INVESTIGATION OF THE EFFECT OF MONEY SUPPLY AND PUBLIC INTEREST PAYMENTS ON INFLATION IN FRAGILE FIVE ECONOMIES WITH PANEL DATA ANALYSIS

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Abstract

In 2013, Turkey, Brazil, India, Indonesia and South Africa were determined by Morgan Stanley as the countries most affected by the policy change of the US central bank, the FED, and these countries were named the "fragile five". In this study, the effects of money supply and public interest payments on inflation were investigated by using the data of the "fragile five" economies for the period 1990-2020. Panel data analysis was used in the study. According to the results of the study, a one-unit increase in money supply increases inflation by 0.774 units. A one-unit increase in public interest payments increases inflation by 1.52 units. Uncontrolled expansions in the money supply increase inflation. An increase in interest payments also increases inflation. When inflation increases, monetary expansion is made and temporary solutions can be sought because inflation reduces the purchasing power of the society. However, this situation can increase inflation even more.

Keywords: Fragile Five, Turkey, Money Supply, Interest, Inflation

JEL Classification: O50, O52, E51, E43, E31

KIRILGAN BEŞLİ EKONOMİLERİNDE PARA ARZI VE KAMU FAİZ ÖDEMELERİNİN ENFLASYON ÜZERİNE OLAN ETKİSİNİN PANEL VERİ ANALİZİ İLE İNCELENMESİ

Öz

2013 yılında Morgan Stanley tarafından Türkiye, Brezilya, Hindistan, Endonezya ve Güney Afrika ABD merkez bankası olan FED'in politika değişikliğinden en fazla etkilenen ülkeler olarak belirlenmiş ve bu ülkelere "kırılgan beşli" ismi verilmiştir. Bu çalışmada "kırılgan beşli" ekonomilerinin 1990-2020 yılı verileri kullanılarak para arzı ve kamu faiz ödemelerinin enflasyon üzerine olan etkisi araştırılmıştır. Çalışmada panel veri analizi kullanılmıştır. Çalışmanın sonucuna göre para arzındaki bir birimlik artış enflasyonu 0.774 birim arttırmaktadır. Para arzındaki kontrolsüz genişlemeler enflasyonu artırmaktadır. Ayrıca faiz ödemelerindeki artış da enflasyonu artırmaktadır. Enflasyon yükseldiğinde toplumun alım gücü azaldığından, hükümetler geçici bir çözüm olarak gördüğü parasal genişleme yoluna gidebilmektedir. Fakat bu durum enflasyonu daha da arttırabilmektedir.

Anahtar Kelimeler: Kırılgan Beşli, Türkiye, Para Arzı, Faiz, Enflasyon

JEL Kodu: O50, O52, E51, E43, E31

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1. Introduction

Every day, countries in the world are becoming more and more financially integrated with each other. Especially after the 1990s, with the increase in globalization movements, countries have become more open to the outside and their financial connections with each other have increased. While this situation allows the countries to grow and develop economically, it has also brought along a number of problems. Countries that do not have to develop and grow only with their own savings have also increased their economic activities with foreign capital from the outside world. The US dollar, which is the common currency in international transactions, has spread to all countries of the world. Countries have entered into a race to attract foreign capital from the world to their own countries. This capital flow has helped especially the growth and development of developing countries. However, due to this change process that came with the globalization movement, some risks have come along. In particular, the need for foreign capital by developing countries and carrying out their economic activities with this capital have made countries more dependent on the world financially. This situation has manifested itself periodically as a negative reflection of globalization trends.

Some developments in the world, which may be negative for developing countries that need foreign capital, also negatively affected the macroeconomic indicators of these countries. When foreign capital is directed towards developing countries, while positive developments are experienced in the macroeconomic indicators of these countries, these countries may be negatively affected economically as a result of some policy changes in the monetary policies of the USA, which is the leader of the world economy, and which causes foreign capital to leave the developing countries. It may even experience various financial crises. These financial crises can also negatively affect various macroeconomic indicators of countries.

In this study, the countries that are expressed as "fragile" as a result of the negative developments in some developing countries after some decisions taken by the US central bank, the FED, were examined. In 2013, by Morgan Stanley, Turkey, Brazil, India, Indonesia and South Africa were determined as the countries most affected by the policy change of the US central bank, the FED, and these countries were called the "fragile five". In this study, the effect of money supply and public interest payments on inflation of the "fragile five" economies, especially from 1990, when the globalization movements began, until 2020 was examined. The data set of the study was obtained from the World Bank Data Bank. Panel data analysis of the study was carried out using the STATA16 program. The study is expected to contribute to the literature as inflation, which is one of the macroeconomic indicators and an important point in fragility, is examined in terms of different variables. In addition, it is

important to determine whether this country group is still fragile, since the selected period range approaches the near period.

2. Theoretical Background

When the world economy and the developments in the world economy are examined, it is seen that the USA is leading the world because it is the largest economy in the world. For this reason, the dollar, which is the currency of the USA, is of great importance for all countries of the world. The dollar, which is the international currency reserve and the common currency in world trade, has spread all over the world. Countries trade with the common currency, the dollar, instead of their own currency, and use the dollar as a reserve currency. For this reason, developments in the dollar and the decisions taken by the US central bank, the FED, affect all world economies. This situation brought about by globalization not only helped the economic growth and development of countries, but also increased financial fragility. Developing countries, in particular, are more financially fragile. These countries, which try to attract foreign capital to their countries in order to grow and develop, may be vulnerable to developments that cause foreign capital to leave the country. For this reason, some developing countries in the world can be more "fragile" in financial terms, especially compared to developed countries.

The concept of the fragile five emerged for the first time on May 22, 2013, after some financial decisions taken by the FED. On this date, the FED announced that it would reduce its bond purchases to the markets. After this decision taken by the FED, some countries with high current account deficit and in need of foreign capital to close this deficit experienced various macroeconomic problems. Later, after this decision taken by the FED on August 1, 2013, Morgan Stanley referred to these countries, which had various financial and macroeconomic difficulties, as the "Fragile Five" countries for the first time. These countries included in Morgan Stanley's report are Turkey, Brazil, Indonesia, India and South Africa. It can also be expressed as BIITS, the abbreviation of the initials of the countries. These countries have been the most affected countries in the world by this decision taken by the FED. For this reason, these countries are expressed as fragile five countries. There are many macroeconomic problems in this country group, including Turkey, and these problems have been going on for many years. These problems can be basically expressed as high inflation, significant current account deficit, excessive need for foreign capital, instability in economic growth figures.

In the classical approach, quantity theory is used to explain the relationship between the amount of money and the general level of prices. According to the quantity theory, if the

amount of money in the economy is increased without a change in the amount of production, it will cause prices to rise and money to depreciate. According to Fisher's quantity theory; To what extent the amount of money in the economy increases, the general level of prices will increase at the same rate. In other words, it states that there is an equal and equal relationship between the change in money supply and inflation. For example, he states that if the money supply in the economy is increased by 5%, the inflation rate will increase by 5% (Dinler, 2014:485).

According to Classical and Neo-Classical economics, when the amount of money in the economy is changed, only monetary aggregates are affected and cannot give a direct result. In other words, it is not possible to achieve success in macroeconomic issues such as employment and production in the economy by increasing or decreasing the money supply. When the amount of money in the market is increased more than the current production level, this policy only leads to inflation and does not affect real aggregates. In summary, according to Classics and Neo-Classicals, the cause of inflation is the increase in the amount of money. In this period, inflation was explained by quantity theories of money. According to the quantity theory of money, changes in prices are determined by the amount of money in circulation, and this change takes place at the same rate or in close proportion and in direct proportion (Dinler, 2014:485-495).

According to Keynes, it is possible to reduce interest rates up to a certain level by increasing the money supply. Once the minimum level is reached, money supply increases will no longer affect interest rates. It won't be able to drop any further. In this case, the interest elasticity of money demand will be infinite. This situation in which the economy is in is called the "liquidity trap". If the money supply increases when the economy enters the liquidity trap, the economic decision-makers will continue to demand money with the motive of speculation. According to the Keynesian approach, the economy can reach equilibrium above the full employment equilibrium level. If the economic equilibrium, that is, the point where supply and demand equalizes, is above the full employment equilibrium level, it means that the national income has come to equilibrium in the nominal area. Increases in the money supply in the nominal area do not increase real output, but cause inflation (Bilgili, 2018:165).

Monetarists, like the classics, see the main cause of inflation as money supply increases. Monetary policies can be used as a tool to control and prevent inflation. A controlled increase in money supply will not cause inflation. The reason for inflation is that monetary authorities increase the money supply frequently and uncontrollably. (Ünsal, 2017:380-385)

3. Description of The Fragile Five Countries

When the world economy and the developments in the world economy are examined, it is seen that the USA is leading the world because it is the largest economy in the world. For this reason, the dollar, which is the currency of the USA, is of great importance for all countries of the world. The dollar, which is the international currency reserve and the common currency in world trade, has spread all over the world. Countries trade with the common currency, the dollar, instead of their own currency, and use the dollar as a reserve currency. For this reason, developments in the dollar and the decisions taken by the US central bank, the FED, affect all world economies. This situation brought about by globalization not only helped the economic growth and development of countries, but also increased financial fragility. Developing countries, in particular, are more financially fragile. These countries, which try to attract foreign capital to their countries in order to grow and develop, may be vulnerable to developments that cause foreign capital to leave the country. For this reason, some developing countries in the world can be more "fragile" in financial terms, especially compared to developed countries. (Şerbetçi & Yardımcıoğlu, 2017:115-116).

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From Figure 1 to Figure 5, there are various macroeconomic indicators of the countries expressed as the fragile five. Morgan Stanley, an important investment bank in the world, defined the countries that are the subject of the research as the "fragile five" countries in 2013. For this reason, the time period of the indicators has been chosen to be a few years

before and a few years after this date in order to better understand the expression of this country group as "fragile".
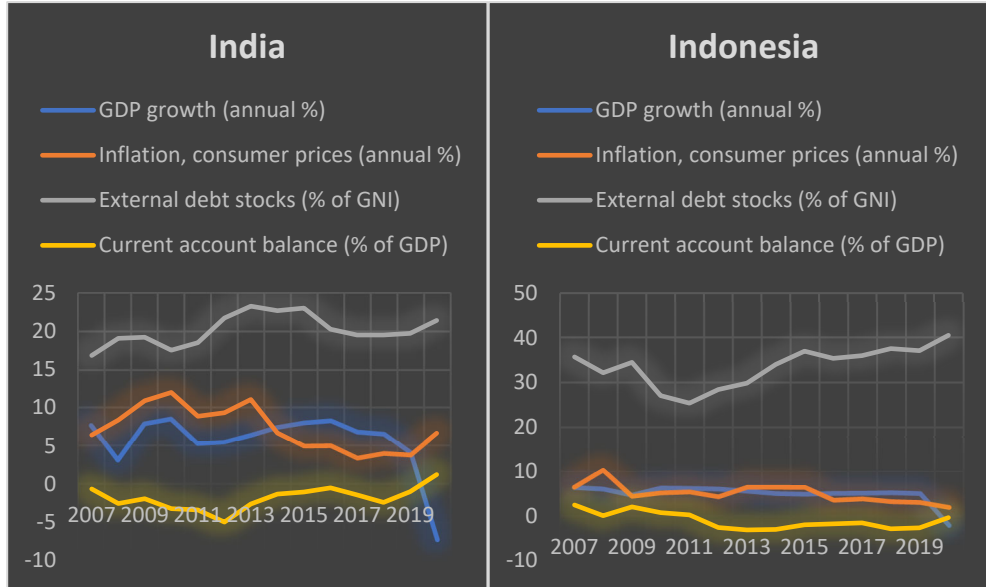
Figure 1: Turkey and Brazil Macroeconomic Indicators
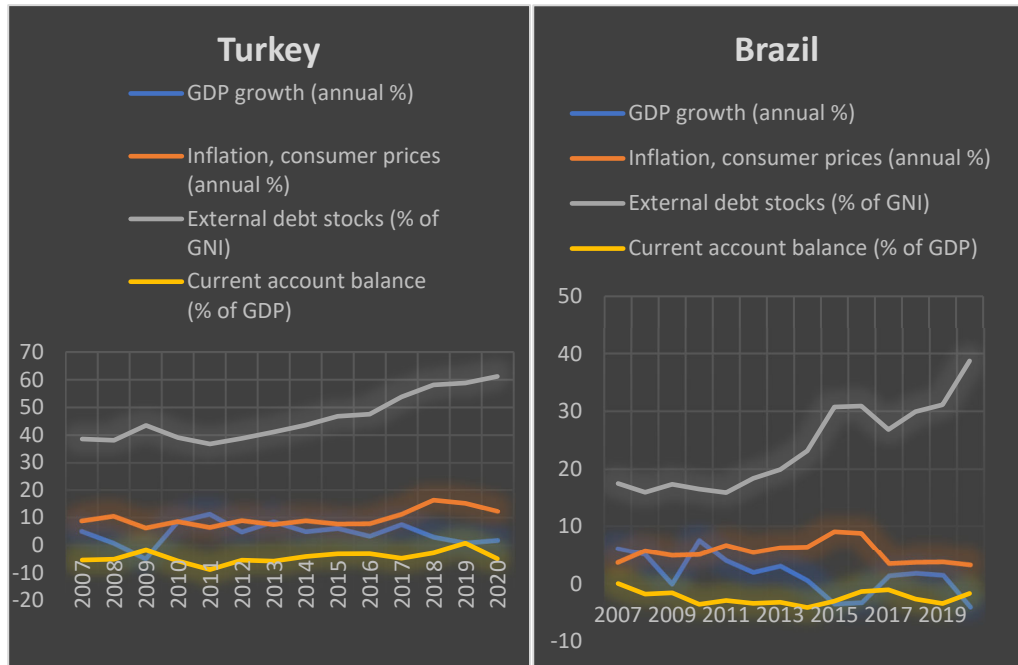
Source: World Bank (2022)

In Figure 1, various macroeconomic indicators of Turkey and Brazil, which are among the fragile five countries, are presented. The increase in external debt stocks of both Turkey and Brazil, especially after 2013, draws attention. Both countries generally run current account deficits. Economic growth rates are not stable. While Brazil's inflation rates are relatively reasonable in single digits, Turkey's inflation rates are generally in double digits.
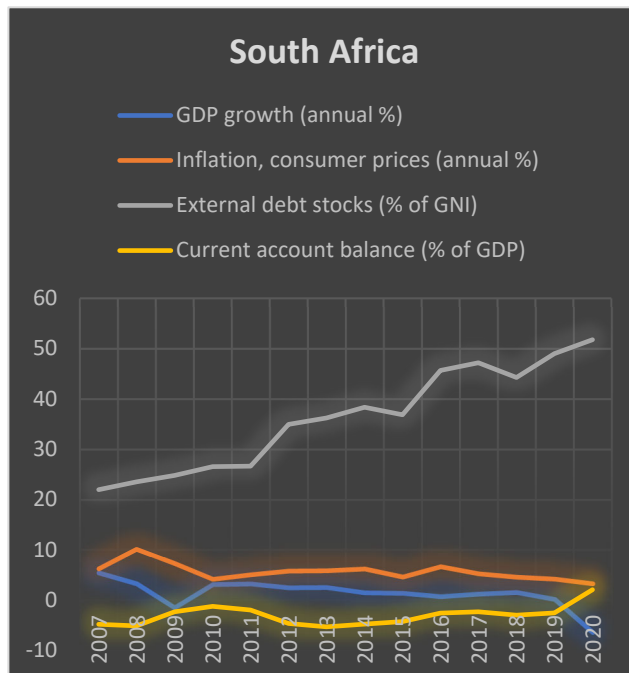
Figure 2: India and Indonesia Macroeconomic Indicators

Source: World Bank (2022)

In Figure 2, various macroeconomic indicators of India and Indonesia, which are among the fragile five countries, are presented. External debt stocks of both India and Indonesia tend to increase, especially after 2013. Both countries generally run current account deficits. India's economic growth rates are not stable. Although Indonesia's economic growth rate has been stable for a long time, the economic growth rate in both countries has been on a downward trend in recent years. India's inflation rates are advancing unevenly. Indonesia has a relatively reasonable and stable inflation rate.

Figure 3: South African Macroeconomic Indicators

Source: World Bank (2022)

In Figure 3, various macroeconomic indicators of South Africa, which is among the fragile five countries, are presented. After 2013, South Africa's external debt stocks tend to increase. The country has a current account deficit in general. Although South Africa's economic growth rate has been stable for a long time, it is both at very low levels and has been on a downward trend in recent years. The country has a relatively reasonable and stable inflation rate.

Figure 4: Country Comparison by Economic Growth and Inflation Indicators
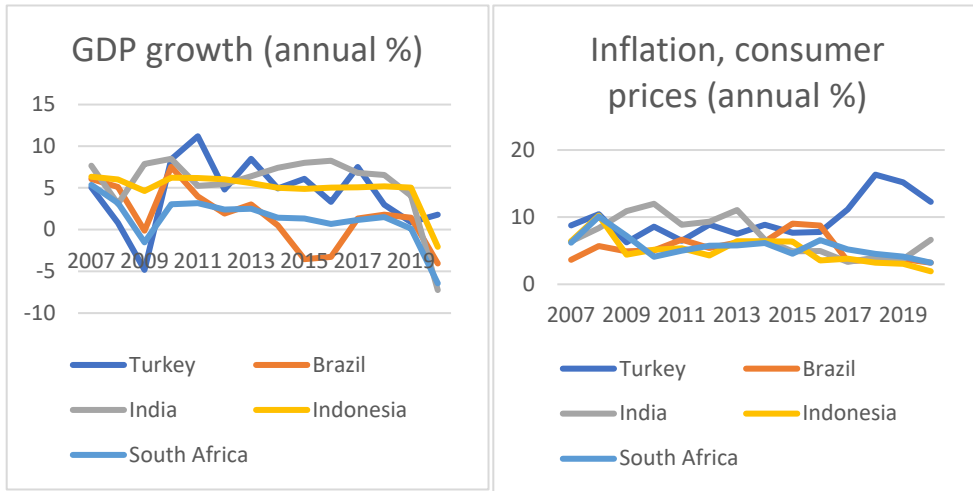
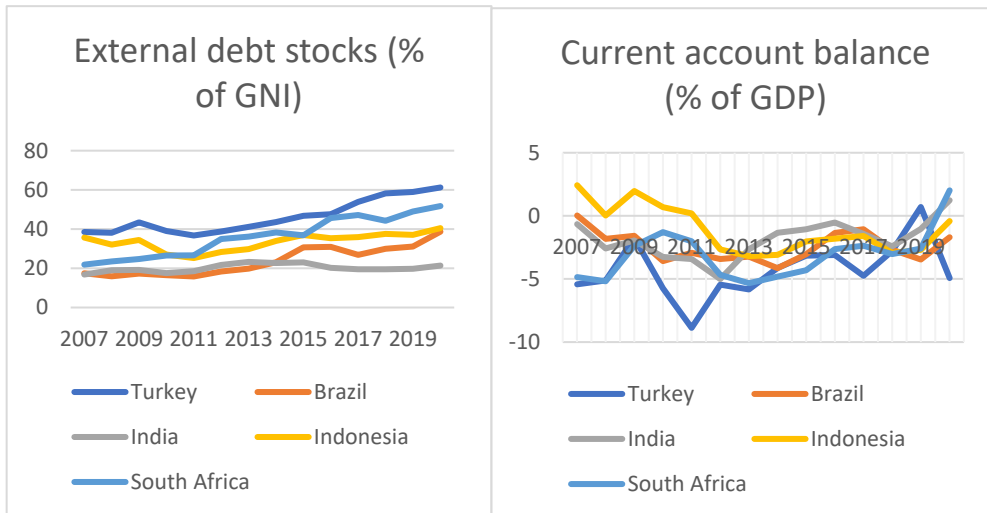
Source: World Bank (2022)

Figure 4 shows the comparative indicators of countries over economic growth and inflation. Accordingly, economic growth rates in the whole country group have decreased in recent years, and even countries have shrunk economically. The economic growth figures of the countries have changed quite inconsistently over the years. The inflation figures of the fragile five economies also made unstable progress. However, in recent years, they have managed to reduce inflation figures, with the exception of Turkey. Looking at the inflation indicator, it can be stated that Turkey is quite fragile.

Figure 5: Country Comparison by External Debt Stock and Current Account Balance

Source: World Bank (2022)

Figure 5 shows the comparison of countries in terms of external debt stock and current account balance data. In all fragile five economies, the external debt stock is quite high and tends to increase. While Turkey is the most indebted country, India is in the best position. Looking at the current account balance data, countries have generally had current account deficits over the years. In particular, Turkey had a large deficit between 2010-2011. Although there has been a relative recovery in the following years, the current account deficit has been increasing again in recent years. The current account of countries is also making a rather unstable progress. These indicators show more clearly why this country group consisting of Turkey, Brazil, India, Indonesia and South Africa is referred to as the "Fragile Five". In this study, it is investigated how money supply and public interest payments affect the inflation of fragile five economies. The effects of different variables on the inflation of countries were examined.

4. Literature Review

Studies measuring the effect of money supply and public interest payments on inflation are shown in Table 1.

Table 1: Literature Review

Author/s	Release Year	Country/s	Period Range	Conclusion
Darman	2016	Indonesia	2000-2014	The author investigated the effect of money supply and interest rate on inflation in Indonesia. According to the results of the study, money supply and interest rates are effective in increasing and decreasing inflation.
Sunal	2018	Turkey	2005-2017	In his study, the author investigated the relationship between consumer price index, money supply and exchange rate. According to the results of the study, there is a long-term significant relationship between the variables.
Sultana	2018	Bangladesh	1981-2016	The author investigated the effects of money supply, inflation rate and interest rate on economic growth. According to the results of the study, it has been observed that there is a long-term significant relationship between the variables on economic growth. There is a positive and significant relationship between money supply and economic growth. In addition, the interest rate negatively affects economic growth in the long run.

Table 1: Literature Review (Continue)

Author/s	Release Year	Country/s	Period Range	Conclusion
Fry	1980	Turkey	1950-1977	The author investigated the relationship between money supply, inflation rate, interest rate and economic growth. According to the results of the study, there is an unbalanced institutional interest rate in Turkey. The exchange rate is under control. Under these conditions, the real supply of domestic credit is determined by the real demand for money. Nominal money supply and nominal interest rate can be used to influence markets.
Nguyen	2015	Selected Asian Countries	1985-2012	The author investigated the effect of financial deficit and broad money supply on inflation. According to the results of the study, the large money supply has a significant and positive effect on inflation in only one model. However, financial deficit, public expenditures and interest rates are important determinants of inflation in both estimation methods.
Amhim-mid et.al.	2021	Indonesia and Libya	2005-2019	The author investigated the effects of interest rate, money supply and exchange rate on inflation. According to the results of the study, there is no significant effect of interest rate on inflation in Indonesia. Money supply has a significant effect on inflation in both Indonesia and Libya. The exchange rate has no significant effect on inflation in either country.
Islatince	2017	Turkey	1988-2016	The author explored the relationship between money, prices and wages in his work. According to the results of the study, there is a bidirectional relationship between money supply and prices. Demand-based factors are effective in Turkey's inflation process.
Kilavuz & Altinöz	2020	Turkey	2006-2018	In his study, the author investigated the relationship between money supply and inflation by adding additional variables. According to the results of the study, although there is a significant and positive long-term relationship between the interest rate and inflation, this relationship is weak. There is a long-term, significant and positive relationship between money supply and inflation. But this relationship is not strong either. Therefore, the basis of inflation in Turkey is cost-driven and structural inflation.

Table 1: Literature Review (Continue)

Author/s	Release Year	Country/s	Period Range	Conclusion
Tanrıöver & Yamak	2015	Turkey	1990-2014	The author examined the relationship between the nominal interest rate and the general price level within the framework of the Gibson paradox. As a result of the study, the Gibson paradox was confirmed. In addition, it has been determined that there is a one-way relationship from the general price level to the nominal interest rate.
Bozkurt	2014	Turkey	1999-2012	The author examined the relationship between money supply, inflation and economic growth in Turkey. According to the results of the study, money supply and velocity of money are one of the main factors affecting inflation. In addition, decreases in income reduce inflation.
Bello & Saulawa	2013	Nigeria	1980-2010	The author examined the relationship between money supply, interest rate, income growth and inflation in Nigeria. According to the results of the study, there is no long-term relationship between the variables. However, there is a bidirectional relationship between money supply and inflation, between economic growth and inflation, and between interest rate and inflation.
Dragos et al.	2013	United States and China	1987-2011	The authors examined the relationship between money supply, interest rate and inflation in the USA and China. According to the results of the study, a 1% increase in money supply in the USA increases inflation by 8%. A 1% increase in interest rates increases inflation by 0.6%. However, when the same model is applied to China, it cannot be clearly associated with changes in inflation when the money supply changes. The authors state that the data may not reflect the truth in order to protect China's economic image and appear strong.
Erkişi	2019	Fragile Five Countries	1980-2018	The author examined the relationship between budget deficit, money supply and inflation in fragile five countries. According to the results of the study, money supply, interest rate and exchange rate have a positive effect on inflation in the long run. A 1% increase in money supply increases inflation by 0.36%. A 1% increase in the interest rate increases inflation by 0.73%. A 1% increase in the exchange rate increases inflation by 0.0015%. The budget deficit has no effect on inflation.

5. Econometric Analysis

The results expressing the effect of money supply and public interest payments applied on fragile five economies on inflation are given in this section. In the study, 5 countries, which are expressed as fragile five economies, are included. Annual data for these countries from 1990 to 2020 are used. In order to obtain more reliable results from econometric analyzes, the time period has been extended compared to the time period in the previous figures.

5.1. Variables of The Study and Descriptive Explanations of These Variables

The preferred variables to be used in the study are given in Table 2. While there are both dependent and independent variables here, it is possible to see the descriptive explanations of these variables.

Table 2: Variables and Descriptive Annotations

Broad money growth (annual %)	MONEY	''Broad money is the sum of currency outside banks; demand deposits other than those of the central government; the time, savings, and foreign currency deposits of resident sectors other than the central government; bank and traveler's checks; and other securities such as certificates of deposit and commercial paper.''
Public interest payments (% of expense)	INT	''Interest payments include interest payments on government debt--including long-term bonds, long-term loans, and other debt instruments--to domestic and foreign residents.''
Inflation, consumer prices (annual %)	INF	'' Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.''

Source: World Bank (2022)

The descriptive explanations in Table 2 belong to the World Bank. These explanations belonging to the World Bank are quoted exactly in order to express the content of the variables more reliably.

5.2. Model of the Research

There are equations 1, 2 and 3 in this section. These equations express the models created for the country group that is the subject of the study. The countries expressed as the fragile five and included in the study are Brazil, India, Indonesia, Turkey and South Africa.

$$INF_{it} = \alpha_0 + \beta_1 MONEY_{it} + \beta_2 INT_{it} + \mu_i + \lambda_t + \varepsilon_{it} \tag{1}$$

$$MONEY_{it} = \alpha_0 + \beta_1 INF_{it} + \beta_2 INT_{it} + \mu_i + \lambda_t + \varepsilon_{it} \tag{2}$$

$$INT_{it} = \alpha_0 + \beta_1 INFP_{it} + \beta_2 MONEY_{it} + \mu_i + \lambda_t + \varepsilon_{it} \tag{3}$$

$i = 1 \ldots 5$

$t = 1990\text{-}2020$

Variables that form part of the study, inflation is indicated in the model (INF), broad money growth (MONEY) and interest payments (INT). The total number of countries included in the study is 5. On the other hand, the time dimension between 1990 and 2020 was included in the analysis.

In this study, while analyzing and estimating the data, estimation was made using the Driscoll - Kraay estimator. There are a number of reasons for this choice. These reasons are that the estimator gives reliable results even against the basic deviations that may occur in the model. In addition, as in this study, when the number of countries is less than the time dimension, every estimator cannot give reliable results. This estimator can also reach consistent results in this case (Yerdelen Tatoğlu, 2018:266). The Driscoll - Kraay estimator, which can be used even in unbalanced panel data, is considered to be the right choice.

5.3. Cross-Section Dependency and Homogeneity Tests

Table 3 shows the tests used to test cross-sectional dependence and homogeneity and their results. Accordingly, cross-section dependence was measured using the Pesaran CD Test. Homogeneity was measured with the Swamy S Test.

Table 3. Cross-Section Dependency and Homogeneity Test

Cross-Section Dependency	Pesaran CD Test	INF - p-value: 0.000 MONEY - p-value: 0.000 INT - p-value: 0.000
Homogeneity Test	Swamy S Test	Chi2:89.37 (Prob=0.0000)

When the results in Table 3 are examined, it is understood that, it has a cross-section dependence. In other words, as a result, the existence of cross-section dependence has been reached. For this reason, unit root test and parameter estimation method, which are robust to the existence of cross-section dependence, will be used. Subsequent analyzes will be shaped according to this result and will lead to second generation panel data tests. According to the results of the homogeneity test, which is another test in Table 3, it was understood that the parameters were not homogeneous. In this case, too, there will be a trend towards non-homogeneous estimator tests.

5.4. Lag Length Selection Test

One of the substantial issues when model estimation is the lag length. One of the tests that should be done is the tests that determine the appropriate lag length. Table 4 contains the test that determines the appropriate lag length for this analysis and the result of this test. One of the most preferred tests to determine the appropriate lag length is the Hansen J test.

Table 4. Hansen J Test

Hansen J Test						
Lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	.999997	40.8887	.2644228	**-124.8974**	**-31.1113**	**-69.06824**
2	.999994	28.89365	.3660752	-95.44595	-25.10635	-53.57405
3	.9999275	13.96262	.7315249	-68.93045	-22.03738	-41.01585
4	-9.626759	8.841538	.4520285	-32.60499	-9.158462	-18.6477

The conclusion contains Bayesian Information Criteria (MBIC), Akaike Information Criteria (MAIC), and Hannan Quinn Information Criteria (MMQIC) based on Hansen J statistics (Yerdelen Tatoğlu, 2018:138). According to the result of the Hansen J test, which was also applied in the study, it was decided that the appropriate lag length was 1.

5.5. Stationarity (Unit Root) Tests

Among the previous tests, the result of the cross-section dependence test is included. It has been stated before that there is a correlation between units in the data in this test. For this reason, at this stage, a unit root analysis test was conducted taking into account the correlation between residues. Table 5 shows the results of the Multivariate Augmented Dickey Fuller (MADF) panel unit root test based on it.

Table 5. Multivariate Augmented Dickey Fuller (MADF) Test

Variables	Lags	MADF	Approx 5% CV
INF		98.040	
MONEY	1	50.168	26.904
dINT		135.312	27.491

According to the unit root test results in Table 5, the reference value is greater than 5% CV for all variables. Accordingly, inflation and large money growth are stable at the 95% confidence level and have trend stationary. Interest payments are stationary when the first difference is taken.

5.6. F, LM and LR Tests

The tests in Table 6 are among the tests that help in choosing an estimator and that should be done before model estimation. The purpose of these tests is to determine the unit and time effects that the model has or does not have. (Yerdelen Tatoğlu, 2020:164).

Table 6. F, LM ve LR Tests

	Unit Effect	Time Effect
F test statistic	0.84 (Prob=0.5000)	0.97 (Prob=0.5150)
LM test statistic	0.00 (Prob=1.0000)	0.03 (Prob=0.4366)
LR test statistic	0.00 (Prob=1.0000)	0.00 (Prob=1.000)

These tests are carried out to test whether the model includes unit and time effects. In other words, it is tested whether the data differ from unit to unit and/or whether the data differ from time to time. According to the results of the test, if the probe values are determined as 0.000, it shows that this model has a unit or time effect according to the test used. However, since all the results were greater than 0.000 in the tests, it was understood that both effects were not seen. When the results of Table 6 are interpreted, it is understood that the model contains neither unit nor time effect according to all test results.

5.7. Robust Hausman Test

Another substantial test that needs to be done before model estimation is the selection of the model. In other words, it is essential to know whether the analyzes will be made according to the random effects model or the fixed effects model. Basically, two models are used in panel data analysis. One of them is the fixed effects model and the other is the random effects model. The Hausman test is a test that shows which model can achieve more consistent results. The Hausman test is a specification test. The Robust Hausman test is highly preferred in this determination. Table 7 contains the results of this test.

Table 7. Robust Hausman Test

	Robust Hausman Test
rH test statistic	1.05 (Prob=0.5911)

The Ho hypothesis of the Robust Hausman test, that is, the main hypothesis, is constructed as "The difference between parameters is not systematic". Accordingly, Ho cannot be rejected because the probe value is greater than 0.05, and it is decided that the random effects estimators are valid because they are efficient. When the results of Table 7 are interpreted, it is seen that the model selection should be in the direction of the random effects model.

5.8. Multicollinearity and Normal Distribution Tests

Multicollinearity and normal distribution tests, which are necessary to reach a reliable analysis result, are also included in the study. First, multicollinearity was examined with a priori indicators, and then the priori indicators were supported with variance inflation factor. The Joint Test was used to determine the normal distribution.

Table 8. Multicollinearity and Normal Distribution Tests

Multicollinearity	
Least squares estimator	R2=0.5343
	Prob: 0.000
Variance inflation factor (VIF)	Mean VIF=1.01
Normal Distribution	
Joint test for normality on e:	Chi2=10.81 prob>chi2=0.0045
Joint test for normality on u:	Chi2=0.90 prob>chi2=6368

When the results of Table 8 are interpreted, the priori indicators can be looked at first. Accordingly, the priori indicators indicate that there is no multicollinearity problem. This is due to the fact that the R2 value is quite high and the probe value is also significant. However, to clearly support this result, the VIF value was also examined. If the VIF value is to be interpreted, a result between 0-5 indicates that there is no multicollinearity. Since the result obtained is in this range, it has become clear that there is no multicollinearity problem. When the results of the normal distribution test are examined, normal distribution is seen in error terms, but the same is not valid for residuals.

5.9. Autocorrelation and Heteroskedacity Tests

One of the last tests to be done is the deviation from the basic assumptions. In order to detect this situation, cross-section dependence, autocorrelation and heteroscedasticity tests are performed. While Table 9 includes the results of the last two tests, it should be noted that the cross-section dependency test has already been performed before.

Table 9. Autocorrelation and Heteroscedasticity Tests

Basic Assumption Tests			
Autocorrelation	Durbin- Watson	2.4895823	
	Baltagi-Wu, LBI	2.5865833	
Heteroscedasticity	Levene, Brown ve Forsythe Test	W0: (Prob=0.00003326)	7.0154776,
		W50: (Prob=0.02858989)	2.7874967,
		W10: (Prob=0.02792871)	2.8022870,

It is understood that some of the main deviations from the assumption are seen in the results in Table 9. Heteroscedasticity and cross-section dependency are deviations that have been detected. It has already been noticed in previous tests that it is a cross-section dependency. However, it was observed that there was no autocorrelation. However, due to the two main deviations detected, the Driscoll-Kraay estimator, which is robust to these deviations and can be used even in the presence of these deviations, was used in the model estimation.

5.10. Driscoll-Kraay Model Forecast Results

At the end of the analysis, model estimation was started. For the model estimation, the Driscoll-Kraay standard error estimator was preferred due to the results obtained earlier. The model was analyzed according to the random effects model. The country group is a country group that consists of 5 countries in total and is known as the "Fragile Five" in the world. The analysis is based on data from these countries between 1990 and 2020. Table 10 contains the estimation results.

Table 10. Driscoll-Kraay Model Forecast Results

INF	Coefficients	Drisc/KraayStd.Err.	t statistic	p > |t|
MONEY	0.7747265	0.0064149	120.77	0.000
INT	1.524193	0.6253906	2.44	0.071
Constant Coefficients	-13.45872	6.748997	-1.99	0.117
F statistic			24507.84 (Prob>F: 0.0000)	
R^2			0.5347	
Number of Observations			155	

According to the estimation in Table 10, the relationship between inflation rate and money supply is significant. Money supply has a positive effect on inflation. A one-unit increase in money supply increases inflation by 0.774. While the relationship between inflation and interest payments is insignificant at the 95% confidence level, it is significant at the 90% confidence level. A one-unit increase in public interest payments increases inflation by 1.52 units at the 90% confidence level.

6. Conclusion and Policy Recommendations

In this study, the effects of money supply and public interest payments on inflation were investigated by using the data of the "fragile five" economies for the period 1990-2020. Panel data analysis was used in the study. According to the results of the study, the relationship between inflation rate and money supply is significant. Money supply has a positive effect on inflation. A one-unit increase in money supply increases inflation by 0.774. While the relationship between inflation and interest payments is insignificant at the 95% confidence level, it is significant at the 90% confidence level. A one-unit increase in public interest payments increases inflation by 1.52 units at the 90% confidence level.

The findings of the study support the relationship between interest, money supply increase and inflation in the theoretical background. The results are in agreement with the theoretical background. In addition, consistent results were obtained with many studies in the empirical literature review. In the study, it is expected to contribute to the literature and enrich the literature in terms of both the selected period range and the selected country group.

Money and interest have an increasing effect on inflation. For this reason, the "fragile five" countries, which are in the category of developing countries, need to keep both variables under control in order to achieve a permanent stability in the general level of prices, that is, in inflation, and to bring inflation to reasonable levels. Uncontrolled expansions in the money supply increase inflation. An increase in interest payments also increases inflation. When inflation increases, monetary expansion is made and temporary solutions can be sought because inflation reduces the purchasing power of the society. However, in order to solve this problem in the long run, central banks should avoid uncontrolled monetary expansions. However, it is obvious that the monetary policies implemented by the central bank are not sufficient to produce permanent solutions in the markets. For this reason, central banks that implement monetary policy and governments that implement fiscal policy should engage in a coordinated and reciprocal work in the solution of inflation. Contrasting practices in monetary and fiscal policies cause both policies to fail. For this reason, the central banks and governments of the fragile five countries should implement rational and coordinated monetary and fiscal policies that comply with the realities of economics and oriented to market conditions in order to get rid of the fragile structure and to stabilize inflation at reasonable levels.

Conflict of Interest

The authors declare that they have no conflict of interest.

Ethical Approval

This article does not contain any studies with human participants or animals performed by any of the authors

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