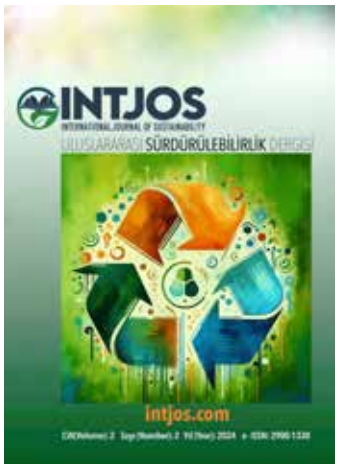

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The Impact of Exchange Rate Volatility on Economic Growth[1]

Döviz Kuru Oynaklığının Ekonomik Büyümeye Etkisi

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SUMMARY

Exchange rate is a complex factor that affects the economic progress of a country. It is an important component of international trade, directly affecting export and import costs and economic growth. In this article, we examine the impact of exchange rate changes on economic growth in Türkiye from a Keynesian perspective. Using quarterly data for the period 1998-2023, we set an empirical model. By rigorously analysing real exchange rate data, we evaluate the output response with statistical techniques such as the ARDL bound test. Our research reveals that public spending, credit to the private sector and terms of trade positively affect real gross domestic product (GDP). On the other hand, the effect of changes in the real exchange rate on GDP is not statistically significant. Based on those results, increase in public expenditures and credit support to the private sector to stimulate economic growth. Additionally, appropriate policy

1 This article has been produced from a master's thesis.

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measures should be taken to ensure exchange rate stability and prevent fluctuations.

Key Words: Exchange rate, economic growth, real exchange, to ensure exchange rate stability, real gross domestic product.

INTRODUCTION

Exchange rate volatility in Türkiye between 1990 and 2024 is shaped by a combination of economic and political factors. 1990-2024 covers a period in which Türkiye entered the economic liberalization process and became more integrated into global markets. Adoption of financial liberalization policies expose to sharp exchange rate fluctuations (Barguellil et al., 2018). In the early 1990s, contractionary monetary policy and structural reforms implemented by Türkiye played an important role in ensuring exchange rate stability. However, political uncertainties and high inflation rates during this period put pressure on the exchange rate and increased volatility.

The 2001 economic crisis led to a radical change in Türkiye's exchange rate policy, triggering the transition from a fixed exchange rate regime to a floating exchange rate system. Although this change caused significant fluctuations in the value of the Turkish Lira, it paved the way for the strengthening of the independence of the Central Bank and the introduction of new policy tools such as inflation targeting.

Since the mid-2000s, the Turkish economy has experienced significant growth with low inflation rates and macroeconomic stability. However, the 2008 global financial crisis and subsequent geopolitical developments brought exchange rate volatility back to the agenda. In particular, political tensions and economic uncertainties towards the end of the 2010s led to serious declines in the value of the Turkish Lira.

In the early 2020s, two important factors began to fluctuate the exchange rate, the pandemic, which shook the global economy, negatively affected the economic activities of many countries. This increased investors' perception of risk and led to volatility in exchange rates and during this period, political developments in Türkiye and fluctuations in domestic politics created uncertainty in the foreign exchange markets and triggered fluctuations in the exchange rate. The Turkish Lira, which reached record low levels in 2021, exhibited similar volatility in 2022 and 2023. During this period, the Central Bank's interest rate cuts and changes in economic management increased uncertainty in the markets and continued the pressure on the exchange rate.

In other words, exchange rate volatility in Turkey between 1990 and 2024 was under the influence of both internal and external factors and was closely related to political and geopolitical developments as well as economic policies. The volatility experienced during this period can be considered as an indicator of the openness of the Turkish economy and its place in global markets.

Exchange rate volatility means that the value of a country's currency against other currencies constantly fluctuates, which can have significant effects on the global economy and countries. Fluctuations in exchange rates, which are affected by factors such as interest rates, inflation, political developments and the global economic conjuncture, pose a risk especially for developing

countries. Exchange rate volatility, which upsets the foreign trade balance, makes imports more expensive, encourages exports, discourages investments and causes general economic instability, can make the economic development of countries difficult. Therefore, it is very important for countries to carefully manage their macroeconomic policies and ensure stability in financial markets (Morina et al., 2020).

A range of studies have consistently found a negative impact of exchange rate volatility on economic growth. Barguellil (2018) and Morina (2020), (Yensu et al., 2022) found that negative relationship to be significant, with Morina (2020) emphasizing the need for stable exchange rates to foster growth. Yensu (2022) further explored this connection in the context of Ghana, identifying negative correlations between exchange rate volatility and various economic factors. Janus (2015) extended this analysis to the impact of the euro on exchange rate volatility, finding that its adoption was associated with a decline in volatility and a subsequent increase in economic growth. These findings collectively underscore the importance of exchange rate stability for sustained economic growth. While, Some of the studies such as (Azid et al., 2005) stress that there is exchange rate variability has no significant effect on GDP.

On of the base study about the exchange rate variability effect on economic was carried out by (Edwards, 1986). By using the variance components method, (Edwards, 1986) addresses criticisms and theoretical debates about the use of devaluations in economic stabilization policies and provides empirical evidence on this issue.

Two important studies conducted by Edwards (1986) and (Rhodd, 1993)a examining the impact of devaluation on real output will be mentioned. Both studies argue that, contrary to conventional wisdom, devaluations do not always have an expansionary effect and in some cases can lead to a decline in real output. Edwards (1986) In his study "Are Devaluations Contractionary?", Edwards examined real output behaviour using a model on 12 developing countries between 1965 and 1980. The model includes possible determinants of real growth, such as changes in monetary and fiscal policies, exchange rates and trade conditions. The study's findings show that devaluations had a small contractionary effect in the first year, but this effect was completely reversed in the second year. It is stated that devaluations are neutral in the long run. Edwards also noted that nominal devaluations could create some contractionary pressures on aggregate demand that exceed the traditional spending-shifting effect. For example, a devaluation can lead to a higher price level, creating a negative real equilibrium effect, which in turn can lead to a decline in aggregate demand and output. In addition, devaluation may cause a decrease in total demand and production due to its effect on income distribution. Rhodd (1993), in his study titled "The impact of real exchange rate changes on output: Jamaica's devaluation experience", Rhodd examined the impact of devaluation on the Jamaican economy. Based on traditional economic theory and empirical research, Rhodd shows that devaluation improves the balance of payments by reducing import demand and increasing export supply. However, Rhodd notes that recent research suggests that devaluation also occurs as a result of reduced income and adjustment of the trade deficit. The three-market Keynesian model used in the study found that devaluation has a contractionary effect in the short term and an expansionary effect in the long term, according to

the results of research on the Jamaican economy. It is stated that devaluation can reduce output through its effects on aggregate supply, its effects on investments and interest rates, and its effects on aggregate demand. In particular, it was emphasized that the increase in imported input costs will reduce the demand for imported inputs, which may lead to a contraction in total supply after devaluation.

Ünlü (2016) examined the relationship between exchange rate volatility and economic growth specifically for Türkiye. In the study, the effects of consumer price index, gross fixed capital formation, foreign direct investment and exchange rate volatility on Turkey's real gross domestic product were analysed using quarterly data. As a result of the ARDL Boundary Test, it was determined that there was a long-term relationship between the variables. It was found that the CPI and SSO variables have a positive and significant effect on real gross domestic product, but the FDI variable is positive but insignificant. It has been observed that the OYN variable has a negative and significant effect on real gross domestic product. These results show that exchange rate fluctuations have negative effects on economic output in Turkey.

The impact of exchange rate volatility on economic growth has been a long-debated issue. In the research conducted by (Barguellil et al., 2018), an analysis was conducted based on a sample of 45 emerging and developing countries between 1985 and 2015 to examine this effect. The findings of the research show that exchange rate volatility has a negative impact on economic growth. This effect is especially evident in countries with flexible exchange rate regimes. In a flexible exchange rate regime, international trade and investment activities become more uncertain as exchange rate fluctuations are greater. This uncertainty is a factor that negatively affects economic growth. In the fixed exchange rate regime, international trade and investments take place in a more stable environment, since the fluctuations in the exchange rate are less. This ensures that exchange rate volatility does not have a significant impact on economic growth. The research emphasizes that it is important to ensure stable and predictable exchange rates, especially for developing countries. The stability of foreign trade and investments in these countries is a factor that supports economic growth. Therefore, it is critical that exchange rate policies are stable and predictable to support economic growth. The methodology used in the research includes the difference method and system generalized moment estimators. Countries were selected based on monthly effective exchange rate data. Additionally, the relationship between exchange rate volatility and exchange rate regimes and financial openness was also examined. (Barguellil et al., 2018) research shows that exchange rate volatility has a significant impact on economic growth, and this impact is especially evident in developing countries with flexible exchange rate regimes. Therefore, ensuring stable and predictable exchange rates in these countries should be considered an important policy tool to stimulate economic growth. Another study is (Morina et al., 2020) study. The study conducted by Morina et al (2020) reveals that exchange rate volatility has a significant negative impact on real economic growth in Central and Eastern European (CEE) countries. These findings show consistency for different measures of exchange rate volatility and highlight that policymakers should focus on adopting a stable exchange rate policy to stimulate economic growth. The study analyzes annual data of fourteen OEA countries between 2002 and 2018 using the panel data

fixed effect estimation method. The aim is to determine whether there is a significant negative relationship between exchange rate volatility and real economic growth. The findings clearly show that exchange rate volatility negatively affects real economic growth in OEA countries. This result remains consistent when different exchange rate volatility measurements are used, and it is observed that economic growth decreases as exchange rate volatility increases. Morina et al.'s (2020) study emphasizes that exchange rate stability is critical for economic growth in OEA countries. Therefore, policymakers in the region need to prioritize developing policies to reduce exchange rate volatility and maintain a stable exchange rate regime. In this way, a more solid basis can be created for the long-term development and prosperity of the region.

Tekgöz and Özcan (2020), investigated the relationship between exchange rate volatility and financial development in five emerging economies (Brazil, Czech Republic, Poland, Chile and Turkey). Panel data analysis was conducted using quarterly data for the period 2001-2018. The results show that exchange rate volatility has a causal relationship towards the financial system. The findings support the literature and reveal that exchange rate volatility causes movements in the financial system.

The effect of exchange rate volatility on economic growth was examined by Ağaslan and Alkan (2021). In this context, the relationship between economic growth and exchange rate volatility of 28 countries was analysed with data from the period 2002-2019. GARCH model was used for volatility series and analysis was performed with panel corrected standard errors (PCSE) estimator for panel data analysis. The findings revealed that exchange rate volatility negatively affects economic growth in developing countries, especially when compared to developed countries. Additionally, it has been found that human capital contributes negatively to economic growth in developing countries, but this effect is positive in developed countries. Based on results of this study the volatility of the exchange rate has a more negative impact on economic growth than the level of the exchange rate. Production strategies of developing countries based on intensive energy and raw material imports should be reviewed with policies aimed at reducing foreign dependency, which may be compatible with the findings. In another study Özdemir and Bilgen (2021) aimed to determine the effects of exchange rates on economic growth in Turkey. Analysis was made with the Vector Autoregressive method using quarterly data between 2003Q1 and 2019Q4. The findings show that exchange rate decreases or easing policies positively affect economic growth in Turkey. These results reflect the impact of the economic policies implemented by policy makers. In other words, the findings were found not to be compatible with the theoretical framework.

(Yensu et al., 2022) stress that changes in exchange rate negatively correlated with economic factors and there is a negative long run relationship with economic growth, and policy recommendations include encouraging industrialization and tightening monetary policy. (Yensu et al., 2022) employed not technical statistical method, correlation and regression analysis the data spanning from the year between 2000 and 2020.

Based on (Azid et al., 2005) study, exchange rate variability has no significant effect on GDP. (Azid et al., 2005) found a positive but statistically insignificant relationship between exchange

rate volatility and manufacturing production, suggesting that excessive volatility or changes in exchange rate regimes do not significantly affect output. The methodology used in the study includes regression analysis to estimate the interaction between exchange rate volatility and manufactured production, with GARCH estimation used to measure the conditional variance of the real exchange rate.

Akyol, Bilirer and Zeren (2023) aimed to measure and evaluate the effects of unemployment, exchange rate and export rates on economic growth in Turkey. For this purpose, time series analyses were conducted using data from the period 1961-2021. Causality relationships between variables were investigated bidirectional using Fourier Toda Yamamoto and Fourier Quantile causality tests. As a result of the causality tests, no causality was found between exchange rate and unemployment variables and economic growth. A one-way causality relationship was detected from exports to economic growth, but no causality was found from economic growth to exports. Using the Fourier ADL cointegration test, a long-term cointegration relationship was found between unemployment, exchange rate, exports and economic growth. Therefore, it was concluded that there was co-activity among the variables.

1. EMPIRICAL MODEL AND DATA

Empirical part is closely followed the framework discussed in detail in the previous section and theoretical model represents long-run relationships and examines the relationship between aggregate production and other variables, such as exchange rate, fiscal policy and monetary policy. However, many empirical studies such as (Razzaque et al., 2017), (Atkins, 2000) (Edwards, 1986), and (Rhodd, 1993) (Witter, 1983) (Ozata, 2020) (Jawaid & Waheed, 2011) (Morina et al., 2020) have included external terms of the respective countries, including the balance of trade (TOT) and also based on those references the reasons is that the term of trade is often used in the analysis of the effect of exchange rate volatility on economic growth as it shows the connection between the country's export prices and import prices, thus reflecting the possible influence of exchange rate flutter. Some other reasons are that changing of exchange rates can impact on a country's trade balance. A positive TOT, for example, means that a country can get more imports with the same amount of exports which may imply an increase of its wealth. Exchange rate fluctuations can potentially cause a change in the price competitiveness of goods and services of a nation. The term of trade is used to evaluate the decline in export and import prices in relation to those of its trading partners due to the disruption of the exchange rates. Trade's term of trade may have an impact on the distribution of resources for export-oriented and domestic industries. Fluctuations in exchange rates which might be the reason for term of trade shifting can bring a re-allocation of resources and then a developmental slowdown. Exchange rate displacements may provoke incomes among nations through the mechanism of terms of trade. A devaluation of the exchange rate serves as a gain for a country specializing in export commodities that in the long run results in higher national income and growth. Exchange rate volatility continuously influences investment decisions, however, because it generates uncertainty. The term of trade is the way to

evaluate how exchange rate causes trade and investment flows - particularly in the export sector – and consequently, growth. Politicians say that trade balance is a measure of economic activity improvement. It helps to figure out if policies enforced to prevent exchange rate fluctuations are correct for the growth of economy.

In small open economies, Terms of Trade (TOT) is an important exogenous variable. When not explicitly controlled in experiments, the unaccounted for effect of TOT can be conveyed as an indicator of foreign competition through the exchange rate. However, it appears that the real exchange rate does not always accurately reflect a country's foreign trade balance. TOT and exchange rate movements may differ for many countries. Therefore, the impact of TOT on different sectors cannot be fully measured by the real exchange rate variable. For those reason in this article, we decided to add TOT to our main empirical model.

Regarding government expenditures, government expenditure is a significant measure of fiscal policy stance for several reasons, especially when assessing the impact of exchange rate fluctuations on economic growth: Government expenditure is a significant measure of fiscal policy stance for several reasons, especially when assessing the impact of exchange rate fluctuations on economic growth: Government expenditure is a direct marker of fiscal activity and the spending has the power to substantially strengthen aggregate demand and make a country much more prosperous (IMF, 1995). Greater levels of government expenditures are an indication of a consequent increase in the budget deficit which in turn results in an increase in the level of government expenditure consequently spurring economic growth and especially so in the event of recession where the economy is below its potential output and also held up elections automatically policy can play a stabilizing function, given the favourable interest rates and the increase of public spending, which will act as a defender to economic growth[2]. Government financial aid can have a multiplication effect on the economy, that is, the first input of the financial budget can lead to the bigger spending amount in all economic activities. Allocations to infrastructure, education, and technology enhance productivity and propel the economy to foster long-term economic development and changes in government spending are a signal for investors; performance of economic policies reflect the credibility of government and affect their confidence in profitable investment as well as in growth.(IMF, 1995). The government expenditure is a great instrument that can be used as a tool of stabilizing the economy in the face of exchange rate volatility by shifting the burden of negative effect on the country's export and restores its potential to import that are derailed by exchange rate fluctuations (Ozata, 2020). Therefore, by considering above studies and their models, our model can be written as follows:

$$log\,GDP_t = \alpha_0 + \alpha_1\, log(GEX_t) + \alpha_2\, log(krd_t) + \alpha_3\, log(TOT_t) + \alpha_4\, log(REX_t) + \varepsilon_t$$

Eq1

Where, log represents the natural logarithm. Time t is indicated by the subindex. GDP, GEX, krd, TOT and REX stand for real GDP, real government expenditure, credit to the private sector, term of trade and real exchange rate respectively. ε represents the error term. As expected, it is

2 https://www.economicshelp.org/blog/glossary/fiscal-stance/

stated that the sign of the coefficient cannot be determined in priori. while and are positive. The coefficient, which covers the effect of real devaluation on real output growth, is the main focus of the study and its sign cannot be predetermined.

The data were taken from different databases. Real GDP (GDP), credit to the private sector (CRD), real government expenditures (GEX), and real exchange rate (REX) data were obtained from the Federal Reserve Economic Database (FRED). Balance of trade (TOT) data was taken from the Organization for Economic Co-operation and Development (OECD) database. The time range of the data covers seasonal data from 1998 Q1 to 2023 Q3. Table 1 shows our variable and source of our data:

Table 1: Variables

Variables	Acronym	Source
Real Gross Domestic Product for Turkey, Domestic Currency	RGDP	Federal Reserve Economic Data
Total Credit to Private Non-Financial Sector, Adjusted for Breaks, for Turkey, Billions of Turkish New Liras	Krd	Federal Reserve Economic Data
Real Broad Effective Exchange Rate for Turkey, Index 2020=100	REX	Federal Reserve Economic Data
Real General Government Final Consumption Expenditure for Turkey, Domestic Currency	GEX	Federal Reserve Economic Data
Term of Trade	TOT	OECD

The above table contains the abbreviations, full names and data sources of the variables used to analyse Türkiye's economic indicators. These variables include Türkiye's real gross domestic product (GDP), total credit amount to the private non-financial sector (Krd), real effective exchange rate (REX), real general government final consumption expenditures (GEX) and trade balance (TOT). There are. These variables were obtained from reliable data sources such as the Federal Reserve Economic Database and the Organization for Economic Co-operation and Development (OECD).

1.1. Unit root test:

One of the most fundamental steps in econometrics and finance is unit root tests. They are used to determine if a time series is stationary or not. According to (Wolters & Hassler, 2006) commencing the empirical time series study with the unit root tests has become a common practice. (Herranz, 2017) emphasis on unit root processes in linear regressions and explains how unit roots can affect equality of relationship while the unit roots close together can impair cointegration. (Wolters and Hassler, 2006) accentuates the necessity of using the determinant component in unit root tests and postulates the expediency of testing for structural shifts. (Dickey & Fuller, 1979) and (Phillips & Perron, 1988) unit root test methodologies are the testing methods we employ.

The results are given in a table 2.

Table 2: Unit Root Results

	Augmented Dickey–Fuller test (ADF)		Phillips–Perron test (PP)	
Variables	intercept	Intercept and trend	intercept	Intercept and trend
LRGDP	-0.137	-3.438**	-0.701	-8.170***
LKrd	-1.78	-2.81	-1.57	-2.81
LKrd	-8.500***	-8.520***	-8.500***	-8.516***
LGEX	0.067	-2.71	-1.509	13.165***
LGEX	-36.197***	-36.007***	-51.242***	-50.906***
LTOT	1.269	-0.948	0.418	-1.295
LTOT	-4.530***	-4.844***	-2.943**	-3.048
LREX	-0.808	-1.733	-0.609	-1.455
LREX	-9.985***	-10.169***	-10.073***	-23.259***

Note: ** represent a 95% confidence level, and *** represent a 99% confidence level. L shows natural logarithm and Δ represent first difference of variables.

To evaluate the stationarity of the variables presented in Table 2, we employed two common unit root tests: the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests. The results indicated that the LRGDP variable exhibited stationarity at its original level (I(0)). In contrast, the remaining variables required differencing once (becoming I(1)) to be stationarity.

Considering unit root test results, ARDL bound model is suitable methodology for testing long-run relationship. The ARDL Bound Technique can specially be applied in conjunction with stationary variables to analyse their interrelationships. The model presents a chance of understanding relationships between variables in the long run and short term even when they belong to different orders of integration. Since dependent variable and independent variables are integrated in mix of order I(0) and I(1), we can apply ARDL to analyse both the short run dynamics (by incorporating lagged values of the variables) and long run equilibrium relationship (by providing the cumulative effects over time). It turns attention to the possibility of cointegration among the variables, which defines them as moving together in the long run under the influence of short-run fluctuations. The bound-tests approach for the ARDL cointegration was proposed by (Pesaran et al., 2001). The testing method ARDL bounds of time series analysis is widely in use,

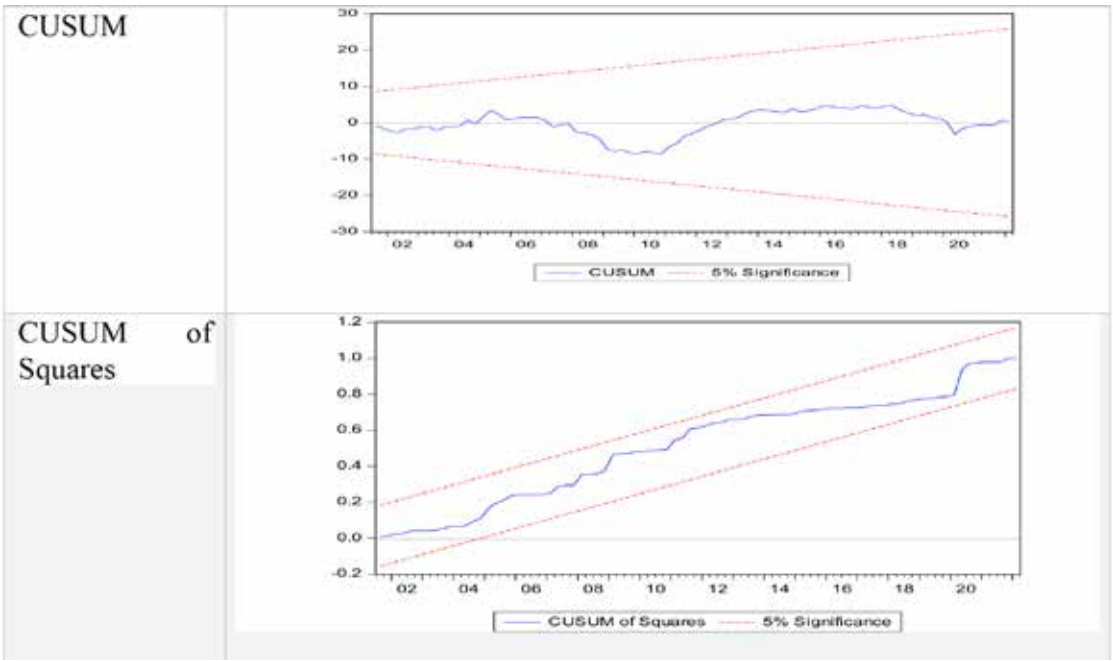
mostly in small data samples case.

Bounds way of testing cointegration is preferable when other approaches are not possible, as for instance, in small samples, or when some of the variables are mixed-degree integrated stock. This method performs bounds testing to check the presence of long-term relationship between the dependent and the independent variables and, if cointegration is confirmed, applies the econometric technique called ARDL with a view to compute long-run coefficients. In the model, it is also possible to establish efficiency correction one to bring in short run dynamics and the speed of adaptation. This may be based on different lag numbers for individual variables and as such, ARDL can offer a degree of flexibility in respect of choosing the ARDL model. Under this model, variables can either be stationary or non-stationary and serve as the basis for the constant need of pretesting the exogenous variables for unit roots. Besides that, the ARDL model supports both short and long run coefficients which are analysed simultaneously. The ARDL methodology which has already made its way into the toolbox of econometric analysis is quite effective one. Nevertheless, the appropriate model must be specific, essential conditions of econometric analysis should be met (Pesaran et al., 2001), (Ojaghlou, 2019), (Ojaghlou, 2020). Table 3 show the results of long run coefficients of ARDL bound test:

Table 3: long run coefficients of model

Variables	Coefficient	t-Statistic	Probability
intercept	5.869	2.117	0.037
LGEX	0.503	2.029	0.0456
LTOT	0.175	0.581	0.562
LREX	-0.042	-0.499	0.618
LKRD	0.125	2.403	0.0185
EC_{t-1}[4]	-0.418	-4.957	0.0000
F-Bounds	5.662 Upper bound of 99%=4.37		
χ^2_{RESET}	> 0.10		
χ^2_{ARCH}	> 0.10		

[4] $EC = LRGDP$ - (O.5035$LRGEE$ + 0.1758LTT - 0.0423$LREX$ + 0.1256$LKRED$ + 5.8698)



Note: L shows natural logarithm of variables

Based on the long-run coefficients of the ARDL bound test summarised Table 3, the model reveals several significant insights. The intercept coefficient suggests that even in the absence of explanatory variables, there's a baseline effect on the log of national income (LGDP), with a value of 5.869.

The coefficients for LGEX and LKRD are (0.503) and (0.125). Both of them are positive statistically significant at the 5% level. As noted in model specification those coefficients expected to be positive, indicating that increases in government expenditure and total credit to the private non-financial sector positively impact real gross domestic product (LRGDP).

While the negative coefficient (-0.042) of the real exchange rate suggests a negative impact on economic activity, its statistical insignificance implies that changes in the real effective exchange rate do not have a significant effect on real gross domestic product (LRGDP). This suggests that other factors may be driving the observed relationship between the real exchange rate and LRGDP.

The coefficient for LTOT (0.175) is positive and also not statistically significant, indicating that changes in the term of trade have no significant effect on real gross domestic product (LRGDP).

Moreover, the lagged error correlation term $\boldsymbol{EC}_{t-1}$ is (-0.418) and it is statistically significant and within the accepted range of -1 and 0.

In the ARDL model, the lagged error correction term is behaving in line with the expectations; both theoretically and statistically, the trend confirms a credible and significant adjustment process towards a long run equilibrium. ARDL on our Autoregressive Distributed Lag (ARDL) model is the speed at which the dependent variable will respond during the process of returning

to equilibrium with the independent variables. The value of -0.418 flies in the face reckons that the reservoir's disequilibrium reduces by 41.8% in a one period. This means the model says the long-term changes in the relationship between variables aren't invalid and that adjustments the short-run dynamics are moving toward on long-term equilibrium. The error correction term, that has gain value from -1 to 0, is the accepted range. It gives a value of -1 belying the fact that the disequilibrium is corrected in only one period in the past, which is, indeed, less frequent in the economic scenario. The value of 0 refers to no formula and the value of 10 would imply setting an upper limit of around 2 degrees Celsius. This way, value -0.418 is fair as it means a moderate dynamic stability. Economically, a coefficient of -0.418 indicate that if there is a shock that causes a deviation from the long-run equilibrium, nearly 42% of that deviation will be corrected within the one period ahead and this provides insights into the dynamic behaviour of the variables and the stability of the long-run relationship.

F-Bound critical value is 5.662. and upper bound of 99% is 4.37, indicating the model is within the bounds and statistically reliable. Autocorrelation (X^2_{RESET}) and heteroscedasticity (X^2_{ARCH}) tests show no significant problem, indicating that autocorrelation and heteroscedasticity are not make any problems in the model. Additionally, the CUSUM and CUSUM of Squares tests both are stability. Both of them suggest that the model adequately captures the relationship between the explanatory variables and real gross domestic product (LRGDP) over time.

In summary, the model suggests that government expenditure, total credit to the private non-financial sector and term of trade have a positive impact on the log of national income, while the real effective exchange rate has negative effect on GDP, but it is not statistically significantly.

CONCLUSION

Exchange rate refers to the value of a country's currency against other currencies and has a significant impact on economic growth. Prioritizing scenario planning and risk assessment is essential for proactive crisis preparedness (Özcan, 2024). A strong exchange rate can make imports cheaper and exports more expensive, which can make domestic producers less competitive and slow economic growth. On the other hand, a weak exchange rate can stimulate exports and attract foreign investments, which can boost economic growth. However, exchange rate volatility, that is, sudden and unpredictable changes in its value, creates uncertainty for businesses and can adversely affect long-term investment decisions. In the case of Turkey, exchange rate fluctuations experienced in the period from 1990 to 2024 affected the dynamics of both local businesses and international trade and played a decisive role on economic growth. Exchange rate policies are therefore critical to ensuring economic stability and supporting sustainable growth. In this context, this study aims to understand the effects of exchange rate changes on economic growth in Turkey. With an empirical model using the Keynesian analytical framework, real exchange rate data are rigorously examined and the output response evaluated using cointegration techniques such as the ARDL bounds test. For this purpose, quarterly data for the period 1998-2023 was used. The results show that public expenditure, total credit to the private sector, and trade terms

positively affect real gross domestic product, while real exchange rate changes have a negative impact on GDP. This effect is not statistically significant. Considering these findings, it may be recommended to increase public expenditures and credit support to the private sector to stimulate economic growth. In addition, appropriate policy measures should be taken to ensure exchange rate stability and prevent fluctuations.

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