialization increased unemployment rates. Üzar (2019) examined the relationship between financialization and unemployment for nine OECD countries from 1980 to 2015 and found a long-term co-integration relationship between financialization and the unemployment rate. Furthermore, a causal relationship between these variables was identified. In a study conducted by Özbek and Türkmen (2020) on E7 countries, it was discovered that financialization has a significant effect on unemployment rates. Specifically, an increase in the share of broad money supply in GDP was found to increase unemployment, while an increase in the share of domestic loans to the private sector in GDP led to a reduction in unemployment. Similarly, Eryılmaz et al. (2021) explored the impact of bank loans on SMEs (small and medium enterprises) and its effect on the economy and employment in Turkey from 2007 to 2020. Their findings revealed that there was no co-integration relationship between small business loans and employment. However, there was a co-integration relationship between loans to micro, medium, and large enterprises and employment, indicating that bank loans to these businesses could lead to an increase in gross domestic product and employment rates. Karadağ (2021) analysed the relationship between unemployment, housing loans and housing sales in Turkey with cointegration and causality tests using quarterly data covering the period 2010:Q1-2020:Q3. The CCR (Canonical Cointegrating Regression) method was used for coefficient estimation in the model. According to the results of the study, while a 1% increase in housing loans increases unemployment by 0.46%, a 1% increase in total house sales increases unemployment by 0.59%. At the same time, a 1% increase in unemployment increases housing loans by 1.67% and total housing sales by 1.019%. In another study, Gür (2023) analysed the relationship between the volume of domestic loans extended by the banking sector in Turkey and the unemployment rate using data for the period 2010:M01-2022:M12. According to the results of Bayer-Hanck (2013) cointegration test, the variables are long-run related. The coefficient estimation in the model with long-run relationship was performed by FMOLS (Fully Modified Ordinary Least Squares) method. According to the FMOLS findings, it was determined that the domestic credit volume variable decreased the unemployment variable by 23.8%.

2. DATA AND METHODOLOGY

The study aimed to investigate the relationship between domestic credit volume and unemployment rate in Turkey using monthly data from January 2014 to October 2022. Domestic credit volume, which includes private and public loans extended by banks in the country, and the unemployment rate are used as variables in the study. The series were obtained from the Electronic Data Distribution System of the Central Bank of the Republic of Turkey and were transformed using natural logarithmic forms to reduce scale differences and

variability in variances between the series. The domestic credit volume and unemployment rate were denoted as LnCV and LnUR, respectively.

2.1. Vector Autoregressive Model

In the fields of economics and finance, understanding and predicting the complex relationships between variables can be a difficult task for analysts. In this case, simultaneous equation systems can be used to estimate the relationship between dependent and independent variables. However, it is important to accurately determine the dependent and independent variables in simultaneous equation systems, as misidentification can affect the consistency of the analysis (Uysal et al., 2008). The Vector Autoregressive Model (VAR) is a model developed to solve this problem in simultaneous equation systems (Keating, 1990). The VAR model does not require a distinction between internal and external variables. That is, the relationships between variables are directly modeled in the model, and each variable in the model can be modeled as both a dependent and independent variable. Therefore, VAR models differ from simultaneous equation systems. The VAR model also takes into account the lagged values of the dependent variables, allowing for more consistent predictions and improved model performance (Kumar et al., 1995). In addition, problems such as autocorrelation can be eliminated by increasing the lag length of the variables.

A two-variable VAR model is expressed as:

$$y_t = a_1 + \sum_{i=1}^{p} b_{1i} y_{t-i} + \sum_{i=1}^{p} b_{2i} x_{t-i} + v_{1t} \quad (1)$$

$$x_t = c_1 + \sum_{i=1}^{p} d_{1i} y_{t-i} + \sum_{i=1}^{p} d_{2i} x_{t-i} + v_{2t} \quad (2)$$

Where p is the lag length. v is a zero-mean, covariance-zero (with lagged values), constant-variance, normally distributed error term. In VAR models, no constraints are imposed on the model because errors are independent of the lagged values. In addition, autocorrelation can be eliminated by increasing the lag length of the variables.

To estimate the VAR model, it is necessary to determine the optimal lag lengths of the variables. For this purpose, methods such as Akaike Information Criterion (AIC), Likelihood Ratio Information Criterion (LR), Schwarz Information Criterion (SIC), Hannan-Quinn Information Criterion (HQ), and Final Prediction Error Information Criterion (FPE) can be used. These information criteria allow for comparison between models with different lag lengths and enable the selection of the most appropriate model.

2.2 Granger Causality Test

The Granger Causality Test is one of the most commonly used causality tests in econometrics. This test is used to determine whether one variable has a causal effect on other variables. The Granger Causality Test is important for controlling both Type I and Type II errors. In a two-variable VAR model, the Granger Causality Test examines both directions of causality.

$$y_t = \phi_0 + \sum_{j=1}^{p} \phi_j Y_{t-j} + \sum_{j=1}^{p} \varphi_j X_{t-j} + u_{1t} \quad (3)$$

$$x_t = \varphi_0 + \sum_{j=1}^{p} \varphi_j X_{t-j} + \sum_{j=1}^{p} \phi_j Y_{t-j} + u_{2t} \quad (4)$$

For a two-variable time series, the Granger Causality Test is represented by equations (3) and (4), where p is the lag length, u_{1t} and u_{2t} are independent error terms, and the equations include lagged values of both variables in their respective equations. The lagged values of one variable are used to predict the other variable.

The Granger Causality Test assumes that the variables are stationary and do not have any seasonal effects. Under these assumptions, the test is a useful tool for determining whether one variable has a causal effect on the other variable. The test only determines whether the causal effect is statistically significant.

In conclusion, the Granger Causality Test is a widely used tool for determining causality between variables. However, test results are only valid for a specific time period and may change over time. Therefore, interpretation of test results should be done carefully, taking into account other factors (Canbaz, 2019).

3. EMPIRICAL FINDINGS

To analyze the relationship between the two time series, the VAR model was employed. This model is used to identify how the time series affect each other and not to estimate parameters. It is important to note that the time series used in the equation system must be stationary, and if there is no cointegration relationship among the non-stationary time series, the series can be made stationary by taking differences and then analyzed with the VAR model.

In the research process, the stationarity properties of the series were tested using traditional unit root tests, including the Augmented Dickey Fuller (ADF) and Philips Perron (PP-1988) tests. The VAR model was then

established, and the results were analyzed using impulse-response function, variance decomposition, and Granger causality test for causality relationships.

The first stage of the research involved examining the stationarity properties of the series using the ADF and PP unit root tests. The test results showed that the LnCV and LnUR series contain a unit root at the level values at the %1, %5, and %10 significance levels but become stationary when first differences are taken.

The second stage of the research involved establishing the VAR model and analyzing the results using impulse-response function, variance decomposition, and Granger causality test for causality relationships. These analyses helped to determine the causality relationships between the series. Table 1 shows the findings of ADF and PP unit root tests.

Table 1. ADF and PP Unit Root Test Results

Series		ADF		PP	
		Stationary	**Stationary and Trend**	**Stationary**	**Stationary and Trend**
LnCV	Level	2.6827	-0.0645	2.2076	0.1069
		(1.0000)	(0.9949)	(0.9999)	(0.9970)
	First Difference	-7.7323	-8.0754	-7.8220	-8.0778
		(0.0000)	(0.0000)	(0.0000)	(0.0000)
LnUR	Level	-1.7947	-1.0637	-1.9284	-1.2643
		(0.3813)	(0.9295)	(0.3182)	(0.8910)
	First Difference	-9.8802	-10.0490	-9.9245	-10.0571
		(0.0000)	(0.0000)	(0.0000)	(0.0000)

Note: The values in parentheses ( ) indicate probability values. The critical values for the ADF and PP unit root tests for the stationary model are -3.493747 (%1), -2.889200 (%5), and -2.581596 (%10); for the stationary and trended model, the critical values are -4.048682 (%1), -3.453601 (%5), and -3.152400 (%10). The optimal lag length was determined for all tests using the Schwarz Information Criterion (SIC). Additionally, for the PP test, the Bartlett kernel was used for the spectral estimation method, while bandwidth options were used for the Newey-West method.

To summarize, in order to conduct VAR analysis, it is important that the time series used are stationary. The results of the Augmented Dickey Fuller and Philips Perron unit root tests indicate that the first differences of the lnCV and lnUR series are stationary, which makes them suitable for VAR modeling. Additionally, the Engle and Granger Cointegration Test results (shown in Table 2) suggest that there is no long-term relationship between the series. Therefore, a VAR model can be constructed using the first differences of the series without needing to consider any cointegration relationship.

Table 2. Engle and Granger Cointegration Test

Null hypothesis (H_0)		**The series are not cointegrated.**			
Dependent Variable	**Independent Variable**	**tau-statistic**	**Prob.***	**z-statistic**	**Prob.***
LnCV	LnUR	1.991246	1.0000	2.759757	0.9997
LnUR	LnCV	-1.178909	0.8641	-3.601014	0.8365

Note: * MacKinnon (1996) shows p values.

The optimal lag length must be determined for the VAR model. According to the information criteria listed in Table 3, the optimal lag length is determined to be 5.

Table 3. Optimal Lag Length for VAR Model

Lag	LogL	LR	FPE	AIC	SIC	HQ
0	419.8848	NA	6.21e-07	-8.616180	**-8.563094***	**-8.594715***
1	423.4485	6.907025	6.27e-07	-8.607185	-8.447925	-8.542788
2	426.7647	6.290527	6.36e-07	-8.593086	-8.327652	-8.485758
3	432.8005	11.20051	6.10e-07	-8.635062	-8.263454	-8.484802
4	433.0269	0.410721	6.59e-07	-8.557255	-8.079474	-8.364064
5	441.3099	**14.68749***	**6.04e-07***	**-8.645566***	-8.061611	-8.409443
6	444.1336	4.890520	6.20e-07	-8.621312	-7.931183	-8.342258
7	444.4853	0.594509	6.69e-07	-8.546088	-7.749786	-8.224102

Notes: * denotes the optimal lag length according to the specified criteria. LR: Sequential Modified LR Test Statistic, FPE: Final Prediction Error, AIC: Akaike Information Criterion, SIC: Schwarz Information Criterion, HQ: Hannan-Quinn Information Criterion. LAG: Represents the lag length.

Determining the optimal lag length based on the information criteria is just the first step in VAR modeling. After selecting the lag length, it is crucial to check the stability conditions of the model to ensure that it is a good-fitting model. A well-fitting model should satisfy stability conditions, absence of autocorrelation, constant variance, and normality assumptions (Mert and Çağlar, 2019:224).

To evaluate the stability condition of the VAR(5) model, we can examine the inverse roots of its AR characteristic polynomials. The inverse roots represent the eigenvalues of the coefficient matrix and provide insight into the dynamic properties of the system. If all the inverse roots of the AR characteristic polynomials lie within the unit circle, the model is stationary, i.e., it satisfies the stability condition.

In Figure 1, we present the unit circle plot for the stability condition of the VAR(5) model. As we can see, all the inverse roots of the AR characteristic polynomials lie within the unit circle, indicating that the VAR(5) model is stable and satisfies the stability condition. Therefore, we can proceed with the estimation and interpretation of the model results.

Figure 1. Unit Circle Plot for the Stability Condition of VAR(5)

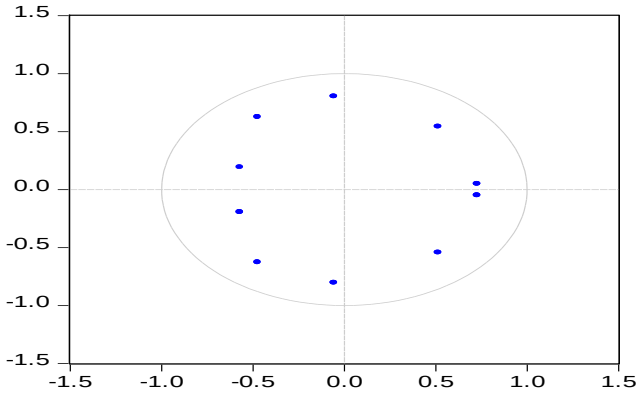


Table 4 presents the results of the autocorrelation tests for the time series, which is crucial to ensure that the VAR(5) model does not suffer from autocorrelation and constant variance problems. The autocorrelation LM test was employed to examine the null hypothesis of "there is no autocorrelation" and the alternative hypothesis of "there is autocorrelation". The results in the table reveal that the probability value has been tested at a 5% significance level for the fifth lag length, and the null hypothesis cannot be rejected due to the value of 0.8093>0.05. Thus, it can be concluded that there is no autocorrelation problem in the VAR(5) model. Moreover, it is also important to check whether the series satisfies the condition of constant variance. The chi-square and probability values of the VAR(5) model are 63.88328 and 0.3417, respectively, which indicates that the constant variance condition is met at the 5% significance level. It should be noted that a constant variance is necessary for the accurate estimation of the model parameters and for making valid inferences based on the model results. Overall, these results indicate that the VAR(5) model is suitable for analyzing the relationship between the selected time series data.

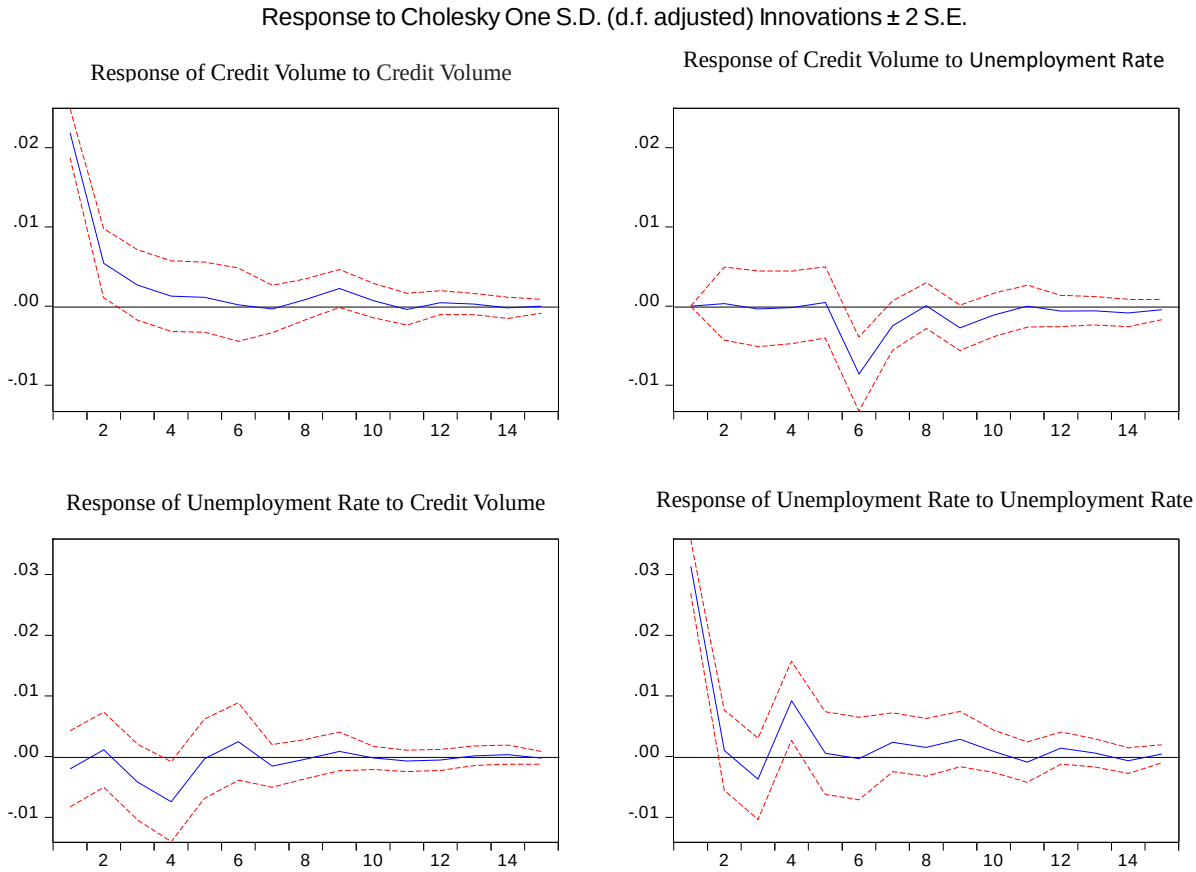
Table 4. Autocorrelation LM Test Results of Series

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	4.731012	4	0.3160	1.192143	(4, 172.0)	0.3160
2	0.128245	4	0.9980	0.031888	(4, 172.0)	0.9980
3	7.995097	4	0.0918	2.033855	(4, 172.0)	0.0918
4	0.819263	4	0.9358	0.204115	(4, 172.0)	0.9358
5	1.596967	4	0.8093	0.398772	(4, 172.0)	0.8093
6	4.066209	4	0.3971	1.022647	(4, 172.0)	0.3971

In time series models, the error term is usually used to represent shocks. The response of each series to its own and other series' errors is expressed as impulse-response functions (Tarı, 2014:453). Impulse-response graphs are examined to see how each series is affected by shocks given to others. Figure 2 shows four impulse-response graphs. The horizontal zero line in each graph represents the point where the response dies out. The region above the zero line indicates a positive response, while the region below indicates a negative response. The red dashed lines in the graphs show the lower and upper bounds of the 0.95 confidence interval, while the

blue line is called the response curve. The X-axis represents the periods, and the Y-axis represents the magnitude of the response. The graph in the top-right corner (Response of Credit Volume to Unemployment Rate) shows the response of domestic credit volume to a shock given to the unemployment rate. It can be seen that domestic credit volume did not respond to shocks caused by the unemployment rate for the first five months. However, between the fifth and eleventh months, domestic credit volume responded negatively to shocks caused by the unemployment rate. After the eleventh month, the effect of this shock died out. The graph in the bottom-left corner (Response of Unemployment Rate to Credit Volume) shows the response of the unemployment rate to a shock given to domestic credit volume. It can be seen that the unemployment rate responded negatively to a shock caused by credit volume in the first month, positively in the second month, negatively between the second and fifth months, positively between the fifth and seventh months, negatively between the seventh and eighth months, and positively between the eighth and tenth months. It can be observed that for the first ten months, the unemployment rate mostly responded negatively to a shock caused by credit volume, and this response disappeared after the tenth month.

Figure 2. Impulse-Response Function Graphs



Variance decomposition is an analysis that explains how much of the changes in a series are due to itself and how much are due to other series (Özdemir and Göçer, 2011:63). Table 5 presents the results of variance decomposition for both series. Variance decomposition is performed for each series for 15 periods. First, when the results of variance decomposition for domestic credit volume are examined, it is seen that the total change in credit volume (100.00) is explained by itself in the first month. In the second month, approximately 99.98% of the change in credit volume is explained by itself, while approximately 0.017% is explained by the unemployment rate. At the end of 15 months, approximately 85.2% of the change in domestic credit volume is explained by itself, while approximately 14.79% is explained by the unemployment rate. There is not much change in the percentage of change explained by itself for domestic credit volume between the ninth and fifteenth months. This can be expressed as the effects of the two series on each other in explaining the total variability lasting for 9 months. When the variance decomposition results of the unemployment rate are examined, it is seen that at the end of 15 months, approximately 92.54% of the changes in the unemployment rate are explained by itself, while 7.45% are explained by domestic credit volume. There is not much change in the percentage of change explained by itself for the unemployment rate between the sixth and fifteenth

months. This can be expressed as the effects of the two series on each other in explaining the total variability lasting for 6 months.

Table 5. Variance Decomposition Findings

Credit Volume-Variance Decomposition:			
Period	**Standard Error**	**Credit Volume**	**Unemployment Rate**
1	0.021853	100.0000	0.000000
2	0.022514	99.98209	0.017908
3	0.022674	99.95773	0.042275
4	0.022709	99.95182	0.048178
5	0.022740	99.91331	0.086690
6	0.024306	87.46416	12.53584
7	0.024435	86.56596	13.43404
8	0.024449	86.58187	13.41813
9	0.024704	85.60616	14.39384
10	0.024740	85.43743	14.56257
11	0.024743	85.44144	14.55856
12	0.024755	85.38838	14.61162
13	0.024764	85.33868	14.66132
14	0.024780	85.23351	14.76649
15	0.024785	85.20308	14.79692
Unemployment Rate- Variance Decomposition:			
Period	**Standard Error**	**Credit Volume**	**Unemployment Rate**
1	0.031425	0.409656	99.59034
2	0.031461	0.536458	99.46354
3	0.031954	2.233469	97.76653
4	0.034074	6.742384	93.25762
5	0.034080	6.749758	93.25024
6	0.034171	7.236219	92.76378
7	0.034286	7.391594	92.60841
8	0.034321	7.390622	92.60938
9	0.034451	7.396390	92.60361
10	0.034462	7.395979	92.60402
11	0.034482	7.430941	92.56906
12	0.034514	7.444617	92.55538
13	0.034520	7.443828	92.55617
14	0.034528	7.449314	92.55069
15	0.034532	7.453195	92.54681

In the study, the causal relationship between domestic credit volume and unemployment rate was investigated using Granger causality test and presented in Table 6. The findings indicate that at the 1%, 5%, and 10% significance level, the unemployment rate Granger causes domestic credit volume. In other words, it can be said that changes in the unemployment rate lead to changes in domestic credit volume.

Table 6. Granger Causality Test Findings

Null Hypothesis	**N**	**F-Statistic**	***p***
Domestic credit volume is not a Granger cause of the unemployment rate.	100	1.54798	0.1832
The unemployment rate is not a Granger cause of domestic credit volume.	100	3.26479	0.0094*

Notes: The significance levels of 1%, 5%, and 10% are used. The lag length is 5.

CONCLUSION

One of the fundamental macroeconomic goals for creating societal welfare in an economy is to reduce the unemployment rate, which in other words means ensuring individuals are employed within the economy. This will lead to economic growth and an increase in prosperity. The participation of individuals in the production mechanisms of the economy and earning income is an important factor in the fight against poverty and reducing income inequality. In addition to the economic aspect of unemployment, there is also a psychological and sociological dimension. In this context, combating unemployment and achieving the targeted employment rates by governments is a desirable situation in terms of the general welfare of society. In addition to the responsibilities that fall to the government to increase employment rates by fighting unemployment, other stakeholders in the economy also have significant responsibilities. Increasing private sector investments, especially in more liberal economies, is a major factor in reducing unemployment rates. Financing investments through borrowing in both private and public sector investments creates new investment opportunities by taking advantage of the leverage effect. These opportunities are the biggest catalyst for increasing employment. Borrowing opportunities are provided in Turkey especially through bank loans. Private and public sector investments are financed through bank loans. The relationship between investments financed by bank loans and unemployment rates has been the subject of research in the literature. Based on this information, this study focuses on the relationship between domestic credit volume and unemployment rates in Turkey. Monthly data covering the period from January 2014 to October 2022 were used. The VAR model was utilized in the study to determine the relationship between domestic credit volume and unemployment rates. Impact-response function and variance decomposition analyses were conducted to interpret the coefficients obtained from the VAR model. Then, the Granger causality test was applied to reveal the causal relationship between domestic credit volume and unemployment rates. In the findings of the impulse-response function, it is observed that for approximately the first five months, there was no response to shocks from the unemployment rate in domestic credit volume, while between the fifth and eleventh months, there was a negative response to shocks from the unemployment rate in domestic credit volume. After the eleventh month, it was found that the effect of this shock had dissipated. A shock from credit volume resulted in a negative response from the unemployment rate in the first month, a positive response in the second month, a negative response between the second and fifth months, a positive response between the fifth and seventh months, a negative response between the seventh and eighth months, and a positive response between the eighth and tenth months. It was observed that the response of the unemployment rate to a shock from credit volume was mostly negative in the first ten months, and it disappeared from the tenth month. As a result, it was determined that shocks from both variables generally created a negative effect for a certain period and then a positive effect, and then dissipated. Based on the impulse-response function, there is some uncertainty in interpreting the relationship between the two variables with definite lines.

In the variance decomposition results, after 15 months, approximately 85.2% of the changes in domestic credit volume were explained by itself, while approximately 14.79% were explained by the unemployment rate. Similarly, after 15 months, approximately 92.54% of the changes in the unemployment rate were explained by itself, while 7.45% were explained by domestic credit volume. In total, it was determined that the effects of the two variables on each other were 9 and 6 months, respectively, in explaining the total variability of the variables. Based on the variance decomposition analysis, it can be interpreted that the process of influencing each other of the variables was relatively short in the research period.

Finally, the causal relationships between domestic credit volume and the unemployment rate were investigated. In this context, according to the results of the Granger causality test, it was found that unemployment rates were the Granger cause of domestic credit volume. Therefore, changes in the unemployment rate create changes in domestic credit volume. This study highlights the significant relationship between domestic credit volume and the unemployment rate in Turkey. The findings suggest that a well-functioning financial system and credit expansion can lead to economic growth and employment. Therefore, policymakers should prioritize policies that promote financial development and credit expansion while ensuring the stability of the financial system.

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