ESTIMATING THE EFFECT OF FISCAL AND MONETARY POLICIES ON ECONOMIC GROWTH IN OECD COUNTRIES: 1996-2021 PERIOD

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ABSTRACT

Theoretical and empirical debates on the impact of fiscal and monetary policies on economic growth are quite old and extensive. This paper examines the monetary and fiscal policies affecting the economic growth of OECD countries between 1996 and 2021. The method of the study is panel data analysis using a fixed effects estimator. The research question of this study is "what is the effect of monetary and fiscal policies on economic growth", and theoretical and empirical studies in the literature were used to answer this question. Growth was used as the dependent variable for this purpose. An exchange rate and inflation were used as independent variables to represent monetary policy. Government expenditure and revenue are other independent variables to represent fiscal policy. According to the results of the analysis, monetary and fiscal policies affect economic growth. Hence, while the exchange rate (-0.001) and public expenditure (-0.880) affect economic growth negatively, inflation (0.005) and public income (0.274) affect economic growth positively. However, the coefficients of the variables are different from each other. While the effect of the monetary policy variables used in the analysis on growth is quite small, the coefficients of the fiscal policy variables are large. In addition, in the study, a discussion about which of the monetary and fiscal policy options that became popular, especially in times of crisis is effective, is discussed for the COVID period. Historically, in every crisis period, justice in income distribution deteriorates and inequalities increase.

Keywords: *Fiscal policy, monetary policy, growth, OECD countries, panel fixed effects analysis*

Jel Code: *E50, E52, F43*

OECD ÜLKELERİNDE MALİYE VE PARA POLİTİKALARININ İKTİSADİ BÜYÜMEYE ETKİSİNİN TAHMİN EDİLMESİ: 1996-2021 DÖNEMİ

ÖZ

Para ve maliye politikalarının iktisadi büyüme üzerindeki etkisine yönelik teorik ve ampirik tartışmalar oldukça eski ve kapsamlıdır. Bu çalışma 1996-2021 yılları arasında OECD ülkelerinin iktisadi büyümesine etki eden para ve maliye politikalarını incelemiştir. Çalışmanın yöntemi, sabit etkiler tahmincisinin kullanıldığı panel veri analizidir. Bu çalışmanın araştırma sorusu, "para ve maliye politikalarının iktisadi büyüme üzerindeki etkisi nedir" şeklinde olup bu soruyu cevaplayabilmek amacıyla literatürde yer alan teorik ve ampirik çalışmalardan yararlanılmıştır. Bu amaçla bağımlı değişken olarak büyüme kullanılmıştır. Bağımsız değişkenler ise para politikasını temsilen döviz kuru ve enflasyon kullanılmıştır. Diğer bağımsız değişkenler ise maliye politikasını temsilen kamu harcaması ve kamu geliri kullanılmıştır. Analizin sonucuna göre para ve maliye politikaları, iktisadi büyümeyi etkilemektedir. Buna göre döviz kuru (-0.001) ile kamu harcaması (-0.880) iktisadi büyümeyi negatif etkilerken, enflasyon (0.005) ve kamu geliri (0.274) iktisadi büyümeyi pozitif etkilemektedir. Ancak değişkenlerin katsayıları birbirinden farklıdır. Analizde kullanılan para politikası değişkenlerinin büyüme üzerindeki etkisi oldukça küçükken, maliye politikasına ait değişkenlerin katsayı büyüktür. Ek olarak çalışmada, özellikle kriz zamanlarında popüler hale gelen para ve maliye politikası seçeneklerinden hangisinin etkin olduğuna yönelik bir tartışma, COVID dönemi itibariyle tartışılmıştır.

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Tarihsel bağlamda her kriz döneminde gelir dağılımında adalet bozulmakta ve eşitsizlikler artmaktadır. Bu eşitsizlik COVID döneminde işten çıkarmalar, kazançların düşmesi, tüketimin azalması ve hatta eğitim de fırsat eşitsizliğine kadar birçok alanda ortaya çıkmıştır.

***Anahtar Kelimeler**: Maliye politikası, para politikası, büyüme, OECD ülkeleri, panel sabit etkiler analizi*

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1. INTRODUCTION

There are two mechanisms by which public expenditures can positively affect economic growth. The first mechanism involves the increase of factors of production, which in turn increases the growth of output. The second mechanism includes the increase in the marginal productivity of the factors of production (Barro, 1991: 407). Also, it is believed that government revenue, which consists mostly of taxes, is generally negatively related to economic growth, and positively related to public expenditures. Taxes may adversely affect economic growth due to increased price levels for capital and/or intermediate goods.

In general, the policy objective of central banks is to maintain price stability with low inflation that supports GDP growth. The objective of the fiscal authorities is to ensure the highest GDP growth and fairness in income distribution (non-fiscal purpose) by using fiscal policies to ensure a balanced budget (fiscal goal). Discussions on the relationship between monetary and fiscal policies in the literature focus on the fact that fiscal policies cause inflation. To avoid inflationary consequences, the policy recommendation is to establish an independent central bank and control inflation under this condition. The harmful consequences of high inflation can also be eliminated by the fiscal authority by rationalizing public expenditures and increasing tax revenues/rates (Bennett & Loayza, 2002: 299). Additionally, the relationship/interaction between the fiscal and monetary policy is complex. The reason for this is that each authority has a different influence on economic activities. Therefore, the type of relationship established by fiscal and monetary policy authorities is important in determining how their policies will affect inflation, debt, and economic growth (Afonso, Alves & Balhote, 2019: 133). The impact of policies differs not only at the institutional level but also at the societal level. Many factors such as the income level of the society, income justice, consumption habits, and savings levels differentiate the effects of these policies.

For much of this century, the independence of monetary policy from the fiscal policy has been a popular topic in macroeconomic theory. This independence assumes that economic activity can be divided into two parts: “cycle and trend”. Accordingly, monetary policy is responsible for stabilizing the economic cycles, and fiscal policy is a more effective tool to influence the trend. Therefore, when the monetary policy became unable to respond to crises such as the 2008 crisis, the potential benefits of counter-cyclical fiscal policy emerged (Bernanke, 2016: 130-131).

The study aims to analyze the effectiveness of monetary and fiscal policies. The scope of the study is to examine the variables of monetary (exchange rate and inflation) and fiscal (public revenue and expenditure) policies of OECD countries between 1996-2021 by the panel fixed effects method. The study consists of four chapters following the introduction. The second part presents the theoretical and empirical literature, and the third part presents the data set, methodology, and findings. The study is concluded with the conclusion after the discussion in the fourth chapter.

2. THEORETICAL AND EMPIRICAL LITERATURE

Discussions on the effectiveness of monetary and fiscal policies in the economy are quite old and extensive. It was believed that fiscal policy was more effective in economic growth since the 1929 crisis. In addition to Keynes's General Theory book published in 1936, studies such as Andersen and Jordan (1968) also contributed greatly to this. In addition, Blinder and Solow (1973) argued that the long-run multiplier of the increase in public spending is more effective than monetary policy. Therefore, the fiscal policy discussions that started with Keynes suggest the use of public expenditures and taxes to influence the economy. According to the Keynesian school, when the government changes taxes and government expenditures, aggregate demand and the volume of economic activity will be affected (Takayama, 1980: 613-614).

The theory of monetarism, formulated by M. Friedman (1968: 1-2), is a theory that focuses on the macroeconomic effects of money supply and central banking mechanisms. This theory argues that monetary policy tools are the main driver of economic growth by reducing the fiscal policies of monetary authorities to maintain price stability (inflation) and expand the money supply. According to monetary policy objectives, interest rates are adjustable and used to control the money supply. When interest rates rise, consumers save rather than spend, thus reducing the money supply. Alternatively, depending on the nature of the economy at the time, an expansionary monetary policy could be implemented by lowering interest rates (lowering borrowing costs) to increase the money supply. For this reason, the growth of the economy will be affected positively.

Friedman and Meiselman (1963) argued that the relationship between the money supply and consumption expenditure in the United States between 1897 and 1958 was stronger than the regression relationship between autonomous (consumption spending and net private investment) spending. Pyun and Rhee (2015), examined the effectiveness of monetary and fiscal policies in 21 OECD countries between 2000 and 2012, found that fiscal policies influenced growth. Mehdi and Reza (2011) stated that the main objectives of monetary policies are price stability, economic growth, and appropriate employment level.

Talpos, Avram & Hetes (2013) analyzed the effect of fiscal policy on economic growth, along with the interest rate and inflation rate in European Union member countries, using the panel VAR model. According to the findings, while the effect of government

expenditures on growth is positive in the first half of the observation period, it has a negative effect in the second half. On the other hand, while the interest rate has a strong negative effect on growth, the inflation rate has a positive effect.

There are many studies and theoretical discussions on the effect of fiscal and monetary policies on economic growth in the literature. The results of the studies vary according to the model used, the country and country groups, and the period. The above-mentioned studies have found that monetary and fiscal policies are effective at the same time in countries and country groups, or that only one policy positively affects economic growth.

3. METHODOLOGY AND RESULTS

3.1. Data and Methodology

The application of the putative research objectives in the study was based on the fixed effects regression model between 1996-2021 with the confirmation of the research hypothesis. Use of such modeling is frequently used in the literature. The models and variables used in the panel analysis were prepared by using the studies and theory in the literature (mentioned above).

$$\ln G_{it} = a_i + \beta_1 exr_{it} + \beta_2 inf_{it} + \beta_3 gexp_{it} + \beta_4 grev_{it} + \beta_5 dummy_{it} + \beta_6 \ln X_{it} + u_{it} \quad (1)$$

$$t: 1996 \ldots .2021 \quad i: 37 \text{ OECD Countries}$$

Table 1 includes the variables, definitions, and data sources related to the data used in the study.

Table 1: Variables and source

Variables	Abbreviation	Source
Growth	g	https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG
Exchange Rates	exr	https://www.imf.org/external/np/fin/ert/GUI/Pages/CountryDataBase.aspx
Inflation, GDP Deflator (annual %)	inf	https://data.worldbank.org/indicator/NY.GDP.DEFL.KD.ZG
Government Expenditure	gexp	https://data.worldbank.org/indicator/NE.CON.GOVT.ZS
Government Revenue	grev	https://data.worldbank.org/indicator/GC.TAX.TOTL.GD.ZS

The study aims to analyze the effect of monetary and fiscal policies implemented in OECD countries on economic growth between 1996-2021. Growth (g) was used as the

dependent variable for this purpose. The independent variables are exchange rate (exr) and inflation (inf) to represent the monetary policy. As other independent variables, government expenditure (gexp) and government revenue (grev) were used to represent the fiscal policy. The data were estimated using the STATA 13.0 package program.

3.2. Research Results

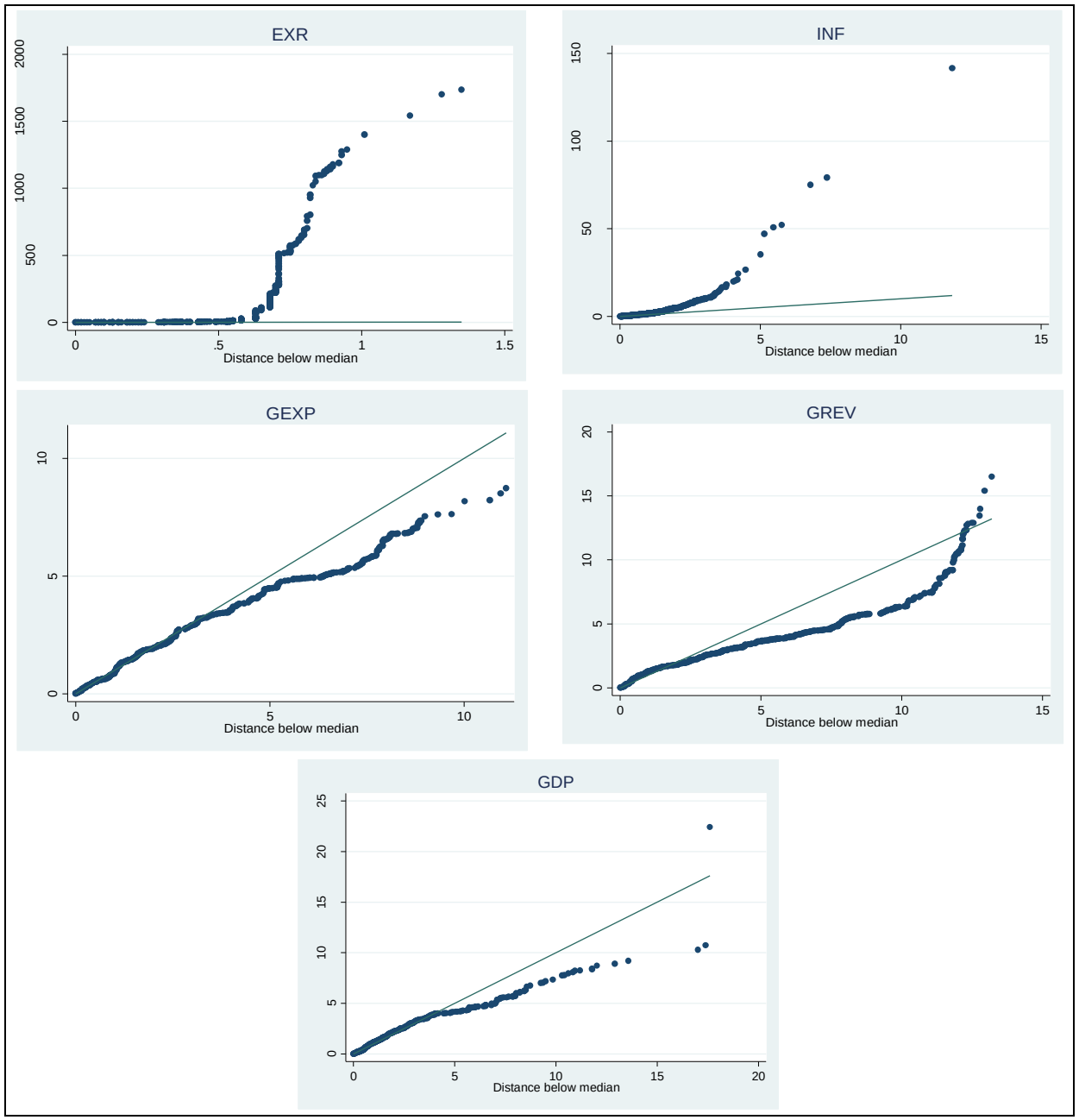
Table 2 presents the results of the descriptive summary statistical analysis of the variables in the study. The result shows that the economic growth for 37 OECD countries between 1996-2021 ranged between -14.84 and 25.18, with an average value of 2.61 and a standard deviation of 3.39. Considering the number of observations of the countries, it is seen that they are suitable for balanced panel data analysis. The minimum value in growth (-14.84) was seen in 2009 in Lithuania. The maximum value in growth (25.18) was seen in 2015 in Ireland.

Table 2: Descriptive statistics

Variables	Observation	Mean	Std. Dev.	Minimum	Maximum
g	962	2.61	3.39	-14.84	25.18
exr	962	83.76	234.34	0.08	1736.21
inf	962	3.53	7.35	-9.67	143.64
gexp	962	18.97	3.89	8.12	27.93
grev	962	20.45	5.74	7.90	37.61

The mean graphs of the variables used in the model are shown below. In table 2 and Table 3 taken together, the minimum value (0.08) in the exchange rate (exr) was realized in Turkey in 1996. The maximum value in the exchange rate (1736.21) was seen in Italy in 1998. On the other part, the minimum value in the inflation indicator was -9.67 in 2009 in Latvia; The highest value was 143.64 percent in Turkey in 1998. Looking at the variables in fiscal policies, the lowest value in public expenditures (8.12) was in Mexico in 1996; The maximum value was 27.93 percent in 2009 in Denmark. However, Iceland also has over 27% of OECD countries, and the ratio of public expenditure to GDP in 2020 is 27.71%. Finally, the country with the lowest share in public revenues was the USA (7.90) in 2009. One possible reason for this rate, which is well below the US average of public revenues (10.60%), is the global financial crisis in 2008. The highest rate (37.61) was seen in Iceland in 2016. In other years, Denmark ranks first among OECD countries in terms of public revenues.

Table 3: Mean of variables and deviations from mean



Regarding variables, Levin, Lin & Chu (2002) Levin-Lin-Chu unit root test results are shown in Table 4. As a result, all variables are stationary at the level and there is no unit root.

Table 4: Levin-Lin-Chu unit-root test for the variables

Variable	p-value	Result
gdp	0.000	Stationary
exr	0.000	
inf	0.000	
gexp	0.004	
grev	0.000	

The correlation matrix of the variables is shown in Table 5. If there is multicollinearity between the variables, this reduces the predictive power of the relevant variable. If the correlation coefficient is above 0.80, it indicates the problem of multicollinearity. Table 5 includes the correlation matrix of the variables used in the analysis. A coefficient above 0.80 was not found in the matrix.

Table 5: Correlation matrix of variables

Variables	gdp	exr	inf	gexp	grev
gdp	1.000				
exr	0.082	1.000			
inf	0.154	0.018	1.000		
gexp	-0.237	-0.307	-0.226	1.000	
grev	-0.045	-0.210	-0.113	0.579	1.000

According to Table 5, while there is a positive correlation between growth (g) and exchange rate and inflation in OECD countries, there is a negative correlation between public expenditure and public revenues. On the other hand, the highest correlation (0.579) in Table 5 is between public expenditure and public revenue. This correlation is an expected result according to the fiscal policy objective. In other words, the most basic financing of public expenditures is taxed, and revenues from foreign borrowing and oil/natural gas/precious metals have secondary importance. The highest negative correlation (-0.307) in Table 5 is between the exchange rate and public expenditures. There is no consensus in the literature regarding the negative relationship of this relationship. For instance, Coesetti & Müller (2006) found this correlation relationship positive, while Monacelli & Perotti (2010) found a negative relationship.

To analyze the variables of the countries, it is first necessary to determine which estimator will be used. In this context, first, the validity of the Pooled Ordinary Least Squares (POLS) estimator, that is, whether the data differ according to the units, is

tested. As a result of the F test performed in this context, the existence of the unit effect was determined, and the POLS estimator was found to be invalid. The presence of a unit effect is required for the invalidity of the POLS estimator. In addition, because of the F test performed to test the time effect in the table, it was concluded that there is a time effect. The LR likelihood ratio, which is another test used to choose between the POLS and the random effects estimators, was similarly detected in the LM tests proposed by Bottai (2003), as well as the presence of unit and time effects. As a result, the POLS estimator cannot be preferred; It has been concluded that the random effects estimator will give more effective results. After testing the classical model against random effects and determining that it is invalid, the random effects model was tested against the fixed effects estimator using the Hausman test. According to the Hausman test result, it was decided that the random effects estimator was inconsistent, and the fixed effects estimator was valid in OECD countries at 1%, 5%, and 10% significance levels. These tests are shown in Table 6.

Table 6: Determination of estimators

	F test	**LR- Likelihood Ratio Test**	**LM test***	**Hausman Test**	**Decision**
Prob.	0.00	0.00	0.00	0.00	Fixed Effects
	F (36, 921) =6.90	chibar2(01) = 92.43	chibar2(01) = 120.60		

*Breusch-Pagan Lagrange Multiplier

As a result of the analyzes made to determine the estimators, the fixed effects method is valid.

The Modified Wald test for the heteroskedasticity assumption of the fixed effects method and the Durbin-Watson (DW) test proposed by Bhargava, Franzini, and Narendranathan using the AR(1) model were used for the autocorrelation assumption. In addition, the Pesaran CD test was used for the assumption of cross-section dependence. According to the test results, it has been found that there is heteroscedasticity, autocorrelation, and cross-sectional independence in OECD countries.

Table 7: Assumption tests

Modified Wald test	DW & LBI test	Pesaran's test	Result
Prob>F=0.000	DW: 1.575 LBI: 1.691	Pr=0.000	The model has heteroscedasticity, autocorrelation, and cross-sectional dependence

* for GroupWise heteroskedasticity in the fixed effect regression model, ** of cross-sectional dependence

In the estimation of OECD countries, analysis was made with the Driscoll-Kraay (1998) estimator, which can give consistent results in the presence of heteroskedasticity, autocorrelation, and cross-sectional dependence in the fixed effects model.

Table 8: Fixed effects regression results (Driscoll-Kraay)

Dependent variable: g	Coefficients	P>|t|	Maximum lag	R^2	Number of obs.	Number of groups	Prob> F
exr	-0.001	0.021**	2	0.185	962	37	0.000
inf	0.005	0.090***					
gexp	-0.880	0.000*					
grev	0.274	0.045**					

*** , ** and * indicate significance at 1%, 5%, and 10% levels, respectively.

According to the findings in Table 8, while a 1-unit increase in the exchange rate in OECD countries affects economic growth since the sign of this coefficient is negative, it can be said that the increase in the exchange rate affects growth negatively. While a 1-unit increase in inflation affects growth positively by 0.005, this coefficient is close to zero. From this point of view, although the effect of monetary policies on economic growth is weak, they are negative and positive, respectively. The findings reported in the literature by Musyoki, Pokhariyal & Pundo (2012) and Mughal, Aslam, Jabbar, & Ullah (2012) are in line with the results of their study. The increase in public expenditures affects economic growth negatively by 0.880. Finally, the increase in public revenues affects the growth positively by 0.274. According to the analysis findings, the most important variable that positively affects the economic growth of the countries is public income. This result is consistent with the findings of Easterly and Rebelo (1993). However, this result varies according to factors such as the rate of

indirect taxes in total public revenues, the transfer of revenues to investment expenditures, and the provision of justice in income distribution. Examples of this are that a significant part of the public income consists of tax revenues, that a significant part of tax revenues consists of consumption taxes, and that economic growth increases as expenditures increase. Furthermore, the variable that has the highest negative effect on economic growth is public expenditures. Those who say that public expenditures have a negative effect on economic growth generally argue that it is due to the crowding-out effect and the increase in bureaucracy (Alleyne, 2004; Forte & Magazine, 2016).

In the related period, it has been found that in OECD countries, fiscal policy has a greater impact on economic growth, while the effect of monetary policies is relatively less. It can be said that the most important reason for this is the economic situation of the country, the method used in the analysis, and the characteristics of the selected data (Precious & Makhetha-Kosi, 2014: 81).

4. DISCUSSION

The effect of monetary and fiscal policies on economic growth does not show a static and deterministic structure. These policies are influenced by the global and national conjuncture, the legal and administrative structure of the country, and the political regime. Therefore, it can be stated that the effect of monetary and fiscal policy on growth is dynamic and indeterministic. Solow (2002) stated that the debate on the "separation of powers" has come to an end, based on the different roles that monetary and fiscal policies play in economic crises. In other words, he stated that the discussions on the effectiveness of monetary and fiscal policies on economic growth have decreased relatively.

In times of economic crisis, the economic structure of a country deteriorates significantly. This causes production to drop, company bankruptcies, increased unemployment, and economic confidence deficits. Although there is no clear definition of an economic crisis, major contractions in economic activities and economic recessions such as the 29 crises are considered crises. Today, when analyzing the economic dimensions of the COVID pandemic, it is compared with these crises. In these cases, more emphasis is placed on economic interventions by the public. Economic crises can also lead to unconventional actions by monetary and fiscal policymakers. A key factor in assessing the appropriateness of complementary policies is the extent to which the contraction was driven by aggregate demand or aggregate supply. Monetary policy instruments work most effectively on aggregate demand by adjusting intertemporal prices and/or liquidity, softening the demand shock over time. In contrast, aggregate supply shocks, particularly long-term shocks, may be more difficult to moderate using monetary policy tools because the productive capacity of an economy is affected (Brzoza-Brzezina, Kolasa, & Makarski, 2022: 43-44).

The COVID-19 pandemic that emerged in 2019-2020 caused not only a health crisis but also a social and economic crisis. In this period, global and national trade came to

a standstill and due to the decrease in the volume of economic activity, the export or tax revenues of the states also decreased. In this period, countries tried to reduce the negative impact of the crisis by following monetary and fiscal policies. According to OECD (2020) the main purpose of monetary and fiscal policies in this period is to maintain economic activities. The measures include extending tax filing deadlines, postponing tax payments, providing faster tax returns, and some tax exemptions, including social security contributions, payroll taxes, or property taxes. Short-term monetary and fiscal policies are focused on maintaining business liquidity and supporting household income. The policy mix varied depending on the country-specific policy architecture, including the strength of the automatic stabilizers. Fiscal policy also needs to be coordinated with monetary policy. Monetary authorities' responses to the crisis have been significant and it may be possible for monetary authorities to support fiscal expansion. Many central banks have aggressively lowered policy interest rates and committed to purchasing large volumes of government bonds and private assets, as well as implementing multiple measures to support liquidity in the financial sector and increase bank lending to businesses and households through special programs and expansion.

Turkey, like other countries, has taken monetary and fiscal policy measures during the COVID period. According to the IMF (2021) as of March 2021, it provided financial support for up to 12.7% of GDP. In addition (i) loan guarantees to firms and households (6.4 percent of GDP) (ii) credit service deferrals of state-owned banks (2.6 percent of GDP) (iii) tax deferrals for businesses (1.4 percent of GDP (iv) equity injections into public banks (0.4 percent of GDP) and (v) a short-term work plan (0.6 percent of GDP) ending in March 2021. In addition, Value-added tax (VAT) has been reduced on certain goods (e.g., catering and accommodation services) until May 2021. Finally, the nationwide prohibited employee layoffs are in effect until mid-May 2021. Monetary policy measures were also taken against COVID in Turkey during this period. Accordingly, (i) interest rates were reduced by 300 basis points as an initial response (ii) debt enforcement and bankruptcy proceedings are suspended (iii) restrictions on dividend payments by banks and firms in 2020 (iv) to support foreign trade financing, a new Turkish Lira credit facility was established for SMEs in the export sector.

Theoretical and empirical discussions have many assumptions and limitations. In real life, in every crisis period, justice in income distribution deteriorates and inequalities increase. This inequality has emerged in many areas, from layoffs, decreased earnings, decreased consumption, and even inequality of opportunity in education during the COVID period.

5. CONCLUSION

This study examines the monetary and fiscal policies that affect the economic growth of OECD countries between 1996-2021. While making this analysis, the variables in the studies in the literature were used and the generally accepted methodology was used. The variables that emerged as determinants of gross domestic product growth were also confirmed in the literature review. According to the main purpose of determining

the effect of the variables in the monetary and fiscal policy field on the economy in the current economic conditions in OECD countries, the importance of the effect of the selected variables corresponding to these policies has been emphasized.

According to the results of the analysis, monetary and fiscal policies affect economic growth. Accordingly, while the exchange rate (-0.001) and public expenditure (-0.880) affect economic growth negatively, inflation (0.005) and public income (0.274) affect economic growth positively. However, the coefficients of the variables are different from each other. While the effect of the monetary policy variables used in the analysis on growth is quite small, the coefficient of the fiscal policy variables is large.

Existing work can be extended by performing threshold regression analysis and effective monetary and fiscal policy thresholds of countries/groups of countries can be determined. Similarly, OECD countries can be compared with, for example, OPEC countries. Thus, it can be examined what kind of dependent economic structure the countries whose public expenditures are financed through taxes and the resource-rich countries have.

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