İktisat Politikası Araştırmaları Dergisi -
Journal of Economic Policy Researches
Cilt/Volume: 9, Sayı/Issue: 2, 2022
E-ISSN: 2148-3876

İSTANBUL UNIVERSITY PRESS

RESEARCH ARTICLE / ARAŞTIRMA MAKALESİ

# Relationship Between Inflation and Economic Growth in EU Countries

## AB Ülkelerinde Enflasyon ve Ekonomik Büyüme İlişkisi

**Ayfer ÖZYILMAZ**[1]

**ABSTRACT**

Low inflation and high economic growth are two of the main macroeconomic targets that all countries hope to reach. The reciprocal relationship between inflation and growth is currently an important debate in the literature. Although early studies generally focused on the view that inflation had no effect on growth or that it had a positive effect on growth, the upward trend of inflation in many countries in the 1970s and 1980s led to a change in direction in the inflation-growth debate. This discussion shows that the way inflation affects growth is directly related to its level. Therefore, if a certain inflation threshold value is exceeded, the view that inflation will affect growth negatively comes to the fore. In addition, the effect of economic growth on inflation is another dimension of the inflation-growth debate. In this context, it is important to examine the inflation growth spiral in the context of causality. In this study, the relationship between inflation and growth was investigated between the years 1996 and 2019 in 27 EU countries using Dumitrescu and Hurlin (2012) causality approach. In the analysis, two variables were used as an indicator of inflation. These are consumer prices Index (CPI) and GDP deflator. The results show that there is a bidirectional causality relationship from inflation to growth and from growth to inflation for both inflation indicators.

**Keywords:** Inflation, CPI, GDP deflator, economic growth, causality analysis
**Jel Code:** O11, O16, E31

**ÖZ**

Düşük enflasyon ve yüksek ekonomik büyüme, ülkelerin temel makroekonomik hedefleri arasında yer almaktadır. Bu noktada enflasyon ve ekonomik büyüme arasındaki karşılıklı ilişki literatürdeki önemli tartışmalardan biridir. Erken dönem çalışmalar her ne kadar genel olarak

DOI: 10.26650/JEPR1132170

[1] Kocaeli University, Department of Foreign Trade, Kocaeli, Turkiye

ORCID: A.Ö. 0000-0001-9201-2508

**Corresponding author/Sorumlu yazar:**
Ayfer ÖZYILMAZ,
Kocaeli University, Department of Foreign Trade, Kocaeli, Turkiye
**E-mail/E-posta:**
ozyilmazayfer@gmail.com

**Submitted/Başvuru:** 17.06.2022
**Revision Requested/Revizyon Talebi:** 11.07.2022
**Son Revizyon/Last Revision Received:** 12.07.2022
**Accepted/Kabul:** 13.07.2022

**Citation/Atıf:** Ozyilmaz, A. (2022). Relationship between inflation and economic growth in EU countries. *İktisat Politikası Araştırmaları Dergisi - Journal of Economic Policy Researches, 9*(2), 425-438. https://doi.org/10.26650/JEPR1132170

enflasyonun ekonomik büyüme üzerinde etkisiz olduğu veya büyümeyi pozitif etkilediği görüşünde yoğunlaşsa da enflasyonun 1970'lerde ve 1980'lerde birçok ülkede artış eğilimi göstermesi enflasyon-ekonomik büyüme tartışmanın yön değiştirmesine yol açmıştır. Esasında bu tartışmada enflasyonun ekonomik büyümeyi ne yönde etkileyeceği enflasyon düzeyi ile doğrudan bağlantılıdır. Dolayısıyla belirli bir enflasyon eşik değerinin aşılması durumunda enflasyonun ekonomik büyümeyi olumsuz etkileyeceği görüşü öne çıkmaktadır. Bunun yanı sıra ekonomik büyümenin enflasyona etkisi de enflasyon büyüme tartışmasının diğer boyutunu oluşturmaktadır. Bu çerçevede enflasyon-ekonomik büyüme sarmalının nedensellik bağlamında incelenmesi önem arz etmektedir. Bu çalışmada 1996-2019 döneminde 27 AB ülkesinde enflasyon ve büyüme arasındaki ilişki Dumitrescu ve Hurlin (2012) nedensellik yaklaşımı kullanılarak incelenmiştir. Analizde enflasyon göstergesi olarak iki değişken kullanılmıştır. Bunlar Tüketici Fiyatları Endeksi (TÜFE) ve GSYİH deflatörüdür. Elde edilen sonuçlara göre her iki enflasyon göstergesi için de enflasyondan ekonomik büyümeye ve ekonomik büyümeden enflasyona doğru çift yönlü nedensellik ilişkisi bulunmaktadır.

**Anahtar Kelimeler:** Enflasyon, TÜFE, GSYİH deflatörü, ekonomik büyüme, nedensellik analizi
**Jel Code:** O11, O16, E31

## Introduction

Inflation, which is a continuous increase in the general level of prices, is one of the important macroeconomic indicators of countries. One of the main indicators currently being discussed together with inflation is that of economic growth. Over the years, the content of discussions on the relationship between economic growth and inflation has differed depending on the period of the world economy. After the Second World War, Keynesian policies began to come to the fore in the world and as a result of the policies that increased the total demand, inflation started to rise along with an increase in production. In this period, inflation was not perceived as a problem, so the Keynesian approach did not initially develop a theory of inflation and did not see inflation as a fundamental problem. In fact, the Phillips curve approach, which emerged in the 1960s, was seriously embraced by Keynesian economists, and moderate inflation was accepted as a reasonable cost on the way to full employment. This was because the focus of the Phillips Curve was that high inflation would reduce unemployment and positively affect economic growth through this channel. According to Mundell (1963) and Tobin (1965), who have similar arguments, increasing inflation increases the cost of holding money. For this reason, households will tend to capitalize in order to protect their real income. An increase in capital accumulation will positively affect economic growth. Therefore, before the 1970's, the prevalent discussions on the relationship between inflation and growth were mostly that there was no relationship between the variables or that the relationship was positive. However, in the 1970s, growth rates began to decline with high inflation in many countries, and as a result, the view that

inflation positively affected growth began to be discussed. In addition, the crisis that emerged in Latin America in the 1980s led to high inflation and hyperinflation, and this process led to the acceptance of inflation as a monetary phenomenon that needed a solution (Tatlıyer, 2017; Majumder, 2016; Rao & Yesigat, 2015; Behera, 2014; Ahmed, 2010; Ercel, 1999).

There are many parameters that determine the inflation-growth relationship. The first of these is the economic conditions of countries. If the potential output of the economy grows enough to keep up with demand, high growth can be achieved without a significant increase in inflation. When actual output is equal to potential output, the economy reaches economic growth and full employment and can be achieved despite rising inflation. However, at this stage, if demand continues to increase and production capacity is not increased, a rapid increase in the general price level can be seen in the long run. Rising inflation may become a serious problem for the economy at this stage (Ayyoub, Chaudhry, & Farooq, 2011).

One of the channels by which inflation affects growth is exports. Increasing inflation may affect the balance of payments by making exports morecostly and reducing the international competitiveness of countries. Inflation also directly affects borrowing and lending decisions. In this context, firms may have to allocate more resources to cope with the effects of inflation. This causes inefficiency in resource allocation and is a direct determinant on growth (Gokal & Hanif, 2004).

One of the debates on the inflation-growth relationship is that inflation affects growth by distorting the income distribution. One of the factors leading to this is wage delay. Accordingly, there is a time gap between the increase in output prices and the increase in input prices during inflation periods. When this process, called wage delay, continues for a long time, there is an increase in the profit margin of firms. Increased profits increase firms' investable funds. This results in a rise both in production capacity and in output level. Moreover, since upper income groups have a higher tendency to save, increasing inflation increases total savings. An increase in savings increases the supply of investable funds and lowers interest rates and this encourages investment and economic growth (Datta & Mukhopadhyay, 2011).

Increasing inflation also increases the cost of capital to be used in production. This is because uncertainties about the future increase with inflation and therefore the price of risks rises. In this way, capital owners who do not want to lose real income offer resources to investors with interest rates above inflation. This effect is not only limited to the capital owners but can spread to the general public by influencing consumer confidence. All of these factors may discourage investments and consumption and may, as a result, reduce the

country's potential production capacity (Tunalı & Özkan, 2016; Karaçor, Özer, & Saraç, 2011).

In this study, the relationship between economic growth and inflation in EU countries in the 1996-2019 period is analyzed using Dumitrescu and Hurlin (2012) causality approach. The plan of the paper is as follows: In the next section, empirical studies are presented. This is followed by a section on data and methods. In the final section, the analysis findings are discussed.

**Literature**

There are many studies in the literature that discuss the inflation-growth relationship from different perspectives. Some of these studies discuss the effect of inflation on growth (Kasidi & Mwakanemela, 2013; Hussain & Malik, 2011), while other studies discuss the effect of growth on inflation (Süleymanov & Nadirov, 2014). Despite the studies suggesting that there is a bidirectional causal relationship between growth and inflation (Singh & Singh, 2015; Koulakiotis, Lyroudi, & Papasyriopoulos, 2012), some studies suggest that there is a unidirectional relationship between the variables (Denbel, Ayen, & Regasa, 2016; Niyimbanira, 2013). In addition to these, some studies have suggested that the effect of inflation on economic growth will differ if inflation exceeds/does not exceed a certain threshold level (Pollin & Zhu, 2006; Bruno & Easterly, 1995).

Al-Khulaifi (2018), who argues that there is a unidirectional relationship between economic growth and inflation, found that there is a long-run relationship between inflation and economic growth in Qatar, and that there is a causal relationship from inflation to economic growth. Sa'idu and Muhammad (2015) in Nigeria and Niyimbanira (2013) in South Africa, found unidirectional causality from inflation to economic growth. Hossain et al. (2012) suggested that there is no cointegration relationship between the variables in Bangladesh, but there is unidirectional causality from inflation to economic growth. Uysal, Mucuk, and Alptekin (2008) and Yapraklı (2007) found a unidirectional relationship from inflation to growth in Turkey. Contrary to these studies, other studies found unidirectional causality from growth to inflation. For example, Karabulut (2019), Topçu (2017) and Kanca (2017) found a unidirectional causality relationship from growth to inflation in Turkey. In their studies, Denbel, Ayen, and Regasa (2016), Umaru and Zubairu (2012), and Gokal and Hanif (2004) suggested that there is a unidirectional causality relationship from economic growth to inflation for Ethiopia, Nigeria and Fiji, respectively.

Contrary to the wider literature suggesting that there is a unidirectional relationship between inflation and economic growth, there are also studies in the literature that find a bidirectional relationship between the variables. For example, Singh and Singh (2015) in

Japan and Koulakiotis, Lyroudi, and Papasyriopoulos (2012) in 14 European countries found a bidirectional causality relationship between inflation and growth.

In addition to the studies that discuss the inflation-growth relationship in the context of causality, some studies discuss how inflation affects growth. In this context, Barro (2013) found that inflation negatively affects growth in nearly 100 countries. Majumder (2016) found a positive relationship between inflation and economic growth in Bangladesh in the long run. In addition, Hussain and Malik (2011) suggested that inflation causes growth in Pakistan. Contrary to these studies, there is a large body of literature which suggests that there is a negative relationship between economic growth and inflation. For example, Rivera, Rojo and Gómez (2020) in some Latin American countries and Olamide, Ogujiuba and Maredza (2022) in the Southern African Development Community found a negative relationship between inflation and economic growth. Adaramola and Dada (2020) in Nigeria, Khan and Khan (2018) in Bangladesh, Iran, Indonesia, Malaysia and Pakistan, and Kasidi and Mwakanemela (2013) in Tanzania, argued that inflation has a negative effect on economic growth. According to Salih and Türk (2020), Kopuk (2020), and Gürel and Toker (2019), inflation affects growth negatively in Turkey. In addition, Karaçor, Özer, and Saraç (2011) and Pata (2017) found that there is a negative relationship between the variables in Turkey, both in the short and long run. Korkulu and Yılmaz (2017) argued that the relationship between economic growth and inflation differs according to the chosen inflation indicator. According to the study, only GDP Deflator as an indicator of inflation is significant on growth and inflation reduces growth.

In some studies, the inflation-growth relationship was examined both in the context of causality and on the basis of the direction of the effect. For example, Saungweme, Odhiambo, and Nicholas (2021) found that inflation negatively affects economic growth in the long run in Kenya. In addition, according to the causality analysis, there is unidirectional causality from economic growth to inflation in the short run. Suleymanov and Nadirov (2014) revealed that there is unidirectional causality relationship from growth to inflation in Turkey. In addition, they stated that economic growth had a positive effect on inflation. Berber and Artan (2004) and Karaca (2003) found unidirectional causality relationship from inflation to economic growth in Turkey. In addition, according to the study, inflation affects economic growth negatively.

In some studies, no significant relationship was found between inflation and growth. For example, according to Anidiobu, Okolie, and Oleka (2018) inflation is statistically insignificant on growth in Nigeria. Özçelik and Uslu (2017) found that there is no causal relationship between inflation and growth in Turkey. Similarly, Emsen et al. (2012) argued that inflation is not effective on growth in the long run in Turkey. According to Chimobi

(2010), there is no cointegration relationship between the variables in Nigeria. In addition, Hossain (2005) argued that there is no causal relationship from inflation to economic growth in Indonesia.

In some studies, the inflation-growth relationship may differ according to the short or long-run. In this context, Akter and Smith (2021) found a negative relationship between economic growth and inflation in Malaysia in the short run, but found a positive relationship in the long run. Sahnoun and Abdennadher (2019) found unidirectional causality relationship from inflation to economic growth in the short run for North African countries. However, in the long run, bidirectional causality was found between the two variables. According to Datta and Mukhopadhyay (2011), the direction of causality between inflation and growth is from inflation to economic growth in the short run, but from economic growth to inflation in the long run for Malaysia. Obradović, Šapić, Furtula, and Lojanica (2017) found that there is cointegration between inflation and growth in the long run in Serbia, while there is a unidirectional causality from inflation to economic growth in the short run. Manamperi (2014) found a positive long-run relationship between the variables for India in the BRICS countries, but did not find a long-run relationship in the other four countries. In the short run, a significant negative relationship was found between the variables for South Africa, Russia, Brazil and China but a positive relationship was found for India. In Bangladesh, Ahmed (2010) suggested that there is no significant relationship between inflation and economic growth in the long run, but there is a negative and statistically significant relationship in the short run. In addition, unidirectional causality relationship was found from inflation to economic growth.

In the literature, some studies suggest that the findings differ according to countries. For example, for in five African countries, Opeyemi (2020) found that inflation negatively affects economic growth in four countries, excluding Egypt. Akinsola and Odhiambo (2017) argued that the effect of inflation on economic growth in both developed and developing countries differs according to country and time. However, in general, there is a mostly negative relationship between the variables especially in developed economies. According to Behera and Mishra (2015), a positive relationship between growth and inflation in BRICS countries is valid only for China and South Africa in the long run. According to causality analyses, there is unidirectional causality between the variables in India, but bidirectional causality in China. Paul, Kearney, and Chowdhury (1997) found that the relationship between inflation and economic growth in 70 countries differed by country. According to the study, there is no causal relationship between the variables in 40% of the countries, unidirectional causality relationship in one-third of the countries, and bidirectional causality relationship in about one-fifth of the countries.

There are many studies that focus on the nonlinear relationship between inflation and

growth and discuss this relationship with the threshold value. One of the earliest of these studies was conducted by Sarel (1996), who determined the inflation threshold to be 8% in 87 countries. According to the study, inflation, which affects growth positively up to this point, affects growth negatively after this threshold value. Ghosh and Phillips (1998) found that inflation above 2.5% negatively affects economic growth in 145 countries. Bruno and Easterly (1995) determined the threshold level of inflation as 40% and they argued that after this threshold level, inflation negatively affects economic growth in 26 countries. Pollin and Zhu (2006) found that average inflation positively affects growth up to a threshold of 15-18% in 80 middle-income and low-income countries.

Sergii (2009) argued that if inflation exceeds 8% in CIS countries, it affects growth negatively, but a value below this affects growth positively. Munir, Mansur, and Furuoka (2009) determined the inflation threshold rate as 3.89% in Malaysia and found positive relationship between inflation rate and growth below the threshold level. Risso and Carrera (2009) argued that if the rate of inflation exceeds 9%, inflation will negatively affect growth in Mexico. Ayyoub, Chaudhry, and Farooq (2011) found that inflation negatively affected growth after a threshold level of 7% in the Pakistani economy. Bhusal and Silpakar (2011) found an inflation threshold of 6% for Nepal. According to the study, the inflation rate below or above this level can negatively affect economic growth. Vinayagathasan (2013) argued that if inflation exceeds 5.43%, it will adversely affect growth in 32 Asian countries. Tung and Thanh (2015) determined the inflation threshold as approximately 7% in Vietnam. Accordingly, if the inflation rate exceeds 7%, inflation will negatively affect economic growth. Thanh (2015) argued that after the rate of inflation exceeded the threshold level of 7.84%, it affected growth negatively in ASEAN-5 countries. Altıntaş and Koçbulut (2019) found that if the inflation rate exceeds the level of 3.286% in 27 OECD countries, it will affect economic growth negatively, but inflation below this level will affect growth positively. Tien (2021) suggested that the threshold value of inflation is 6%, and hyperinflation above this threshold and very low inflation below this threshold negatively affect growth in Vietnam. In addition to these studies, Rao and Yesigat (2015), found a bidirectional causality relationship between inflation and economic growth in Ethiopia. In addition, the study revealed that there is a negative relationship between inflation and economic growth. In addition, the inflation threshold value was calculated and, accordingly, inflation exceeding the level of 9-10% affects economic growth negatively.

## 3. Data and Method

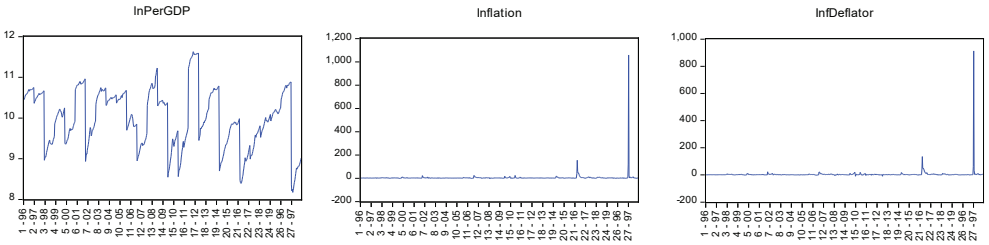
In this study, the relationship between inflation and growth in 27 EU countries was investigated between the years 1996 and 2019 using Dumitrescu and Hurlin (2012) causality approach. Descriptive statistics of the variables used are presented in Table 1.

**Table 1: Descriptive Statistics**

| Variables | Description | Min | Max | Std. Dev. | Mean |
|---|---|---|---|---|---|
| lnPerGDP | GDP per capita (constant 2015 US$) | 8.1710 | 11.6299 | 0.7241 | 9.9878 |
| Inflation | Inflation, consumer prices (annual %) | -4.4781 | 1058.374 | 42.4094 | 5.1780 |
| Deflator | Inflation, GDP deflator (annual %) | -9.6661 | 913.2117 | 36.5455 | 4.9706 |

The time dynamics of the period considered for the variables are given below.

**Figure 1. Dynamics of Variables by Years**




Dumitrescu and Hurlin (2012) Panel Causality test was developed by Dumitrescu and Hurlin (2012) and takes into account cross-sectional dependence and heterogeneity. The following model is taken into account in model estimation (Dumitrescu & Hurlin, 2012).

$$y_{i,t} = a_i + \sum_{k=1}^{K} \gamma_i^{(k)} y_{i,t-k} + \sum_{k=1}^{K} \beta_i^{(k)} x_{i,t-k} + \varepsilon_{i,t} \quad (1)$$

In the equation $\beta_i^{(k)} = \left(\beta_i^{(1)}, \ldots\ldots, \beta_i^{(k)}\right)'$. $a_i$ individual effects are shown and are assumed to be constant over the period under consideration. Parameters $\gamma_i^{(k)}$ and regression slope parameters $\beta_i^{(k)}$ differ between units. The lag length K is assumed to be the same across cross sections in the panel. The main and alternative hypotheses are as follows. The main hypothesis shows that there is no causality from X to Y (Dumitrescu and Hurlin, 2012).

$$H_0: \beta_i = 0 \quad \forall i = 1, \ldots\ldots, N \quad (2)$$

The alternative hypothesis, on the other hand, shows that there is a causal relationship in at least one unit (Dumitrescu and Hurlin, 2012).

$$H_1: \beta_i = 0 \quad \forall i = 1, \ldots\ldots, N_1 \quad (3)$$

$$H_1: \beta_i \neq 0 \quad \forall i = N_1 + 1, N_1 + 2, \ldots\ldots, N \quad (4)$$

Here $N_1$ is the unknown parameter. However, the condition $0 \leq N_1/N < 1$ must be satisfied. $N_1/N$ is necessarily less than 1. This is because if $N_1$ is equal to N the hypothesis

will be no causality equivalent to the basic hypothesis. Conversely, when $N_1$ is equal to 0, there is causality for all cases (Dumitrescu & Hurlin, 2012).

The test statistic used to test the basic hypothesis is the average of the Wald statistics of the units (Dumitrescu & Hurlin, 2012).

$$W_{N,T}^{Hnc} = \frac{1}{N}\sum_{i}^{N} W_{i,T} \tag{5}$$

$W_{i,T}$ shows the Wald test statistic used for causality testing for each country. In the case where T and N go to infinity, it can be decided by looking at the $Z_{N,T}^{Hnc}$ statistic, which has an asymptotic distribution (Dumitrescu and Hurlin, 2012).

$$Z_{N,T}^{Hnc} = \sqrt{\frac{N}{2K}}\left(W_{N,T}^{Hnc} - K\right) \underset{T,N\to\infty}{\overset{d}{\to}} N(0,1) \tag{6}$$

When T is constant, the $Z_{N}^{Hnc}$ statistic with a semi-asymptotic distribution is used (Dumitrescu & Hurlin, 2012).

$$Z_{N}^{Hnc} = \frac{\sqrt{N}\left[W_{N,T}^{Hnc} - N^{-1}\sum_{i-1}^{N} E\left(W_{i,T}\right)\right]}{\sqrt{N^{-1}\sum_{i-1}^{N} Var\left(W_{i,T}\right)}} \underset{N\to\infty}{\overset{d}{\to}} N(0,1) \tag{7}$$

## 4. Empirical Results

In the empirical application part of the study, an examination of whether there was a cross-section dependence in the series took first place. When testing cross-sectional dependence, the CD test developed by Pesaran (2004) gives consistent results in the case of N>T, as well as the Bias Adjusted LM test developed by Pesaran, Ullah, and Yamagata (2008), which gives consistent results in cases where N and T are long were used. Test results are given in the Table.

**Table 2: Cross-Section Dependency and Unit Root Test Results**

| Tests | Cons./Trend | lnperGDP | ΔlnPerGDP | Inflation | ΔInflation | Deflator | ΔDeflator |
|---|---|---|---|---|---|---|---|
| **CIPS** | Constant | -3.271*** | -5.493*** | -2.881*** | -3.212*** | -3.172*** | -5.231*** |
| | Constant+Trend | -3.746*** | | -3.014*** | | -3.497*** | |
| **$Z_A^{SPC}$** | Constant | 0.877*** | 0.215*** | -1.054*** | -0.204*** | 0.650*** | 0.533*** |
| | Constant+Trend | 3.976 | | 0.310*** | | 3.859 | |
| **$Z_A^{LA}$** | Constant | 0.175*** | 2.445 | 3.772 | 3.899 | 4.327 | 5.401 |
| | Constant+Trend | -0.953*** | | 0.843*** | | 5.078 | |
| **CD Test** | | 49.388*** | | 49.461*** | | 17.858*** | |
| **Bias_ Adjusted LM** | | 197.703*** | | 175.274*** | | 166.603*** | |

*** indicates that there is a cross-section dependence in the series at the 1% significance level for the cross-sectional dependence, and that the series is stationary for the unit root test.

When the results of the cross-section dependence of the variables are examined, it is seen that there is a cross-section dependence in all the variables. Therefore, the CIPS test developed by Pesaran (2007), and $Z_A^{SPC}$ and $Z_A^{LA}$ unit root tests developed by Hadri and Kruzomi (2012) which takes into account the cross-section dependency, were used. According to CIPS and $Z_A^{SPC}$ test results, the series are stationary. The homogeneity of the models was examined by the Pesaran and Yamagata (2008) Delta test. Models and homogeneity test results are given below.

**Model 1**

$$lnPerGDP_{it} = \beta_{0it} + \beta_1 Inflation_{it} + \varepsilon_{it} \quad (8)$$

**Model 2**

$$lnPerGDP_{it} = \beta_{0it} + \beta_1 Deflator_{it} + \varepsilon_{it} \quad (9)$$

**Table 3: Homogeneity Test Results**

| Model | Model 1 | Model 2 |
|---|---|---|
| $\hat{\Delta}$ | 34.0935*** | 108.1775*** |
| $\hat{\Delta}_{Adj}$ | 37.1990*** | 118.0313*** |

*** Indicates that the model is heterogeneous at the 99% confidence level.

Delta test results show that both models are heterogeneous. Since Dumitrescu and Hurlin (2012) panel Granger causality test takes into account heterogeneity, this method was used in this study. The causality results are shown in Table 4.

**Table 4: Dumitrescu ve Hurlin (2012) Causality Test Results**

| Causality | $W_{N,T}^{Hnc}$ | $Z_{N,T}^{Hnc}$ | $Z_N^{Hnc}$ |
|---|---|---|---|
| Inflationà lnPerGDP | 16.5321*** | 15.7982*** | 1.9596* |
| lnPerGDPàInflation | 32.2751*** | 39.4127*** | 6.6825*** |
| Deflator àlnPerGDP | 19.9602*** | 20.9403*** | 2.9881*** |
| lnPerGDPà Deflator | 12.2753*** | 9.4129*** | 0.6826 |

The optimum lag length was determined by the Akaike information criterion.

According to the results of Dumitrescu and Hurlin (2012) causality test, there is a bidirectional causality relationship between inflation and growth. The findings also apply to the different inflation indicators, the CPI and GDP deflator.

**Conclusion**

Early studies discussing the relationship between inflation and growth mostly focused on the positive effect of inflation on economic growth. According to the Phillips Curve, which

stands out in the discussions on the inflation-growth relationship, high inflation reduces unemployment and through this channel, inflation affects economic growth positively. According to the Tobin Effect, which advocates a similar view from a different perspective, increasing inflation increases the cost of holding money. For this reason, households and businesses will turn to capital accumulation instead of holding money in their asset portfolios in order to protect their real income, and as a result, increased investments will positively affect growth. However, according to another approach, high inflation, which has a negative effect on investment decisions, affects growth negatively through the investment channel. At this point, some studies have argued that the growth effect of inflation is directly dependent on the level of inflation. In this context, empirical findings that started with the work of Fischer (1993) and continued with the work of De Gregorio (1993) and Bruno and Easterly (1995) suggested that the effects of different inflation levels on the economy are different.

In this study, the relationship between inflation and growth in 27 EU countries was investigated using Dumitrescu and Hurlin (2012) causality approach between the years 1996 and 2019. In the analysis, CPI and GDP deflator were used as inflation indicators. According to the results of the causality test, there is a bidirectional causality relationship between inflation and growth. According to the findings of the study, there is a bidirectional causality relationship between inflation and economic growth for both inflation indicators.

**Peer-review:** Externally peer-reviewed.
**Conflict of Interest:** The author has no conflict of interest to declare.
**Grant Support:** The author declared that this study has received no financial support.

## References

Adaramola, A. O., & Dada, O. (2020). Impact of inflation on economic growth: Evidence from Nigeria. *Investment Management and Financial Innovations, 17*(2), 1–13.

Ahmed, M. S. (2010). An Empirical study on İnflation and economic growth in Bangladesh. *OIDA International Journal of Sustainable Development, 2*(3), 41–48.

Akter, F., & Smith, D. S. (2021). Impact of inflation on GDP growth in Malaysian economy. *International Journal of Innovative Science and Research Technology, 34*(2), 33–41.

Altintaş, H., & Koçbulut, Ö. (2019). Enflasyon ve ekonomik büyüme: OECD ülkeleri için dinamik panel eşik etki analizi. *Uluslararası Yönetim İktisat ve İşletme Dergisi, 15*(3), 629–648.

Anidiobu, G. A., Okolie, P. I., & Oleka, D. C. (2018). Analysis of inflation and its effect on economic growth in Nigeria. *Journal of Economics and Finance, 9*(1), 28–36.

Ayyoub, M., Chaudhry, I. S., & Farooq, F. (2011). Does inflation affect economic growth? The case of Pakistan. *Pakistan Journal of Social Sciences*, *31*(1), 51–64.

Barışık, S., Türk, M.M. 2020. Türkiye'de 2001 krizi sonrası enflasyon-büyüme etkileşimi, *Üçüncü Sektör Sosyal Ekonomi Dergisi, 55*(3), 2078–2093.

Barro, R. J. (1995). *Inflation and economic growth.* National Bureau of Economic Research Working Paper No. 5326.

Barro, R. J. (2013). Inflation and Economic Growth. *Annals of Economics & Finance, 14*(1), 85–109

Behera, J. (2014). Inflation and its impact on economic growth: Evidence from six south Asian Countries. *Journal of Economics and Sustainable Development, 5*(7), 145–154.

Behera, J., & Mishra, A. K. (2016). Inflation and economic growth nexus in BRICS: Evidence from ARDL bound testing approach. *Asian Journal of Economic Modelling*, *4*(1), 1–17.

Berber, M., & Artan, S. (2004). *Enflasyon ve ekonomik büyüme ilişkisi: Türkiye örneği.* Discussion Paper, No. 2004/21

Bhusal, T. P., & Silpakar, S. (2011). Growth and inflation: Estimation of threshold point for Nepal. *Economic Journal of Development, 13*(2), 131–138.

Bruno, M., & Easterly, W. (1995). *Inflation crises and long-run growth.* World Bank Policy Research, Working Paper No. 1517.

Chimobi, O. P. (2010). Inflation and economic growth in Nigeria. *Journal of Sustainable Development, 3*(2), 159–166.

Datta, K., & Mukhopadhyay, C. K. (2011). Relationship between inflation and economic growth in Malaysia-an econometric review. *International Conference on Economics and Finance Research, 4*(1), 415–419.

De Gregorio, J. (1993). Inflation, taxation, and long-run growth. *Journal of Monetary Economics, 31*, 271–298.

Denbel, F. S., Ayen, Y. W., & Regasa, T. A. (2016). The relationship between inflation, money supply and economic growth in Ethiopia: Co-integration and causality analysis. *International Journal of Scientific and Research Publications, 6*(1), 556–565.

Dumitrescu, E. I., & Hurlin, C. (2012). Testing for Granger non-causality in heterogeneous panels. *Economic modelling*, *29*(4), 1450–1460.

Erçel, G. (1999). Türkiye'de enflasyon ve büyüme ilişkisi: Genel bir değerlendirme. *İMKB Dergisi, 12*, 15–30.

Fisher, S. (1993). The role of macroeconomic factors in growth. *Journal of Monetary Economics*, *32,* 485–512.

Ghosh, A., & Phillips, S. (1998). Warning: inflation may be harmful to your growth. Washington: International Monetary Fund.

Gokal, V., & Hanif, S. (2004). Relationship between inflation and economic growth. Suva: Economics Department, Reserve Bank of Fiji Working Paper, No. 2004/04

Hadri, K., & Kurozumi, E. (2012). A simple panel stationarity test in the presence of serial correlation and a common factor. *Economics Letters, 115*(1), 31–34.

Hossain, A. (2005). The Granger-causality between money growth, inflation, currency devaluation and economic growth in Indonesia: 1954-2002. *International Journal of Applied Econometrics and Quantitative Studies, 2*(3), 45–68.

Hussain, S., & Malik, S. (2011). Inflation and economic growth: Evidence from Pakistan. *International Journal of Economics and Finance*, *3*(5), 262–276.

Kanca, O. C. (2017). İç borçlanma, enflasyon ve ekonomik büyüme: Türkiye için ekonometrik bir uygulama (1980-2014). *Finans Politik ve Ekonomik Yorumlar,* 627, 47–58.

Karabulut, Ş. (2019). Türkiye'de ekonomik büyüme ve enflasyon ilişkisi. *Optimum Ekonomi ve Yönetim Bilimleri Dergisi, 6*(2), 171–184.

Karaca, O. (2003). Türkiye'de enflasyon-büyüme ilişkisi: Zaman serisi analizi. *Doğuş Üniversitesi Dergisi, 4*(2), 247–255.

Karaçor, Z., Özer, H., & Saraç, Taha B. (2011) Enflasyon ve ekonomik büyüme ilişkisi: Türkiye ekonomisi üzerine ekonometrik bir uygulama (1988-2007). *Niğde Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 4(2), 29–44.

Kasidi, F., & Mwakanemela, K. (2013). Impact of inflation on economic growth: A case study of Tanzania. *Asian Journal of Empirical Research, 3*(4), 363–380.

Khan, M. A., & Khan, S. (2018). Inflation and the economic growth: Evidence from Five Asian countries. *Pakistan Journal of Applied Economics, 28*(2), 235–252.

Khan, M. S., & Senhadji. A. S., (2000). Threshold Effects in the relationship between inflation and growth. IMF Working Paper No. 110, Washington: International Monetary Fund

Kopuk, E. (2020). İşsizlik ve enflasyonun ekonomik büyüme üzerine etkisi: 1988-2019 dönemi Türkiye incelemesi. *IBAD Sosyal Bilimler Dergisi*, *Özel Sayı*, 11–22.

Korkulu, A., & Yılmaz, B. (2017). Türkiye'de büyüme-enflasyon ilişkisi: Granger nedensellik analizi (1939-2013). *International Journal of Academic Value Studies*, *3*(13), 85–93.

Koulakiotis, A., Lyroudi, K., & Papasyriopoulos, N. (2012). Inflation, GDP and causality for European countries. *International Advances in Economic Research, 18*(1), 53–62.

Majumder, S. C. (2016). Inflation and its impacts on economic growth of Bangladesh. *American Journal of Marketing Research, 2*(1), 17–26.

Manamperi, N. (2014). The short and long-run dynamics between inflation and economic growth in BRICS. *Applied Economics Letters, 21*(2), 140–145.

Mubarik, Y. A. (2005). Inflation and growth: An estimate of the threshold level of inflation in Pakistan, *State Bank of Pakistan – Research Bulletin*, *1*(1-2), 35–44.

Munir, Q., Mansur, K., & Furuoka, F. (2009). Inflation and economic growth in Malaysia: A threshold regression approach. *ASEAN Economic Bulletin, 26*(2), 180–193.

Niyimbanira, F. (2013). An econometric evidence of the interactions between inflation and economic growth in South Africa. *Mediterranean Journal of Social Sciences, 4*(13), 177–193.

Obradović, S., Šapić, S., Furtula, S., & Lojanica, N. (2017). Linkages between inflation and economic growth in Serbia: An ARDL bounds testing approach. *Engineering Economics, 28*(4), 401–410.

Olamide, E., Ogujiuba, K., & Maredza, A. (2022). Exchange rate volatility, inflation and economic growth in Developing countries: Panel Data Approach for SADC. *Economies, 10*(3), 67.

Opeyemi, A. F. (2020). Impact of foreign direct investment and inflation on economic growth of five randomly selected countries in Africa. *Journal of Economics and International Finance*, *12*(2), 65–73.

Özçelik, Ö., & Uslu, N. (2017). Ekonomik büyüme, işsizlik ve enflasyon arasındaki ilişkinin VAR modeli ile analizi: Türkiye örneği (2007-2014). *Ekev Akademi Dergisi,* 69, 31–51.

Pata, U. K. (2018). Türkiye'de enflasyon, tasarruf ve ekonomik büyüme arasındaki ilişkilerin simetrik ve asimetrik nedensellik testleri ile analizi. *Maliye Dergisi,* 174, 92–111.

Paul, S., Kearney, C., & Chowdhury, K. (1997). Inflation and economic growth: A multi-country empirical analysis. *Applied Economics, 29*(10), 1387–1401.

Pesaran, M. H. (2004). General diagnostic tests for cross section dependence in panels. IZA Discussion Paper No. 1240.

Pesaran, M. H. (2007). A simple panel unit root test in the presence of cross-section dependence. *Journal of Applied Econometrics, 22*(2), 265–312.

Pesaran, M. H., Ullah, A., Yamagata, T. (2008). A bias-adjusted LM test of error cross-section independence. *Econometrics Journal, 11*(1), 105–127.

Pollin, R., & Zhu, A. (2006). Inflation and economic growth: A cross-country nonlinear analysis. *Journal of Post Keynesian Economics, 28*(4), 593–614.

Rao, P. N., & Yesigat, A. (2015). Inflation and economic growth: inflation threshold level analysis for Ethiopia.

*International Journal of Ethics in Engineering & Management Education*, *2*(5), 1–22

Risso, W. A., & Carrera, E. J. S. (2009). Inflation and Mexican economic growth: Long-run relation and threshold effects. *Journal of Financial Economic Policy, 1*(3), 246–263.

Rivera, E. G., Rojo, L. A. P., & Gómez, D. X. G. (2020). Analysis of the performance of the inflation and economic growth goals for Latin America. *Journal of Administrative Science, 1*(2), 22–32.

Sa'idu, B. M., & Muhammad, A. A. (2015). Do unemployment and inflation substantially affect economic growth. *Journal of Economics and Development Studies*, *3*(2), 132–139.

Sahnoun, M., & Abdennadher, C. (2019). Causality between inflation, economic growth and unemployment in North African Countries. *Economic Alternatives, 1*, 77–92.

Sarel, M. (1996). Nonlinear effects of inflation on economic growth. *Staff Papers, 43*(1), 199–215.

Saungweme, T., and Odhiambo, Nicholas M. (2021). Inflation and economic growth in Kenya: An empirical examination. Unisa Economic Research Working Paper, No. 24/2021

Sergii, P. (2009). Inflation and economic growth: The Non-linear relationship. Evidence from CIS countries. MA Thesis in Economic, Kyiv School of Economics

Singh, S., & Singh, A. (2015). Causal nexus between inflation and economic growth of Japan. *Iranian Economic Review*, *19*(3), 265-278.

Suleymanov, E., & Nadirov, O. (2014). Türkiye örneğinde enflasyonla ekonomik büyüme arasında ilişki. *Journal of Qafqaz University-Economics and Administration, 2*(2), 119–125.

Tatliyer, M. (2017). Türkiye ekonomisinde enflasyon ve ekonomik büyüme 1950-2015. *Uluslararası Yönetim İktisat ve İşletme Dergisi*, *13*(13), 173–188.

Thanh, S. D. (2015). Threshold effects of inflation on growth in the ASEAN-5 countries: A panel smooth transition regression approach. *Journal of Economics, Finance and Administrative Science*, *20*, 41–48.

Tien, N. H. (2021). Relationship between inflation and economic growth in Vietnam. *Turkish Journal of Computer and Mathematics Education, 12*(14), 5134–5139.

Gürel, P. & Toker, K. (2019). Enflasyon-ekonomik büyüme ilişkisi: Türkiye ekonomisinde Mundell-Tobin etkisinin analizi. *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi,* 36, 335–348.

Topcu, E. (2017). Enflasyon oranı-ekonomik büyüme ilişkisi: Türkiye örneği. *Nevşehir Hacı Bektaş Veli Üniversitesi SBE Dergisi, 7*(2), 180–191.

Tunalı, H., & Özkan, İ. (2016). Türkiye'de tüketici güven endeksi ve tüketici fiyat endeksi arasındaki ilişkinin ampirik analizi. *Journal of Economic Policy Researches, 3*(2), 54–67.

Tung, L. T., & Thanh, P. T. (2015). Threshold in the relationship between inflation and economic growth: Empirical evidence in Vietnam. *Asian Social Science*, *11*(10), 105–112.

Umaru, A., & Zubairu, A. A. (2012). Effect of inflation on the growth and development of the Nigerian economy: An empirical analysis. *International Journal of Business and Social Science, 3*(10), 183–191.

Uysal, D., Mucuk, M., & Alptekin, V. (2008). Türkiye ekonomisinde vektör otoregresif model ile enflasyon-büyüme ilişkisinin analizi. *Uluslararası Yönetim İktisat ve İşletme Dergisi, 4*(8), 55–72.

Vinayagathasan, T. (2013). Inflation and economic growth: a dynamic panel threshold analysis for Asian economies. *Journal of Asian Economics*, *26*, 31–41.

Yapraklı, S. (2007). Enflasyon ve ekonomik büyüme arasındaki ilişki: Türkiye için eş-bütünleşme ve nedensellik analizi. *Atatürk Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, *10*(2), 287–301.

Yüksel, S. (2016). Rusya ekonomisinde büyüme, işsizlik ve enflasyon arasındaki nedensellik ilişkileri. *Finans Politik ve Ekonomik Yorumlar,* 614, 43–57.