



## Money Supply, Inflation and Dollarization: An Analysis on Türkiye Using Fourier Models

Para Arzı, Enflasyon ve Dolarizasyon: Türkiye Üzerine Fourier Modeller ile İnceleme

Serhat Alpağut<sup>a</sup>

<sup>a</sup>Dr. Öğr. Üyesi, Ağrı İbrahim Çeçen Üniversitesi, Eleşkirt Meslek Yüksekokulu, Finans Bankacılık ve Sigortacılık Bölümü, Ağrı/Türkiye, salpagut@agri.edu.tr, ORCID: 0000-0001-7326-4048 (Sorumlu Yazar/Corresponding Author)

### ARTICLE INFO

#### Article Type

Research Article

#### Keywords

Inflation  
Dollarization  
Money Supply  
Monetary Policy  
Fourier ADL

**Receive:** Mar, 21, 2024

**Accepted:** Apr, 30, 2024

### ABSTRACT

This study examines the impact of inflation and money supply on dollarization. Especially in recent years, the rapid rise of the exchange rate and inflation in Türkiye has put the phenomenon of dollarization back on the agenda. The study covers the period 2012Q4-2023Q4. The study first applies the Fourier ADL cointegration test, which allows for soft breaks. As a result of the test, it was found that the variables have a long run relationship. In the short run, only budget revenue has a positive effect on dollarization. In the long run, the exchange rate, exports, money supply, and deposit rates have a positive effect, while inflation has a negative effect. The study also applied the Fourier-Toda-Yamamoto causality test. As a result of the test, bidirectional causality was found between exchange rate, inflation and money supply variables and dollarization. The striking result of the study is that inflation has a negative impact on dollarization. This result, which is consistent with some studies in the literature, is attributed to the money supply. Although the demand for foreign exchange increases because the money supply is higher than inflation, the dollarization index decreases. This explanation can explain the negative relationship.

### MAKALE BİLGİSİ

#### Makale Türü

Araştırma Makalesi

#### Anahtar Kelimeler

Enflasyon  
Dolarizasyon  
Para Arzı  
Para Politikası  
Fourier ADL

**Geliş Tarihi:** 21 Mart 2024

**Kabul Tarihi:** 30 Nisan 2024

### ÖZ

Bu çalışma enflasyon ve para arzının dolarizasyona etkisini incelemektedir. Özellikle son yıllarda Türkiye'de kur ve enflasyonda görülen hızlı yükselişler, dolarizasyon olgusunu tekrar gündeme getirmiştir. Çalışma 2012Q4-2023Q4 veri dönemini kapsamaktadır. Çalışmada ilk olarak yumuşak kırılmalara izin veren Fourier ADL eş bütünlüşme testi uygulanmıştır. Test sonucunda değişkenlerin uzun dönemli ilişkiye sahip oldukları tespit edilmiştir. Kısa dönemde sadece bütçe gelirlerinin dolarizasyona pozitif etkisi tespit edilmiştir. Uzun dönemde ise döviz kuru, ihracat, para arzı ve mevduat faizinin pozitif, enflasyonun ise negatif etkisi bulunmaktadır. Çalışmada ayrıca Fourier Toda-Yamamoto nedensellik testi uygulanmıştır. Test sonucunda döviz kuru, enflasyon ve para arzı değişkenleri ile dolarizasyon arasında çift yönlü, nedensellik tespit edilmiştir. Çalışmanın dikkat çeken sonucu enflasyonun dolarizasyonu negatif etkilemesidir. Literatürde bazı çalışmalarla uyumlu olan bu sonucun para arzından kaynaklandığı tahmin edilmektedir. Para arzının enflasyondan yüksek olmasından dolayı döviz talebi artsa da dolarizasyon endeksinde düşüşler görülmektedir. Bu gerekçe negatif ilişkiyi izah edebilmektedir.

## 1. Introduction

Dollarization is the widespread use of a foreign currency in place of a country's official currency. When this happens, transactions in foreign currency become more common in the country and foreign exchange prices become dominant in the country's economy. Dollarization usually occurs for reasons such as economic instability, inflation, and mistrust of the currency.

**Atıf/Cite as:** Alpağut, S. (2024). Money Supply, Inflation and Dollarization: An Analysis on Türkiye Using Fourier Models. *International Journal of Economics, Business and Politics*, 8(1), 244-261.



Bu makale, Creative Commons Atıf (CC BY) lisansının hüküm ve koşulları altında dağıtılan açık erişimli bir makaledir. / This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license.

Particularly in developing countries, exchange rate appreciation can lead to large macroeconomic imbalances. One of the most important of these imbalances is price inflation. As a result of rapid exchange rate appreciation, economic units adjust their prices to the expected exchange rate level rather than to the current exchange rate (Alesina and Barro, 2001: 381). Thus, due to the inflationary effect of reducing the value of money, economic units increase their demand for foreign exchange as a means of storing wealth. The increased demand for foreign exchange in turn leads to an increase in the exchange rate (Yeyati, 2006: 64). Thus, first, inflation rises due to the pass-through of exchange rates to prices. Then the exchange rate rises due to inflationary effects. Finally, the exchange rate and inflation continue to feed off each other.

Dollarization is a phenomenon that damages the value and reputation of the domestic currency. Dollarization is detrimental to monetary and price stability because it increases sensitivity to external shocks and reduces the effectiveness of monetary instruments (Fabris and Vujanović, 2017: 22; Bailey, 2005: 3). For this reason, it is a phenomenon that needs to be addressed at the macroeconomic level. Central banks are institutions responsible for ensuring price stability. It ensures price stability in the short run through interest rates and in the long run through the money supply. It is controlled by means of contractionary monetary policy, especially in times of rising exchange rates and increasing demand for foreign exchange. In an economy where inflation and exchange rates are rising, increasing the demand for foreign exchange is rational behavior. However, an increase in the money supply over the same period can cause the dollarization index to fall even as the demand for foreign exchange increases. This is because dollarization refers to the ratio of foreign currency deposits to total deposits or money supply. In this case, the money supply plays an important role in the relationship between inflation and dollarization.

Türkiye is a country that has been living with the phenomenon of dollarization for many years. The fact that exchange rates have been announced daily since 1981, the right to open accounts and save in foreign currency in 1984, and the fact that the national currency became fully convertible in 1989 caused significant fluctuations in the exchange rate between 1980 and 1990 (Sarı, 2007: 28). In the 1980s, dollarization increased mainly due to foreign exchange return expectations. The dollarization index, which was 13 in the 1980s, reached 23% in 1989 (Özer, 2022: 28). The 1990s were years in which Türkiye, like many other countries, faced economic crises and political turmoil. In 1993, the excess liquidity resulting from the cancellation of Treasury auctions increased the demand for foreign currency. The crisis of 1993 occurred. In addition, the 1999 earthquake and the Russian crisis in the same year increased the demand for foreign currency, leading to an increase in dollarization. During this period, dollarization peaked at 55 percent in 1994. The fact that it did not increase further thereafter was interpreted as individuals switching to national currency deposits due to high interest rates (Coşkun, 1999: 253). There were two major crises in the 2000s. 2001 was a national crisis and 2008 was a global crisis. Although the increase in the private sector's external debt and external financing difficulties due to the 2001 crisis brought the dollarization level to 55% in 2002, it decreased to 29% in 2012 as a result of the economic programs implemented afterwards (Sever, 2012: 211). It is estimated that the main reason for the decrease is the decrease in inflation and the increase in global liquidity (Akşehirli, 2024: 341). From this date until 2021, the index increases to 66% and then decreases to 44% in 2023. Important developments in the upward trend until 2021 are that the Federal Reserve began to increase interest rates in 2016 and the Covid19 pandemic in 2019 (Akkaya, 2023: 619). In addition, the Central Bank of the Republic of Türkiye's reduction of interest rates between 2018-2020 and 2021-2023, despite high inflation, is also believed to have affected dollarization.

Looking at studies on Türkiye, studies by Serel and Darıcı (2006); Zeybek (2014); Taşseven and Çınar (2015); Demirgil and Birol (2020); Demir and Sezgin (2023) concluded that inflation positively affects dollarization. Studies by Hekim (2008); Saraç (2010) and Kaya and Kara (2022) concluded that inflation negatively affects dollarization. Studies by Dumrul (2015); Yılmaz and Uysal (2019); Ağaslan and Gayaker (2019); Y. Yalta and T. Yalta (2022) concluded that the effect is

very small or absent. From these studies, it can be seen that there is no consensus in the literature on the effect of inflation on dollarization.

Türkiye has experienced periods of significant economic dislocation, especially in the recent past. Türkiye has recently experienced important events such as an attempted coup, a pandemic, terrorist attacks, political processes and natural disasters. All these developments are important breaking points for the economy. For an accurate analysis, it is very important to include such important economic breaks in the model. One method is to include each break in the model as a dummy variable. Another problem with including breaks in the model is that the impact range of each break must be known exactly. Fourier models, which have recently become popular, are models that can capture soft fractures by adding trigonometric terms to the model without the need to know the date and impact duration of the fractures. It is believed that the use of such an econometric model in the literature on the subject will bring innovation to the subject.

The order of the following parts of the study is as follows. The second part are examining Türkiye's inflation, dollarization, and money supply data. A brief theory of the subject is discussed in the third section. The fourth chapter provides a summary of the literature. The fifth chapter presents the variables and the model to be used in the study as well as the econometric methodology. The sixth chapter presents the results of the analysis. The seventh chapter presents the results and discussion.

## **2. Theoretical Background**

When foreign currency replaces domestic currency in an economy, we can talk about dollarization in that country. There are different degrees of dollarization. However, when economic units subject their contracts, payments, obligations and assets to business and transactions in foreign currency, this indicates full dollarization. Small countries such as Panama and Ecuador are examples of this situation in the world (Serdengeçti, 2005: 2). Looking at the last decade, Türkiye has a dollarization rate of 33% at its lowest in 2012 and 66% at its highest in 2021. The values of this index, which expresses the ratio of foreign exchange deposits to the money supply, are quite high. With these index values, Türkiye is experiencing partial dollarization.

Currency substitution refers to economic units transacting in foreign currency instead of domestic currency when holding deposits or borrowing money. The reason that pushes economic units to do so is the deterioration of the country's macroeconomic indicators. In economies with high inflation, the value and purchasing power of the domestic currency declines over time. This increases the opportunity cost of local money. Economic units hold assets in foreign currency to protect the purchasing power of their deposits. Economic units are motivated to protect their assets by acting rationally. This situation is known in the literature as asset dollarization (Zeybek, 2018: 290). Here, economic units have an incentive to protect themselves against inflation. They try to protect themselves against inflation by behaving rationally. Deposit interest is a good solution here. Positive real interest paid by the banking system can reduce the demand for foreign exchange and dollarization. On the other hand, real interest is an important tool in the fight against dollarization, as it will increase the short-term inflow of foreign capital into the country (Sever, 2012: 206).

A further increase in dollarization can also lead to some new macroeconomic problems. The first of these problems is the increase in input costs as a result of the depreciation of the domestic currency due to dollarization in an economy with a high import content. Producers reflect this cost increase in their prices, both immediately and with a time lag (Kolcu and Yamak, 2022: 496). This situation is an important factor in accelerating inflation. The frequency of exchange rate movements and high volatility are also important. Sudden and large increases in exchange rates lead to unpredictable costs for producers. This situation leads producers to set prices that are higher than the current exchange rate information. The impact of this situation on the acceleration of inflation

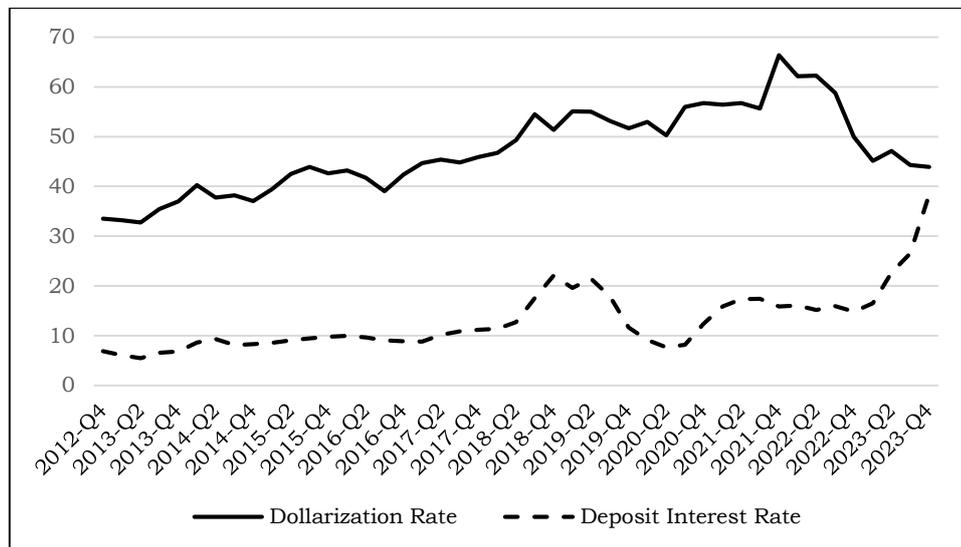
is greater than initially thought. This is because, in addition to the exchange rate effect, the effect of expectations is now priced in. This is the effect of exchange rate movements and dollarization on inflation through costs. Second, there is the demand side. Consumers may initially pull back their demand in anticipation of further price increases in the future. This demand can be reflected in the goods market as well as in money market products. As demand increases, so does the demand for money by economic units. By controlling the money supply, policymakers control the inflationary effect of money demand. During inflationary periods, when prices and exchange rates are rising, increasing the money supply also ensures that the rising demand for money is met. Thus, as inflation rises, the exchange rate is also expected to rise, depending on the money supply. If the exchange rate is subject to long-term control by the monetary authority, economic units will increase the share they allocate to consumption in the expectation that prices will continue to rise rather than to exchange rate risk (Kaya and Kara, 2022: 850).

In some developing countries, high public debt and negative fiscal balances are also associated with dollarization. A negative real interest rate environment may be preferred by the public as it creates a positive in the financing of public debt. Negative real interest rates have the direct effect of increasing dollarization. In addition, since high public borrowing from the markets makes it difficult to finance the private sector, the private sector will be financed from abroad (Hekim, 2008: 29). In this case, these are the factors that increase dollarization. It is of great importance to support monetary policy with fiscal policy in the fight against dollarization (Edwards, 2001: 1).

### 3. Examining the Relationship between Money Supply, Inflation and Dollarization with Data from Türkiye

Figure 1 shows data on money supply, deposit rates, inflation, and dollarization for Türkiye for the last year. Due to a difference in scale between the data, four variables are not shown in a single graph.

Figure 1: Deposit Interest and Dollarization Rate for Türkiye

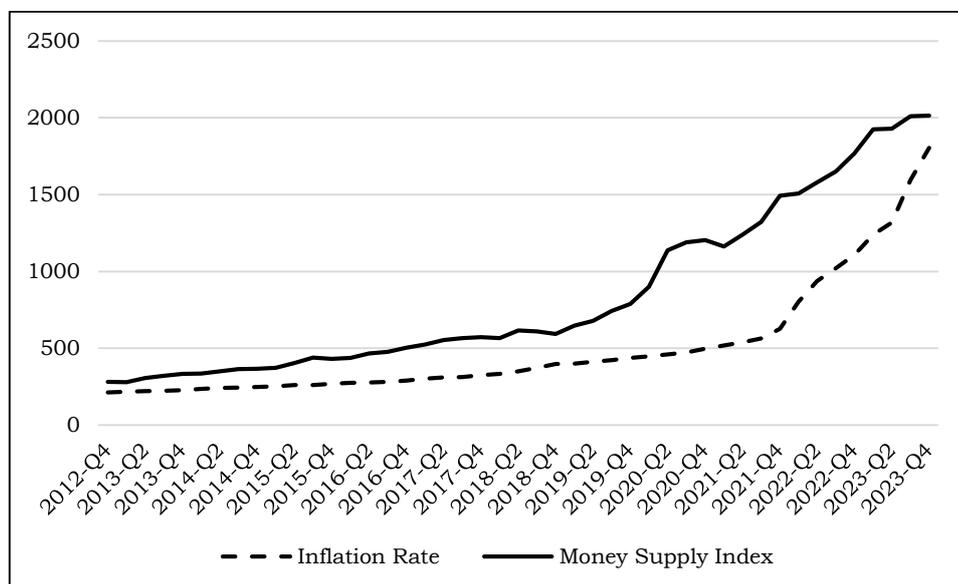


Note: Data obtained from the Central Bank of the Republic of Türkiye, EVDS database and visualized by the author.

Uncertainty about exchange rate risks and expectations of exchange rate appreciation on the part of economic units are important factors in the demand for foreign exchange. However, deposit rates are an alternative to foreign exchange products in terms of returns. Figure 1 shows that deposit rates and dollarization are not far apart until 2021. The steady increase in the central bank's policy rate from May 2023 is also reflected in deposit rates. As a result of the high interest income,

dollarization decline. However, to reach this conclusion with certainty, the growth of the money supply has to be controlled. Thus, dollarization does not refer to the demand for foreign currency, but to the share of foreign currency deposits in total deposits or money supply.

**Figure 2: Inflation Rate and Money Supply Index Data for Türkiye**



**Note:** The data were obtained from the Central Bank of the Republic of Türkiye, EVDS database and visualized by the author. In addition, both variables represent the level value and the index (inflation, 2003=100; M2 money supply, 2005=100).

Figure 2 shows the change in money supply and inflation. It can be seen that the trend angle of the money supply has increased since 2019. The same trend increase can be seen for inflation in 2021. It is important to note that the money supply remains above inflation.

Looking at Figures 1 and 2 together, the dollarization index is falling despite the increase in the money supply. We know that the exchange rate has appreciated during this period. This means that the demand for foreign currency is increasing, not decreasing. Nevertheless, a decline in dollarization can be observed. As a comment, individuals increase their demand for foreign currency despite the rising exchange rate. In this case, the cause of dollarization can be identified as the money supply rather than the exchange rate.

As there is no information on foreign currency deposits in the data source before 2012, both the graph and the analysis start from that date. Information on the variables mentioned in earlier periods has been examined in studies in the literature. Zeybek (2014) visually presents monthly data on inflation and dollarization between 1990 and 2013. The study shows that inflation declined after its peak in 1994 until 2013. In the same period, dollarization was shown to have increased after its peak in 1994 until 2002, after which it declined slightly and remained horizontal. It is noteworthy that dollarization exceeded inflation in the period 2002-2013. The study also found a positive correlation between inflation and dollarization.

To sum up, dollarization and inflation in Türkiye followed the same direction until 2012, but recently the same directional relationship between inflation and dollarization has deteriorated as a result of the increase in money supply. This situation is due to the money supply.

#### 4. Literature

The phenomenon of dollarization is a monetary phenomenon that is on the agenda in periods when risks and uncertainties increase in economies (Karakaya and Karoğlu, 2020: 354). During

crisis periods in countries, foreign trade deficits of economies, increases in exchange rates, deficits in budget balance, high inflation and increased demand for foreign currency by individuals who want to be protected from risks can be observed. Literature studies have also used these variables as control variables when examining the relationship between dollarization and inflation.

In the general evaluation of the studies, it was found that some used causality analysis and some used regression analysis. The studies by Terzi and Kurt (2007); Özkul (2021); Çorak and Aksoy (2022) found a unidirectional causality from dollarization to inflation. Saraç (2010) and Özer (2022) find unidirectional causality from inflation to dollarization. Demirgil and Birol (2020) find a bidirectional causality from inflation to dollarization. In multivariate studies, Erkan and Ertürk (2024) found causality from inflation and exchange rate to dollarization and Erkan (2021) found causality from inflation, exchange rate and interest rate to dollarization.

Evaluating the results of studies that applied regression analysis, the studies by Serel and Darıcı (2006); Zeybek (2014); Taşseven and Çınar (2015); Demirgil and Birol (2020); Aydınlık and Aktaş (2022); Demir and Sezgin (2023) find that the effect of inflation on dollarization is positive. The studies by Hekim (2008); Saraç (2010) and Kaya and Kara (2022) find that the effect of inflation on dollarization is negative. In addition to the positive and negative effects of inflation in the aforementioned examples, the study of Dumrul (2015) finds that the effect of inflation on dollarization is positive, but at a very low level. The study by Yılmaz and Uysal (2019) also finds similar results. In the variance decomposition, it was concluded that a small part of the dollarization shocks could be explained by inflation. In the study of Ağaslan and Gayaker (2019), the impulse response functions constructed for inflation and dollarization are statistically insignificant. Moreover, the variance decomposition results suggest that the dollarization shock is driven by the exchange rate rather than inflation. Y. Yalta and T. Yalta (2022) find that the effect of the exchange rate and inflation on dollarization is very weak.

Since the decrease in deposit interest will increase the monetary costs of economic units, the dollarization effect of interest will be negatively affected. However, the results of the decline in the exchange rate of economic units allow the formation of a positive relationship between interest and dollarization in the stock of interest income. The studies of Hekim (2008) and Kaya and Kara (2022) did not obtain results suitable for being included in this ranking. Exchange rates are also a very important part of dollarization. An increase in the exchange rate increases dollarization. Hekim (2008); Taşseven and Çınar (2015); Kaya and Kara (2022); Aydınlık and Aktaş (2022) dollar studies find that drying is positive, while Serel and Darıcı (2006) study finds that this effect is negative.

**Table 1: Literature Review**

Studies	Period, Place, Methodology	Variables	Conclusion
Serel and Darıcı (2006)	Türkiye (1990:3-2002:3) OLS	Dollarization, inflation, exchange rate	While the effect of inflation on dollarization is positive, the effect of exchange rate is negative.
Terzi and Kurt (2007)	Türkiye (1995:1-2006:4) VAR, Granger	Dollarization, inflation, money supply, imports, exports	It has been determined that the price pass-through of exchange rates is high in periods when dollarization is high, and high in periods when dollarization is low. Additionally, there is one-way causality from exchange rates to prices.
Karacal and Bahmani-Oskooee (2008)	Türkiye (1987:1-2003:12) ARDL	Dollarization, inflation, exchange rate, money supply, budget balance	Money supply, exchange rate and dollarization have a positive effect on inflation in the long run.
Hekim (2008)	Türkiye (1992:1-2007:12) OLS	Dollarization, inflation, exchange rate, interest, credibility	While exchange rate and interest variables affect dollarization positively, inflation has a negative effect.
Saraç (2010)	Türkiye (1994:1-2009:12) VAR, Granger	Dollarization, inflation	In impulse response analysis, dollarization reacts negatively to inflation shocks. The reaction of inflation to dollarization reactions is also negative. Additionally, there is causality from inflation to dollarization.
Zeybek (2014)	Türkiye (2012:1-2018:9) VAR	Dollarization, inflation, economic confidence index	Inflation and confidence index positively affect dollarization.

Taşseven and Çınar (2015)	Türkiye (1996-2013) Panel PMG, CCEMG	Dollarization, inflation, exchange rate	Inflation and exchange rate dollarization have a positive impact.
Dumrul (2015)	Türkiye (1988-2009) ARDL	Dollarization, inflation, exchange rate, interest, openness	The strongest determinant of dollarization is the exchange rate. The effect of inflation is positive but negligible in the short term. In the long run, it is very low and positive compared to other variables.
Olayungbo and Ajuwon (2015)	Nigeria (2012:1-2018:9) VAR	Dollarization, inflation, interest	In the impulse response analysis, it was determined that dollarization reacted negatively to shocks to inflation.
Yılmaz and Uysal (2019)	Türkiye (2012:1-2018:9) VAR	Dollarization, inflation	Impulse-response analyzes between variables are statistically insignificant. In the variance decomposition analysis, a very small proportion of inflation shocks originate from dollarization, and a very small proportion of dollarization shocks originate from inflation.
Ağaslan and Gayaker (2019)	Türkiye (2003.03-2018.03) VAR	Dollarization, inflation, exchange rate	Impulse response functions are statistically insignificant. As a result of the variance decomposition analysis, it was determined that the shock to dollarization was caused by the exchange rate rather than inflation.
Demirgil and Birol (2020)	Türkiye (2012.1-2020.4) Johansen, Granger	Dollarization, inflation	A long-term and positive relationship was detected between the variables. Additionally, there is bidirectional causality between the variables.
Erkan (2021)	Türkiye (2011:12-2021:1) Hatemi J	Dollarization, inflation, exchange rate	Causality from inflation, exchange rate and interest to dollarization has been determined.
Özkul (2021)	Türkiye (2005.12-2020.10) Toda-Yamamoto	Dollarization, inflation, employment	Unidirectional causality from dollarization to inflation has been determined.
Kaya and Kara (2022)	Türkiye (2014:1-2022:3) ARDL	Dollarization, inflation, exchange rate, interest, current account deficit, CDS	It has been concluded that inflation and current account deficit affect dollarization negatively, while other variables have a positive effect.
Özer (2022)	Türkiye (2006:1-2020:12) Fourier Causality	Dollarization, inflation, exchange rate, deposit interest	One-way causality from inflation to dollarization has been determined.
Çorak and Aksoy (2022)	Türkiye (2006:1-2022:9) Toda-Yamamoto	Dollarization, inflation	Unidirectional causality from dollarization to inflation has been determined.
Aydınlık and Aktaş (2022)	Türkiye 81 il (2007: 4-2019: 1) Panel (FE-RE)	Dollarization, inflation, exchange rate, imports, exports, CDS	While imports, exports and inflation affect dollarization positively, the effect of CDS on dollarization is insignificantly small.
Y. Yalta and T. Yalta (2022)	Türkiye (2013:1-2021:1) Rolling Window	Dollarization, inflation, exchange rate,	Inflation and exchange rate have very weak effects on dollarization.
Demir and Sezgin (2023)	Türkiye (2007:4-2021:4) Heterogeneous Panel Data	Dollarization, inflation	Inflation affects dollarization positively. Causality from inflation to dollarization was determined in 13 of Türkiye's 26 regions subject to the study.
Erkan and Ertürk (2024)	Türkiye (2013:1-2023:4) Hatemi J	Dollarization, inflation, exchange rate, interest, CDS	Asymmetric causality from inflation and exchange rate to dollarization has been detected. It has been stated that exchange rate and inflation levels are the cause of reverse dollarization.

## 5. Data Set and Methodology

### 5.1. Data Set

This study aims to examine the combined effects of money supply and inflation on dollarization in a period of rising interest rates. Thus, the main hypothesis here is to investigate whether inflation and money supply are the main reasons for the decline in dollarization despite the rise in the exchange rate and dollar demand.

The variables used in the study are listed in Table 2. The variables were obtained from the Central Bank of the Republic of Türkiye, EVDS database. The study covers the data period 2012Q4-2023Q4. The limitation of the study is that the starting date of the study is 2012. The limitation is due to the fact that data on foreign currency deposits can be obtained from the data source from

this date onwards. The variables reported in Table 2 are at their level values. Before using the variables in the analysis, the logarithms of the variables *INF*, *BUD* and *EXP* were taken. In addition, all variables are seasonally adjusted using the STL decomposition method.

**Table 2: Variables and Explanations**

Variables	Descriptions	Type
Dollarization (DOL_sa)	Rate of foreign currency deposits in total money supply	Ratio
Money supply (MS_sa)	M1 money supply adjusted for exchange rate effect (2005=100)	Index
Inflation (INF_sa)	General consumer price inflation index (2003=100)	Index
Exchange rate (EXC_sa)	US dollar selling price	TRY
Interest (INT_sa)	Average interest rate of deposits opened in TRY with a maturity of up to 1 month	Ratio
Budget revenues (BUD_sa)	Budget revenues	TRY
Export (EXP_sa)	Export level value	TRY

The studies by Bailey (2005); Terzi and Kurt (2007) and Karacal and Bahmani-Oskooee (2008) were used for the variables used in the specified model. In the relationship between dollarization and inflation, the control variables and the relationship function with dollarization are specified in equation (1).

$$DOL_t = f(EXC_t, BUD_t, INF_t, EXP_t, MS_t, INT_t) \tag{1}$$

The model constructed according to equation (1) shows that the exchange rate, budget revenues, inflation, export, money supply and interest rates are considered as functions of the dollarization phenomenon. The control variables used were selected from studies in the literature. In addition, the model was derived using the money supply variable. The descriptive statistics of the variables are presented in Table 3.

**Table 3: Descriptive Statistics of Variables**

	DOL	EXC	lnBUD	lnINF	lnEXP	MS	INT
<b>Mean</b>	0.487	1.630	19.194	6.021	10.740	843.29	13.008
<b>Median</b>	0.466	1.474	18.973	5.853	10.692	589.65	10.701
<b>Maximum</b>	0.683	3.340	21.282	7.498	11.088	2011.3	38.510
<b>Minimum</b>	0.343	0.575	18.270	5.358	10.361	277.37	5.407
<b>Stan. Dev.</b>	0.084	0.794	19.194	0.582	0.184	843.29	6.352

Looking at the descriptive statistics in Table 3, the average level of dollarization in Türkiye is around 49%. The maximum level of dollarization is 68% and the minimum level is 34%. This situation indicates that Türkiye has a very high ratio of dollar deposits to money supply. The exchange rate (USD/TRY) fluctuated between TL 1.47 and TL 3.34 during the period under review. The log of *BUD* ranges between 18 and 21, with an average of around 19. The variable log of *INF*, with a mean value of 6.02, shows a concentrated distribution in a range between 5.35 and 7.49. The variable log of *EXP*, with a mean of 10.7, shows a concentrated distribution in a range between 10.3 and 11.0. *MS* is the money supply index. The year 2005 has a value of 100. Accordingly, its maximum value is around 2000 and its minimum value is 277. Compared to the data period, it has increased by about 7.5 times. The last variable, *INT*, concerns the interest rate. The average interest rate is 5.4%, with a maximum of 38.5% and a minimum of 10%.

**5.2. Methodology**

**5.2.1. Fourier ADL Cointegration Test**

National economies are subject to both national policies and international cyclical changes. For this reason, as time series become longer, shapes are formed where sometimes the trend angle changes and sometimes the trend structure changes. Neglecting these structural changes in the series can lead to erroneous results in the examined relationship between variables (Faisal et al.,

2021: 5). Innovations in econometric analysis methods have solved the problem by including these structural breaks in the model by adding dummy variables to the models (Cai and Omay, 2021: 448). In fact, since these breaks represent a sudden break, it is necessary to know the history of structural breaks in these methods and make accurate predictions about this date (Ozgur et al., 2022: 1659).

There appear to be a number of problems with the analyses that are made by including structural breaks in the model. First, it is very difficult to isolate the effects of structural breaks that may occur more than once in the same year, especially in annual data. Second, the use of dummy variables to represent multiple breaks in the same year reduces the degrees of freedom. This situation leads to an overfitting problem. The third problem is that when structural breaks do not have a direct and one-off effect on the dependent variable, but have a gradual effect, dummy variables cannot reflect this gradual transition (Kumar and Patel, 2023: 702). According to the study by Banerjee et al. (2017), these problems can be overcome by using Fourier models.

The growing use of the Fourier approach has led to an increase in its use in econometric time series over time. The ability to capture soft and non-sudden breaks, rather than tracking linear and sudden breaks, has increased the popularity of Fourier models. The study by Enders and Lee (2012) is a pioneering approach by adding Fourier terms to the unit root test. This unit root test is notable for its privileges, such as not needing to know the date and number of breaks, allowing nonlinear breaks, and allowing multiple breaks, in contrast to previous unit root tests that allowed one or two breaks. The study by Banerjee et al. (2017) adds Fourier terms to the ARDL cointegration test proposed by Pesaran et al. (2001), allowing Fourier functions to be used to determine the long-run relationships of variables. In Banerjee et al. (2017), this test is referred to as F-ADL, as used in their study. The working principle is formed by adding the Fourier terms to the model as a constant, as expressed in eq. (2).

$$\Delta Y_t = d(t) + \beta_1 X_{t-1} + \beta_2 Z_{t-1} + \beta_3 Y_{t-1} + \sum_{j=1}^p \alpha_j X_{t-j} + \sum_{j=1}^p \Phi_j Z_{t-j} + \sum_{j=1}^p \Omega_j Y_{t-j} + \mu_t \tag{2}$$

In Eq. (2),  $\beta$  are the parameter coefficients;  $p$  is the lags;  $t$  refers to the time dimension and  $\mu$  refers to the errors. In addition, the term  $d(t)$  was used by Becker et al. (2006) and was created to detect soft breaks in the model. Eq. (2) expresses the specified deterministic term.

$$d(t) = \beta_0 + \phi_1 \sin\left(\frac{2\pi kt}{T}\right) + \phi_1 \cos\left(\frac{2\pi kt}{T}\right) \tag{3}$$

In Equation (3),  $\beta_0$  is the constant term;  $k$  is the calculated frequency value;  $t$ , trend;  $\pi$  represents the constant number  $\pi$ ;  $T$  refers to the number of observations. When the term  $d(t)$  expressed in Equation (3) is substituted in Equation (2), Equation (4) is obtained (Banerjee et al., 2017: 116).

$$\Delta Y_t = \beta_0 + \phi_1 \sin\left(\frac{2\pi kt}{T}\right) + \phi_1 \cos\left(\frac{2\pi kt}{T}\right) + \beta_1 X_{t-1} + \beta_2 Z_{t-1} + \beta_3 Y_{t-1} + \sum_{j=1}^p \alpha_j X_{t-j} + \sum_{j=1}^p \Phi_j Z_{t-j} + \sum_{j=1}^p \Omega_j Y_{t-j} + \mu_t \tag{4}$$

The trigonometric terms in equation (4) can capture more than one fracture. The determined  $k$ -frequency values are  $1 \leq k \leq k_{\max}$  and  $k_{\max} = 5$ , as shown Enders and Lee (2012) pioneering work (Banerjee et al., 2017: 117). It is possible to reject the null hypothesis ( $H_0: \beta_1 = \beta_2 = \beta_3 = 0$ ) that there is no cointegration. This decision is made by comparing the statistical values obtained as a result of the analysis with the critical values in the table. In the case of the model with constant critical

values, we follow the procedure applied by Banerjee et al. (2017: 116) in Table 1a, and in the case of the fixed and linear trend model, we test its significance by comparing it with the values given in Table 1b. If the resulting test statistic is higher than the value in the table, the  $H_0$  hypothesis is rejected and the existence of cointegration is accepted.

**5.2.2. Fourier Toda-Yamamoto Causality Test**

Toda and Yamamoto (1995) added lag of the maximum unit root degree to a vector autoregressive model established with the level values of the variables. This is because the Wald test depends on dummy parameters when the variable is not stationary. With this change made in the Wald test, the problems of the Granger causality test are eliminated by ignoring the non-stationarity of the series and the existence of cointegration (Amiri and Ventelou, 2012: 542; Nazlıoğlu and Soytaş, 2024: 6).

After Enders and Jones (2016) added Fourier terms to the Granger causality test, Nazlıoğlu et al. (2016) added Fourier terms to the Toda-Yamamoto causality test.

$$y_t = y_0 + y_1 \sin\left(\frac{2\pi kt}{T}\right) + y_2 \cos\left(\frac{2\pi kt}{T}\right) + \Phi_1 y_{t-1} + \dots + \Phi_{p+d} y_{t-(p+d)} + \mu_t \tag{5}$$

The terms sin and cos are Fourier trigonometric terms; the term p is the number of lags determined according to information criteria; the term d refers to the highest order stationarity of the variables. After determining the frequency value, which is determined as an integer value, the causality test is applied as in equation (5) with the help of the lag length and the d parameter. The null hypothesis of the test is that there is no causality ( $H_0 = \Phi_1 = \dots = \Phi_n = 0$ ). A causal relationship is determined by rejecting the null hypothesis as a probability value (Payne et al., 2020: 20).

**6. Empirical Findings**

In the continuing part of the econometric analysis, unit root analysis of the variables will be carried out. Afterwards, the existence of cointegration will be tested. Afterwards, long and short term coefficient estimates will be shared. Finally, causality results will be given.

**Table 4: Unit Root Test Results**

Variables		Perron Unit Root Test With Break			
		Level		Difference	
		Const.	Const.+ Trend	Const.	Const.+ Trend
DOL_sa	Stat.				
	Break. Date	-2.43 (2016Q3)	-4.32 (2022Q3)	-8.23*** (2022Q4)	-8.11*** (2022Q4)
EXC_sa	Stat.				
	Break. Date	-0.52 (2021Q2)	-4.33 (2021Q3)	-7.20*** (2021Q3)	-7.22*** (2021Q3)
ln BUD_sa	Stat.				
	Break. Date	1.42 (2021Q3)	-3.28 (2020Q3)	-10.35*** (2023Q2)	-10.39*** (2015Q4)
ln INF_sa	Stat.				
	Break. Date	0.23 (2021Q3)	-4.26 (2021Q2)	-6.34*** (2021Q3)	-5.05** (2020Q4)
ln EXP_sa	Stat.				
	Break. Date	-6.61*** (2020Q2)	-8.14*** (2020Q2)	-8.61*** (2020Q4)	-12.79*** (2020Q2)
MS_sa	Stat.				
	Break. Date	-1.11 (2019Q2)	-1.79 (2021Q2)	-6.79*** (2019Q3)	-9.29*** (2020Q1)
INT_sa	Stat.				
	Break. Date	-2.43 (2023Q1)	-3.58 (2023Q2)	-4.50** (2023Q1)	-4.91* (2023Q2)
Critical Values	1%	-4.94	-5.06	-4.94	-5.06
	5%	-4.44	-4.52	-4.44	-4.52
	10%	-4.19	-4.26	-4.19	-4.26

**Note:** The symbols \*, \*\* and \*\*\* indicate significance levels of 10%, 5% and 1% respectively.

Table 4 shows the results of the structural break unit root test applied to the variables. The unit root test used is Perron (1997). The test was applied both with constant and with constant and trend. This test tests the null hypothesis that the variables do not have a unit root at 1%, 5% and 10% significance levels. The results show that the variable  $\ln EXP$  is stationary at the  $I(0)$  level and all other variables are stationary at the  $I(1)$  level.

**Table 5: F-ADL Cointegration Test Results**

		F: 12.03***	t-Bounds: -10.35***	Opt. Frequency Value
Critical Values	1%	6.23	-5.07	(3) AIC (-5.74)
	5%	5.55	-4.39	

**Note:** Note: \*\*\* symbol indicates 1% significance levels. Critical values are taken from the study by Banerjee et al. (2017).

Table 5 presents the results of the F-ADL cointegration test. If the values of the F and t statistics are greater than the given critical values, the null hypothesis of the absence of cointegration is rejected. Thus, the existence of a long-run relationship between the variables in the specified model has been demonstrated.

**Table 6: F-ADL Cointegration Test Long-run Coefficients**

Variables	Coefficients	St. Error	t stat.	Prob.
EXC_sa	0.600	0.031	19.33	0.000***
$\ln BUD\_sa$	0.063	0.069	0.906	0.374
$\ln INF\_sa$	-0.999	0.110	-9.064	0.000***
$\ln EXP\_sa$	0.175	0.043	4.058	0.000***
MS_sa	0.0001	0.000	1.737	0.096*
INT_sa	0.003	0.001	1.868	0.075*

**Note:** The symbols \*, \*\* and \*\*\* indicate significance levels of 10%, 5% and 1% respectively.

Table 6 shows the long-run coefficients estimated as a result of cointegration. The  $BUD$  variable is statistically insignificant, while the other variables are significant. The coefficients of all variables except  $INF$  have a positive sign. This indicates that positive increases in the variables have a positive effect on the dependent variable, DOL.

**Table 7: Error Correction Model Results**

Variables	Coefficients	St. Error	t Stat.	Prob.
Cons	2.173	0.209	10.35	0.000***
$\Delta EXC\_sa$	0.414	0.031	13.08	0.000***
$\Delta EXC\_sa_{-1}$	-0.146	0.036	-3.979	0.000***
$\Delta \ln BUD\_sa$	0.095	0.019	4.835	0.000***
$\Delta \ln BUD\_sa_{-1}$	0.041	0.019	2.081	0.049**
$\Delta \ln INF\_sa$	-0.833	0.077	-10.70	0.000***
$\Delta \ln INF\_sa_{-1}$	0.430	0.061	7.004	0.000***
$\Delta EXR\_sa$	0.053	0.025	2.093	0.048**
$\Delta EXR\_sa_{-1}$	-0.095	0.025	-3.715	0.001***
$\Delta MS\_sa$	0.000	0.000	0.006	0.994
$\Delta INT\_sa$	0.000	0.000	0.939	0.357
$\Delta INT\_sa_{-1}$	-0.003	0.001	-3.746	0.001***
@COS	-0.004	0.002	-1.824	0.081*
@SIN	0.012	0.002	4.757	0.000***
ECT	-0.945	0.091	-10.35	0.000***

**Note:** The symbols \*, \*\* and \*\*\* indicate significance levels of 10%, 5% and 1% respectively.

An error-correction model has been fitted to detect short-term relationships. An indication that the error correction model is working correctly is that the error correction coefficient has a negative sign and is statistically significant. Accordingly, the error correction coefficient is -0.94.

This means that 94% of the errors that occurred in the short run were corrected in one period. Thus, errors are corrected in about a period.

When the prediction results of the error correction model are evaluated, the current period of the EXC variable has a positive effect, while the first lag has a negative effect. In this case, no judgement can be made about the short-term effect of the exchange rate. The situation is similar for the variables INF, INT and EXR. The value of the variable MS is not statistically significant. In this case, only the short-term effects of the variable BUD on DOL are relevant. It can be seen that positive changes in the current value and the first lag of the BUD variable increase the DOL variable. Additionally, the Fourier terms are statistically significant. This confirms the validity of the established Fourier model.

**Table 8: Diagnostic Test Results**

Tests	Stat.	Porb.	Result
Breusch-Pagan-Godfrey	21.82	0.34	Heteroscedasticity is not present.
Breusch-Godfrey Serial Correlation	2.39	0.30	There is no autocorrelation problem.
Jarque-Bera normality	1.08	0.58	Normal distribution is available.
Ramsey RESET	0.10	0.75	There are no excluded variables in the model and there is no specification error.
Cusum and Cusum <sup>2</sup>	Graphs are given in Annendix 1.		There is no structural break in the model.

Diagnostic tests have been carried out to ensure that the established model works correctly and produces accurate prediction results. According to Table 8, in summary, there is no problem of autocorrelation and heteroskedasticity in the model. The model has normal distribution properties. Furthermore, as a result of the reset test, there are no excluded variables in the model. Finally, Cusum tests were used to check that there is no structural break in the model. The results of these tests are presented in Appendix 1.

**Table 9: Fourier Toda-Yamamoto Causality Test Results**

	Stat.	p + d <sub>max</sub>	Prob.
EXC ⇒ DOL	13.15	4	0.010***
DOL ⇒ EXC	19.96	4	0.000***
INF ⇒ DOL	18.25	4	0.001***
DOL ⇒ INF	12.60	4	0.013**
MS ⇒ DOL	9.52	4	0.049**
DOL ⇒ MS	37.75	4	0.000***
INT ⇒ DOL	5.09	4	0.278
DOL ⇒ INT	3.58	4	0.465

**Note:** The symbols \*, \*\* and \*\*\* indicate significance levels of 10%, 5% and 1% respectively.

Table 9 shows the results of the Fourier Toda-Yamamoto causality test. In the implementation of the test, the frequency value (k) was used as 3, the optimal delay value (p) was 3 and the d<sub>max</sub> value was 1. As a result of the test, causality from EXC to DOL was detected at the 1% significance level. At the same time, there is causality from DOL to EXC at the 1% significance level. This situation indicates bidirectional causality between EXC and DOL. In addition, there is a causality from INF to DOL at the 1% significance level and a causality from DOL to INF at the 5% significance level. This indicates that there is a bidirectional causality between INF and DOL. There is a causality from MS to DOL at the 5% level and a causality from DOL to MS at the 1% level. This indicates the existence of bidirectional causality between MS and DOL. There seems to be no causality between INT and DOL.

When compared with period data, it is seen that the money supply increased despite the decrease in dollarization. The same situation exists in the causal relationship between interest rates and dollarization. While there is causality from deposit interest to dollarization, dollarization is not the cause of interest rates. This situation does not represent a monetary policy that combats the phenomenon of dollarization.

## 7. Conclusion

The purpose of this study is to examine the effect of money supply and inflation on dollarization. For this purpose, a regression equation is set up in which dollarization is the dependent variable and money supply, inflation, exchange rate, deposit interest rate, fiscal revenues and exports are explanatory variables. These variables are the determinants of dollarization. The variables used in the model were derived from Bailey (2005); Terzi and Kurt (2007) and Karacal and Bahmani-Oskooee (2008). Fourier ADL cointegration and Fourier Toda-Yamamoto causality tests are applied in the study for the data period 2012Q4-2023Q4.

According to the Fourier ADL test, increases in budget revenues have a positive impact on dollarization in the short run. Increases in public revenues reduce total expenditures. Accordingly, financial and exchange rate related expenditures are also expected to decrease. The results obtained in the short run are not consistent with expectations.

One of the long-term consequences is the relationship between inflation and dollarization. The expected situation is that economic units will accumulate their wealth in foreign currency depending on exchange rate expectations in the face of rising inflation. However, since wealth does not gain positive real value in the negative real interest rate environment caused by large money supply and relatively low deposit interest rates, economic units acquire physical goods in the goods market rather than in the money market. The main reason for this is that commodity prices are priced higher than the yields of money market products due to monetary policy. In the literature, Hekim (2008); studies by Saraç (2010) and Kaya and Kara (2022) also found the effect of inflation on dollarization to be negative. The result of this study predicts a negative relationship between inflation and dollarization in line with the aforementioned studies. There are several arguments for the negative impact of inflation on dollarization. As inflation increases, the purchasing power of economic units decreases. As inflation increases, the demand for money held for both consumption and savings will decrease, as the share allocated to consumption will increase. In this case, as the inflation rate increases, the demand for money that leads to dollarization will decrease, so the effect of inflation on dollarization will be negative. Second, and supported by this study, the dollarization index will decrease in an environment where high money supply is stronger than dollar demand, so a negative relationship can be detected even if inflation increases.

Another long-term consequence is the relationship between exchange rates and dollarization. Sudden increases in exchange rates in the economies and rapid increases in proportions compared to the previous period strengthen the expectation of economic units that exchange rates will continue to increase in the next period. Especially if inflation remains high during this period, economic units increase their demand for foreign currency in order to protect their wealth. This situation reduces the use of domestic currency and increases the degree of dollarization. Therefore, the exchange rate is an important determinant of dollarization. The results of the analysis show that the increase in the exchange rate has a positive effect on dollarization. The results, Hekim (2008); Taşseven and Çınar (2015); Kaya and Kara (2022); Aydınlık and Aktaş (2022) are compatible with their studies.

The relationship between exchange rates and dollarization is another long-term consequence. If a country's exports are high, the demand for foreign currency will decrease, which may lead to a decrease in the exchange rate depending on the demand for foreign currency. It is expected that

dollarization will tend to decrease in periods of exchange rate depreciation. As a result of the analysis, it was found that exports have a positive effect on dollarization.

Another long-term outcome is the relationship between deposit interest and dollarization. Deposit interest is an alternative to earning foreign exchange in financial markets. Especially in a high interest rate environment, economic units may prefer to earn interest in domestic currency by giving up foreign currency. This situation creates the expectation of an inverse relationship between interest and dollarization. However, if the economic units' expectation of exchange rate appreciation is higher than the deposit interest, the mentioned transition cannot be achieved. This situation causes the demand for foreign exchange and dollarization to increase even if interest rates rise. As a result of the analysis, the interest-dollarization relationship was found to be positive. This result is compatible with the studies of Hekim (2008) and Kaya and Kara (2022) in the literature.

As a result of the causality test, bidirectional causality was found between exchange rate and dollarization, bidirectional causality between inflation and dollarization, and bidirectional causality between money supply and dollarization. No causality was found between deposit rates and dollarization.

It is known that inflation will increase, and exchange rates may increase in periods when money supply increases. As a result of this information, it is expected that economic units will increase their demand for foreign exchange and the level of dollarization will also increase. However, an increase in money supply that is higher than the expected exchange rate will have a negative effect on the dollarization index, even if the demand for foreign exchange increases. This study examines and empirically confirms this situation.

The increase in deposit rates is expected to reduce dollarization. This situation suggests that individuals will switch to a deposit that earns more due to the increase in foreign currency. Since individuals are rational, they will not hesitate to switch to a high-yielding instrument. Although macroeconomic expectations point in this direction, the cointegration test shows that dollarization increases despite the rise in interest rates. Moreover, the fact that there is no causal relationship between deposits and dollarization suggests that individuals expect an increase in the exchange rate to be higher than the return on deposits. Thus, although the central bank's increase in deposit rates to combat dollarization is expected to be a factor in reducing dollarization, the empirical results show the opposite. In our view, controlling dollarization through interest rates is not an appropriate tool, at least in the short run. The role of the money supply in the existence of this situation cannot be denied. In particular, the high level of money supply makes people believe that inflation will be high in the future. The increase in the money supply and the increase in deposit rates together do not create an expectation of monetary tightening among individuals. Thus, the power of the central bank to control dollarization by presenting deposit rates as a rival to dollarization is weakened. We believe that a monetary policy that the Central Bank will create by controlling the money supply instead of interest and deposit policies will be suitable for controlling dollarization.

In addition to monetary policy recommendations, controlling the factors that increase the demand for foreign exchange can be another effective way to control dollarization. More foreign exchange inflows into the country are effective in reducing dollarization. Türkiye is a country rich in tourist destinations. It is possible to get more revenue from tourism. At the same time, Türkiye is a high importing country. Making the net export position positive by increasing export-promoting activities is beneficial for both dollarization and the general economic situation. In addition, supporting favorable investment conditions for foreign investors will further increase foreign exchange inflows into the country. These recommendations ultimately support Türkiye's balance of payments and are very important macroeconomic considerations for dollarization.

**Statement of Support and Thanks:** No external support was received in the preparation of this research.

**Declaration of Researchers' Contribution Rate:** The study was carried out by a single author.

**Conflict Declaration:** As the author of the research, we do not have any conflict-of-interest declaration.

**Ethics Statement:** At every stage of this research, all rules specified in the "Higher Education Institutions Scientific Research and Publication Ethics Directive" were followed. None of the actions specified under the heading "Actions Contrary to Scientific Research and Publication Ethics" of the Directive have been carried out. During the writing process of this study, citations were made in accordance with ethical rules and a bibliography was created. The work was subjected to plagiarism check.

**Ethics Committee Permission:** This study is a type of study that did not receive ethics committee approval.

## References

- Ağaslan, E., ve Gayaker, S. (2019). Türkiye’de Para İkamisinin Belirleyicileri Doğrusal Olmayan Bir Yaklaşım. *Ankara Hacı Bayram Veli Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 21(2), 362-387.
- Akkaya, M. (2023). Türkiye Ekonomisinin Kronik Sorunu Dolarizasyon ve Dolarizasyon Sürecine Makroekonomik-Finansal Değişkenlerin Etkileri. *TESAM Akademi Dergisi*, 10(2), 613-637.
- Akşehirli, N. (2024). Güven Faktörünün Dolarizasyona Etkisi. *Yönetim Bilimleri Dergisi*, 22(52), 339-365.
- Aktaş, R., and Aydınlik, Ü. (2022). Regional Dollarization Differences and Determinants: The Case of Türkiye. *Öneri Dergisi*, 17(57), 295-315.
- Alesina, A., and Barro, R. J. (2001). Dollarization. *American Economic Review*, 91(2), 381-385.
- Amiri, A., and Ventelou, B. (2012). Granger Causality Between Total Expenditure on Health and GDP in OECD: Evidence from the Toda–Yamamoto Approach. *Economics Letters*, 116(3), 541-544.
- Bailey, S. A. (2005). Investigating the Link Between Financial Dollarization and Inflation: Evidence from Jamaica. *Working Paper, Bank of Jamaica*.
- Banerjee, P., Arčabić, V., and Lee, H. (2017). Fourier ADL Cointegration Test to Approximate Smooth Breaks with New Evidence from Crude Oil Market. *Economic Modelling*, 67, 114-124.
- Cai, Y., and Omay, T. (2021). Using Double Frequency in Fourier Dickey–Fuller Unit Root Test. *Computational Economics*, 59,445-470.
- Çorak, M. G., ve Aksoy, E. E. (2022). Dolarizasyon ile Enflasyon Arasındaki Nedensellik İlişkisi: Türkiye Örneği. *Uluslararası Muhasebe ve Finans Araştırmaları Dergisi*, 4(2), 205-220.
- Coşkun, N. Ö. (1999). Türkiye’de Dolarizasyon ve Etkileri. *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, (15), 249-255.
- Demir, F., and Sezgin, A. (2023). The Effect of Inflation on Currency Substitution (Dollarization) an Analysis: on Türkiye NUTS2 Regions. *Politik Ekonomik Kuram*, 7(Özel Sayı), 121-137.
- Demirgil, B. ve Birol, Y. E. (2020). *Türkiye’de Enflasyon ve Para İkamesi İlişkisi Üzerine Uygulamalı Bir Analiz. Temel Ekonomik Göstergeler Çerçevesinde Türkiye Ekonomisindeki Gelişmeler*, Ankara: Gazi Kitapevi.
- Dumrul, C. (2015). Türk Ekonomisinde Para İkamisinin Belirleyicilerinin Sınır Testi Yaklaşımı ile Eş-Bütünleşme Analizi. *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, (35), 199-231.
- Edwards, S. (2001). Dollarization: Myths and Realities. *Journal of Policy Modeling*, 23(3), 249-265.
- Enders, W., and Jones, P. (2016). Grain Prices, Oil Prices, and Multiple Smooth Breaks in A VAR. *Studies in Nonlinear Dynamics & Econometrics*, 20(4), 399-419.

- Enders, W., and Lee, J. (2012). The Flexible Fourier form and Dickey–Fuller Type Unit Root Tests. *Economics Letters*, 117(1), 196-199.
- Erkan, R. (2021). Dolarizasyon Histerisi: Türkiye Örneği. *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (49), 397-407.
- Erkan, R., ve Ertürk, E. (2024). Simetrik Dolarizasyon Olgusu: VAR Analizi ve Hatemi-j Nedensellik Testi. *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 60, 269-280.
- Fabris, N., and Vujanović, N. (2017). The Impact of Financial Dollarization on Inflation Targeting: Empirical Evidence from Serbia. *Journal of Central Banking Theory and Practice*, 6(2), 23-43.
- Faisal, F., Rahman, S. U., Chander, R., Ali, A., Ramakrishnan, S., Ozatac, N., Ullah, M. N. and Tursoy, T. (2021). Investigating the Nexus Between GDP, Oil Prices, FDI, and Tourism for Emerging Economy: Empirical Evidence from the Novel Fourier ARDL and Hidden Cointegration. *Resources Policy*, 74, 102368.
- Hekim, D. (2008). Para İkamesi Histerisi: Türkiye Örneği. *Osmangazi Üniversitesi İİBF Dergisi*, 3(1), 27-43.
- Karacal, M., and Bahmani-Oskooee, M. (2008). Inflation and Dollarization in Türkiye. *In Warsaw International Economic Meeting*, 1-15, Warsaw: Warsaw University, Department of Economics.
- Karakaya, G., ve Karoğlu, Y. (2020). Dolarizasyon Olgusu: 2008 Finansal Krizinden Sonra Türkiye’de Dolarizasyon İncelemesi. *Stratejik ve Sosyal Araştırmalar Dergisi*, 4(2), 353-364.
- Kaya, Z, ve Kara, O. (2022). Dolarizasyonun Belirleyicileri ve Ekonomik Büyüme İlişkisi: Türkiye örneği. *Karamanoğlu Mehmetbey Üniversitesi Sosyal ve Ekonomik Araştırmalar Dergisi*, 24(43), 839-856.
- Kolcu, F., ve Yamak, R. (2022). Döviz Kurunun Mevduat Dolarizasyonu Üzerindeki Asimetrik Etkisi. *İzmir İktisat Dergisi*, 37(2), 481-500.
- Kumar, N. N., and Patel, A. (2023). Modelling Structural Breaks in The Tourism-Led Growth Hypothesis. *Current Issues in Tourism*, 27(5), 701-709.
- Nazlıoğlu, E. H., and Soytas, U. (2024). Energy Prices and Exchange Rates in the Eurasian Economic Union: Evidence from Fourier Toda-Yamamoto approach. *Applied Economics*, 1-15.
- Nazlıoğlu, S., Gormus, N. A., and Soytas, U. (2016). Oil Prices and Real Estate Investment Trusts (Reits): Gradual-Shift Causality and Volatility Transmission Analysis. *Energy Economics*, 60, 168-175.
- Olayungbo, D. O., and Ajuwon, K. T. (2015). Dollarization, Inflation, and Interest Rate in Nigeria. *CBN Journal of Applied Statistics*, 6(1), 241-261.
- Özer, M. O. (2022). Türkiye’de Dolarizasyonun Belirleyicileri. *Karadeniz Sosyal Bilimler Dergisi*, 14(26), 105-117.
- Ozgur, O., Yilanci, V., and Kongkuah, M. (2022). Nuclear Energy Consumption and CO2 Emissions in India: Evidence from Fourier ARDL Bounds Test Approach. *Nuclear Engineering and Technology*, 54(5), 1657-1663.
- Özkul, G. (2021). Türkiye’de Finansal Dolarizasyonun Enflasyon ve İstihdam ile Olan Etkileşimi. *İşletme Ekonomi ve Yönetim Araştırmaları Dergisi*, 4(1), 59-79.
- Payne, J. E., Nazlıoğlu, S., Mervar, A., and Niroomand, F. (2023). Economic Policy Uncertainty, COVID-19, and Tourist Stays in Croatia: Evidence from a Fourier Toda-Yamamoto Modeling Approach. *The International Trade Journal*, 37(1), 7-26.

- Perron, P. (1997). Further Evidence on Breaking Trend Functions in Macroeconomic Variables. *Journal of Econometrics*, 80(2), 355-385.
- Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Econometrics*, 16(3), 289-326.
- Saraç, T. B. (2010). Enflasyon ve Para İkamesi İlişkisi: Türkiye Ekonomisi için Ekonometrik bir Analiz (1994: 01-2009: 12). *Ekonomi Bilimleri Dergisi*, 2(1), 147-152.
- Sarı, İ. (2007). Makroekonomik Değişkenlerin Dolarizasyon Sürecine Etkisi: Ampirik Bir Yaklaşım. (Yayınlanmamış Uzman Yeterlilik Tezi), TCMB Piyasalar Genel Müdürlüğü, Ankara.
- Serdengeçti, S. (2005). Dolarizasyon/Ters Dolarizasyon, TCMB Konuşması, 3 Ekim 2005. <https://www.tcmb.gov.tr/wps/wcm/connect/66b76660-1723-433d-b347-3929b6bea2a3/sunumeskisehir.pdf?MOD=AJPERES&CACHEID=66b76660-1723-433d-b347-3929b6bea2a3>
- Serel, A., ve Darıcı, B. (2006). Para İkamelerini Etkileyen Faktörler: Türkiye Uygulaması. *Kocaeli Üniversitesi Sosyal Bilimler Dergisi*, (11), 150-167.
- Sever, E. (2012). Türkiye'de Dolarizasyon Süreci ve Döviz Kuru Belirsizliği İlişkisi. *Sosyoekonomi*, 17(17), 204-222.
- Taşseven, Ö., ve Çınar, S. (2015). Türkiye'de Borç Dolarizasyonunun Belirleyicileri ve Makroekonomik Göstergeler Üzerindeki Etkileri. *Sosyal Bilimler Araştırma Dergisi*, 4(2), 121-141.
- Terzi, H., ve Kurt, S. (2007). Türkiye'de Dolarizasyon Sürecinde Döviz Kuru ve Enflasyon İlişkisi. *Ekonomik Yaklaşım*, 18(64), 1-22.
- Toda, H. Y., and Yamamoto, T. (1995). Statistical Inference in Vector Autoregressions with Possibly Integrated Processes. *Journal of Econometrics*, 66(1-2), 225-250.
- Yalta, A. Y., and Yalta, A. T. (2022, May). Deposit Dollarization in Türkiye: A Rolling Window Analysis. In *ERF 28th Annual Conference Papers*, 1-15, Cairo, Egypt.
- Yeyati, E. L. (2006). Financial Dollarization: Evaluating the Consequences. *Economic Policy*, 21(45), 62-118.
- Yılmaz, M., ve Uysal, D. (2019). Türkiye'de Dolarizasyon ve Enflasyon İlişkisi. *İktisadi İdari ve Siyasal Araştırmalar Dergisi*, 4(10), 286-306.
- Zeybek, H. (2014). Dolarizasyon ve Finansman Maliyeti. *İşletme ve İktisat Çalışmaları Dergisi*, 2(2), 44-61.
- Zeybek, H. (2018). Effects of Dollarization on the Cost of Financing: A Comparative Analysis on The Turkish Economy. *International Congress on Business and Marketing*, 288-309, İstanbul.

**Appedix 1.** Cusum Tests Result

