Çağ Üniversitesi Sosyal Bilimler Dergisi
Cilt 18, Sayı 1, ss. 9-20, 2021
ISSN:1304-8392
https://dergipark.org.tr/cagsbd

Geliş Tarihi / Received: 06.03.2021
Kabul Tarihi / Accepted: 12.06.2021
Araştırma Makalesi / Research Article

Does Economic Freedom Improve Macroeconomic Performance? A New Research with the PVAR Method in the G-7 Group[1]

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ABSTRACT: The relationship between economic freedom (EF) and growth (GDP) has been the subject of a lot of research recently. The aim of this study is to examine the relationship between EF and GDP in G-7 countries. In the study, 1996-2019 observation period and panel vector autoregression (PVAR) analysis were used as econometric method. In the study, EF variable is included in the equation as subcomponents. A positive relationship was determined between GDP and public expenditures and government integrity variables, which are subcomponents of EF. However, there is a negative relationship between the other three variables and GDP. According to causality analyses, there is an absolute relationship between GDP and EF. In this study, the relationship between EF and macro performance was analyzed again using the most up-to-date and reliable data. Contrary to the general literature, the results show a negative relationship between EF and growth. In addition, many studies in the literature as an econometric method only make causality or coefficient estimation. However, in this study, the PVAR analysis method, in which both causality and regression estimates are presented together, was used. These three cases show the main original contributions of the study to the literature.

Keywords: Economic Freedom, Macroeconomic Performance, GDP, PVAR, Casuality
JEL Code: O11, O43, O44, C23

Ekonomik Özgürlük Makroekonomik Performansı Arttırır Mı? G-7 Grubunda PVAR Yöntemiyle Yeni Bir Araştırma[1]

ÖZ: Ekonomik özgürlük (EF) ve büyüme (GDP) arasındaki ilişki, son zamanlarda birçok araştırmaya konu olmuştur. Bu çalışmanın amacı G-7 ülkelerinde EF ve GDP arasındaki ilişkiyi incelemektir. Çalışmada 1996-2019 gözlem dönemi ve ekonometrik yöntem olarak da panel vektör otoregresyon (PVAR) analizi kullanılmıştır. Çalışmada EF değişkeni denkleme alt bileşenler olarak dâhil edilmiştir. EF'nin alt bileşenleri olan kamu harcamaları ve devlet bütünlüğü ile GDP değişkenleri arasında pozitif bir ilişki tespit edilmiştir. Ancak, diğer üç değişken ile GDP arasında negatif bir ilişki vardır. Nedensellik analizlerine göre GDP ile EF arasında mutlak bir ilişki vardır. Bu çalışmada, EF ve makro performans arasındaki ilişki en güncel ve güvenilir veriler kullanılarak yeniden analiz edilmiştir. Genel literatürün aksine, sonuçlar EF ile büyüme arasında negatif bir ilişki olduğunu göstermektedir. Ayrıca literatürde ekonometrik yöntem olarak birçok çalışma sadece nedensellik veya katsayı tahmini yapmaktadır. Ancak bu çalışmada hem nedensellik hem de regresyon tahminlerinin birlikte sunulduğu PVAR analizi yöntemi kullanılmıştır. Bu üç durum, çalışmanın literatüre orijinal katkılarını göstermektedir.

Anahtar Sözcükler: Ekonomik Özgürlük, Makroekonomik Performans, GDP, PVAR, Nedensellik
JEL Kodu: O11, O43, O44, C23

[1] This article is derived from the PhD thesis titled "Economic Freedom and Macroeconomic Performance Relationship" (Ekonomik Özgürlük ve Makro Ekonomik Performans İlişkisi) at Nevşehir Hacı Bektaş Veli University.

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1.Introduction

When looking at the development process of the literature on economic development, the first theories are known as neoclassical approach. According to the neoclassical theory, natural resources, rent, labor and capital provide the development of the economy. After this theory, growth theories have been tried to be explained with endogenous factors. According to this theory, factors such as innovation and education are among the main drivers of growth. (Dubovicka and Varcholova, 2020). However, when improvement could not be achieved only by these factors, new theories were developed that there were different dynamics of growth. Friedman (1962) may be the founding father of the relationship between EF and GDP, one of the best known of these theories. According to Friedman, more economic rights and democracy have the power to have a positive impact on social welfare and therefore on improvement. Although EF is a set of criteria expressing symbolic values within the framework of economic relations, it varies in each country. EF is also a symbolic whole that affects the economic indicators of countries directly or indirectly. EF shows the power of individuals to control their own workforce and assets. Obtaining more individual income, improving property rights, a healthier and more developed society can be shown among EF's goals (Singh and Gal, 2020; Heritage, 2020).

Why is EF important for growth? In markets where freedom is dominant, production and consumption are carried out directly by individuals. Efficiency in market economies depends on the absence of external intervention. Individuals who are free individually can control their assets and delegate their services to others as they wish. EF is not only important for asset control, production or consumption. In addition, the fight against corruption and the creating free markets are also very important factors for economic enterprise freedom (De Vanssay and Spindler, 1994).

The creation of the EF index started in 1996. It was first published by the Canadian Fraiser Institute as the World Economic Freedom Index (EFW) (Gwartney, Block, and Lawson, 1996). The index has been prepared to cover 162 countries, starting from 1970, based on the freedom of trade of countries. To achieve high scores, countries must best protect individuals' property rights, offer individuals the highest market freedom, and provide them with the best opportunity to compete. The index works according to the 0 – 10 point system. The highest score is 10, the lowest score is 0. The other EF index is published by the Heritage Foundation. This index, which started to be published since the mid-1990s, works according to the 0 – 100 point system and the highest score is 100 and the lowest score is 0. Both indices have slight differences. Theoretically, these differences will not be noted. However, it should be noted that there is no definite consensus on which of the two indices is more valid and better (Lawson et al, 2020).

The aim of this study is to investigate the relationship between EF and GDP. Many studies in the literature have been classified as a group different countries and were investigated by the panel data method. There studies are conducted with a single country time series data using causality methods. However, studies for a certain group of countries (G-7, OECD, NEXT-11 etc.) are almost non-existent. Also, most of the studies are one-sided. Studies include research on either regression or causality. For this reason, there are very few studies in the literature using the PVAR method, which includes regression and causality relationships at the same time. This is a serious gap in the literature together for two reasons. In this study, G-7 countries were selected as a special country group. The PVAR analysis method, which can show the relationship between coefficient and causality, was chosen as the research method. The aim of this study is to analyze the relationship between these two variables with the PVAR method in G-7 countries and to test both the causality and the validity of the theory with regression analysis. We believe the study is going to fill a serious gap in the literature.

2. Brief Literature Review

To examine the idea put forward by Friedman (1962), Barro (1994) examined the relationship between democracy and GDP through panel data on 100 economies between 1960 and 1990. When looking at the results of the analysis, democracy has a positive impact on GDP (Memoli and Quaranta, 2019). After this study, which can be regarded as the first study, many researchers preferred to use the EF variable instead of the democracy variable and reported a positive relationship between EF and GDP

in their studies (Hanke and Walters, 1997; Heckelman, 2000; Sturm and Haan, 2001; Carlsson and Lundström, 2002). However, the relationship between EF and GDP only has not been investigated. The relationship between EF and income inequality is investigated in the literature. As a pioneering study between these two variables, Berggren's (1999) study examining the relationship between two variables can be shown. In a country example, with the increase in economic freedom for the period between 1975-1985, income inequality decreases with years. In 1985, it was observed that inequality in income distribution started to increase. In another study, Scully (2002) examined the relationship between EF and income inequality in 26 economies. The countries used in the study are the developed and industrialized Asian countries. An inverse relationship between EF and income distribution was determined examining the time period between 1975-1985-1990-1995. If EF increases, injustice decreases. At this point, the results obtained differ with Berggren (1999). In this respect, these two studies occupy an important place in the literature as the first empirical studies examining the relationship between EF and income distribution. Perez-Moreno and Angullo-Guerrero (2016) examined the relationship between EF and income inequality in 28 EU countries in their study using the OLS method. The study covers the period 2000-2010. The EF index was used as a variable in the study as a whole with tax distribution, government spending, regulations. The results obtained in the study where income inequality is the dependent variable are surprising. According to the analysis results, EF will increase if tax rates and government expenditures decrease, but unfairness in income distribution will increase. When looking at other variables, it is determined that the relationship between the enhancement of regulations and EF is positive, while its effect on income inequality is positive. This study is important because it shows that the relationship between EF and macroeconomic indicators in the literature is uncertain.

The relationship between EF and other variables has been continuously investigated in the literature. One of the main variables whose relationship with EF is investigated is the Foreign Direct Investment (FDI). The study conducted by Bengoa and Sanchez-Robles (2003) can be seen as one of the first empirical studies between EF and FDI. Education, trade openness and inflation variables were also used as independent variables in this study which is conducted for 18 Latin American countries during the 1970-1999 observation period. According to the findings obtained in this regression analysis, EF has a positive effect directly on FDI (Habib and Zurawicki, 2002; Quazi, 2007; Azman-Saini et al, 2010). Ghazalian and Amponsem (2019) examined the relationship between FDI and discussed the EF subcomponents. In the study, EF subcomponents such as government size, regulations, freedom of trade and real variables such as population, GDP and inflation are also used as independent variables. In the study, 120 countries listed by Fraser Institute were examined during 1970-2015 observation period and 146 countries listed by Heritage Foundation during 1995-2016 observation period. Different results were determined for all variables in the study conducted with panel data analysis. However, looking at the results in general, EF directly affects the FDI variable positively (Seyoum and Ramirez, 2019; Sambharya and Rasheed, 2015; Korle et al, 2020).

The relationship between EF and social capital is also examined. In the study conducted by Jackson (2016), the relationship between EF and social capital was examined for the case of US for the observation period of 1986-2004. In the study, analysis was carried out with the pooled mean group (PMG) method. According to the analysis results, EF affects social capital negatively in the USA. In another study, Shumway and Davis (2015) EF examined the relationship between income and migration. In the study covering the period 1995-2010, the American example was examined. In the analysis performed with the FGLS method, the EF independent variable and immigrants were used as dependent variables. According to the results, there is a positive relationship between EF and migration. Immigration to states with high levels of freedom is higher. On the other hand, income levels of these states increase in this case. However, according to the researchers, this immigrant income between states will stabilize in the long run. Shaar and Ariff (2016) examined the relationship between EF and prices in 152 countries for the 1995-2013 observation period. The variables of freedom of trade, financial freedom, property rights, freedom of investment, financial freedom and monetary freedom, which are subcomponents of EF, were used as independent variables. On the other hand, the national price level was used as the dependent variable. OLS analysis method was used in the study. According to the analysis results, the EF sub-components explain the general level of prices by 90%. It was revealed that the relationship between the two variables is positive. Liao (2018) examined the effect of economic freedom on firm profitability in developing economies. 123,663 companies from 128

countries were used for the period 2000-2014. Research was conducted with variables consisting of GDP, company age and EF subcomponents. Within the scope of Tobin Q theory, according to the results of the research, a direct positive relationship was determined between the profitability of young companies in developing economies and economic freedom. Buscariolli and Carneiro (2019) examined the relationship between transportation costs and EF in their research. Costs have an important place on the profitability of firms. Research was conducted on 1,248 companies in Latin America with VAR model. 1998-2016 was selected as the observation period. According to the results of the research, a positive relationship was determined between EF and the profitability of the company due to transportation costs. (For similar studies, see: DeBode et al 2019; Murphy, 2019). Harkati et al. (2019) examined the relationship between EF and risk taking in the Islamic banking sector and conventional banking sectors. In the study, research was conducted with GLS method during the 2011-2017 observation period. According to the results, a negative relationship between risk-taking and EF was determined in both banking sectors. However, EF's influence is less in traditional banks than in Islamic sector banking. Sarpong-Kumankoma et al. (2020) examined the relationship between banking sector stability and EF in the 139 Sub-Saharan Africa (SSA) economy. In the study covering the period of 2006-2012, analysis was made with system GMM method. EF subcomponents are among the variables. According to the results obtained, a negative relationship between bank stability and EF was determined. In this case, the higher level of EF increases vulnerability in the banking sector. In another study, Alabede (2018) examined the relationship between EF and tax revenues in SSA countries. In the study covering the period 2005-2012, the relationship between EF subcomponents and tax revenues was examined by FGLS method. A positive relationship was found between EF and tax revenues in a study conducted in 42 countries.

Piatek et al. (2013) examined the relationship between EF, political freedom and GDP in twenty-five transition economies. These twenty-five countries, which are specified as transition economies, refer to post-socialist economies. The 1990-2008 observation interval was determined and Granger causality method was used as the analysis method in the study. According to the analysis results, no causal relationship was determined between political freedom and GDP. However, a causal relationship has been determined between EF and GDP (Peev and Mueller, 2012; Gehring, 2013; Bumann et al, 2013). Santiago et al. (2018) investigated the relationship between EF and GDP in 24 developing Latin American and Caribbean countries during the 1995-2015 observation period. Population, electricity consumption, globalization, political globalization and economic globalization variables were also used as control variables in the study. Error correction model (ECM) was used as analysis method in the study. Considering the results of the study, a negative relationship was found between EF and GDP in the long term. Ahmed and Ahmad (2020) investigated the relationship between EF and GDP in 34 Asian countries. In the study, the period of 1995-2018 was used as the observation interval and analysis was carried out by GMM method. According to the findings, EF has a positive effect directly on GDP. Other freedom indices that make up the EF index were also used in the study. Among these sub-variables, political rights and civil liberties directly affect the GDP. Physical and human capital and FDI were used as control variables in the analysis. According to the results, physical and human capital has a positive effect on foreign investments. Khan et al. (2020) examined the relationship between economic freedom and GDP, FDI in 87 emerging economies for the 1984-2018 observation period. Panel threshold estimation method was used in his studies. In this study, unlike other studies, FDI was considered as the dependent variable. When looking at other variables, interest margin and trade gap are used. Looking at the analysis results, it is stated that freedom is an important factor. Economies with low levels of freedom negatively affect financial development in economies with high levels of freedom. On the other hand, after a certain threshold level, EF has an increasing effect on both GDP and financial development.

3. Data and Methodolgy

This study examines the relationship between EF and GDP in the G-7 country group for the period from 1996 to 2019. The relationship between the two variables was analyzed using the PVAR method. The natural logarithms of all variables used in the analysis are taken. Table 1 shows the variables and resources used in the research.

Table 1. Data Describe and Sources

Variable	Abbreviation	Source
Gross Domestic Product	gdp	World Development Indicators (WDI)
EF sub-sectors		
Overall Score	overall	Heritage Foundation
Government Integrity	gintegrity	Heritage Foundation
Tax Burden	tax	Heritage Foundation
Government Spending	gspending	Heritage Foundation
Monetary Freedom	monetary	Heritage Foundation

Table 2 contains the descriptive statistics of the variables used in the study.

Table 2. Descriptive Statistics

	gdp	overall	gintegrity	tax	gspending	monetary
Mean	20.00721	20.00025	19.99962	20.00039	20.00337	19.99971
Median	20.00771	20.00028	20.00000	20.00068	20.00518	20.00051
Maximum	20.54395	20.08127	20.31376	20.23382	22.02531	20.04633
Minimum	19.45728	19.91846	19.52288	19.77069	18.44370	19.94596
Std. Dev.	0.069969	0.014144	0.053195	0.041494	0.239582	0.013528
Skewness	-.002189	0.132377	-2.800509	-1.028672	1.558270	-0.511480
Kurtosis	49.63965	17.02219	45.84463	18.22951	43.72587	5.638370
Jarque-Bera	15770.61	1426.016	13535.99	1712.237	12095.24	58.05394
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	3481.255	3480.044	3479.934	3480.068	3480.586	3479.950
Sum Sq. Dev.	0.846947	0.034610	0.489544	0.297869	9.930156	0.031660
Observations	174	174	174	174	174	174

The basic panel regression model used in the study is as follows:

$$\mathrm{GDP}_{it} = \gamma_0 + \gamma_1 \mathrm{overall}_{it} + \gamma_2 \mathrm{gintegrity}_{it} + \gamma_3 tax_{it} + \gamma_4 gspending_{it} + \gamma_1 \mathrm{monetary}_{it} + \mu_{it} \quad (1)$$

In Equation 1, i and t expressions refer to country group (7 countries) and time period (1996-2019), respectively. Economic growth (GDP) is included in the analysis as the dependent variable. Total EF (overall), tax burden (tax), government expenditure (gspending), monetary freedom (monetary) and government integrity (gintegrity) respectively refer to the independent variables. Independent variables express the variable EF as sub-components. Each γ represents the slope coefficient of the corresponding variable and finally μ_{it} indicates the estimation residual.

The unit roots of all variables must be stationary in order to perform this analysis. In the analysis, the method developed by Im-Pesaran-Shın (IPS) (2003) is used as unit root analysis method.

Once the stationarity of the unit roots of the variables is determined, the application of the PVAR method can be started. The PVAR method is an improved form of the basic VAR model developed by Sims (1980). The VAR model has been used by Holtz-Eakin, Newey and Rosen (1988) in macroeconomic studies with multiple observations. Although it was developed by PVAR Love and Zicchino (2006), it took its final form with the development of Abrigo and Inessa Love (2015). Basic PVAR equation is as follows;

$$U_{it} = U_{it-1}T_1 + U_{it-2}T_2 + U_{it-3}T_3 + ... + U_{it-p+1}T_{p-1} + U_{it-p}T_p + L_{it}K + u_i + e_{it} \quad (2)$$

In equation 2, U_{it} represents the vector of the dependent variable. L_{it} is a $(1xl)$ vector of exogenous covariates; u_i and e_{it} are $(1xk)$ vectors of dependent variable-specific panel fixed-effects and idiosyncratic errors, respectively. The (kxk) matrices T_1, T_2, … , T_{p-1}, T_p and the (lxk) matrix K are parameters to be estimated (Abrigo ve Inessa Love, 2015).

After the PVAR regression estimation of their roots, causality research can be started. The method developed by Granger (1969) is used to investigate causality. The simple causality equation is as follows;

$$M_{it} = \varphi_i + \sum_{a=1}^{A} \tau_i^{(a)} M_{it-a} + \sum_{a=1}^{A} \omega_i^{(a)} G_{it-a} + \varepsilon_{it} \quad (3)$$

Equation 3 expresses the M and G variables. I and t in the equation denote the country group and time respectively. $\tau_i^{(a)}$ express the autoregressive parameters and $\omega_i^{(a)}$ means that slopes of coefficients. Again, the expression A in the equation shows the delay. If the lagged value of the G variable facilitates the estimation in the coefficients of the M variable, there is a causality from the G variable to the M variable. After the causality analysis is performed, variance decomposition and impulse-response studies are performed. Finally, the validity of the PVAR application is investigated.

4.Empirical Findings

The stationary of variables should be investigated as the first stage of PVAR analysis. IPS unit root test used in this section. Table 3 shows the first level of stationary of variables.

Table 3. Panel Unit Root Test Results

	Firs Difference (IPS-individual root)
Variables	**Stat. (Prob.), t**
gdp	-98.0976 (0.0000)*
overall	-13.4325 (0.0000)*
gintegrity	-14.7441 (0.0000)*
tax	-10.8250 (0.0000)*
gspending	-12.6432 (0.0000)*
monetary	-10.6122 (0.0000)*
Null hypothesis of a unit root, automatic lag length selection based on SIC, t denote deterministic component, and imply that individual intercept, statistical significance: *=1% and **=5%.	

After determining the stationarity of the unit roots, it is necessary to determine the most appropriate delay in PVAR analysis. Table 4 shows the most appropriate lag to be used in PVAR analysis. MBIC, MAIC, and MQIC values together are determined as the smallest and the most appropriate delay, and the application continues accordingly. In this case, the most appropriate delay is set to 1. After this stage, PVAR regression analysis can be started according to the first lag.

Table 4. Lag Selection Criteria

Lag	CD	J	J pvalue	MBIC	MAIC	MQIC
1	0.9965701	104.3371	.3372881	-384.1758	-93.66287	-211.7196
2	0.9999188	57.79094	.6943346	-258.0154	-70.20906	-146.5286
3	0.4510871	26.69424	.5881975	-116.4055	-31.30576	-65.88803

Table 5 shows PVAR regression results. In Table 5, variables on the horizontal axis are dependent variables. The variables on the vertical axis refer to the delayed explanatory variables.

Table 5. Panel VAR Model Regression Results

	gdp	***overall***	***gintegrity***	***tax***	***gspending***	***monetary***
L.gdp	.0082902 (0.120)	-.1023125 (0.000)*	-1.674407 (0.000)*	-.664334 (0.000)*	6.362846 (0.000)*	.1002238 (0.000)*
L.overall	-1.053486 (0.000)*	-.3494962 (0.000)*	-6.39997 (0.000)*	-3.14574 (0.000)*	30.58016 (0.000)*	-.9416338 (0.000)*
L.gintegrity	.1248879 (0.000)*	.0547659 (0.000)*	1.434161 (0.000)*	.6286514 (0.000)*	-7.210555 (0.000)*	.0756035 (0.000)*
L.tax	-.0556694 (0.000)*	.2388096 (0.000)*	2.244638 (0.000)*	.8884705 (0.000)*	-5.518306 (0.000)*	-.0740492 (0.000)*
Lgspendig	.0263612 (0.000)*	.026424 (0.000)*	.463835 (0.000)*	.1971077 (0.000)*	-1.847024 (0.000)*	.010464 (0.000)*
L.monetary	-.2272858 (0.000)*	.6614245 (0.000)*	9.071151 (0.000)*	1.599121 (0.000)*	-25.19622 (0.000)*	-.3955869 (0.000)*

*** and ** denotes 1% and 5% statistically significance level, respectively.**

As can be seen in Table 5, all EF sub-sectors significantly affects the GDP variable. Overall, tax and monetary variables negatively affect growth. The other two variables have a positive effect on growth. On a closer look, if the integrity of the government (gintegrty) increases by 1%, GDP increases by 1.2%. If the total score (overall) increases by 1% as freedom, there is a 10% decrease on the GDP. This situation is surprising. EF subcomponents show positive and negative effects on growth. The reason why the EF total score (overall) has a negative effect on growth can be explained by the fact that the negative effect in subcomponents is more dominant than the positive effect. However, a more comprehensive study should be carried out in order to make clearer conclusions. On the other hand, the GDP variable negatively affects the other 3 variables, excluding monetary freedom (monetary) and government expenditure (gspending). If income increases, freedom decreases. The mutual negative relationship between GDP and EF points to a paradox in country groups. After regression estimates, the existence of causal relationship between variables should be investigated. Table 6 shows Granger causality estimates. The variables on the horizontal axis are equation variables. The variables on the vertical axis show excluded variables.

Table 6. PVAR Granger Wald Test Results

	gdp	**overall**	**gintegrity**	**tax**	**gspending**	**monetary**
gdp		341.226 (0.000)*	381.950 (0.000)*	444.020 (0.000)*	391.712 (0.000)*	90.526 (0.000)*
overall	219.161 (0.000)*		91.572 (0.000)*	189.267 (0.000)*	199.677 (0.000)*	104.258 (0.000)*
gintegrity	166.477 (0.000)*	39.219 (0.000)*		265.474 (0.000)*	356.749 (0.000)*	36.839 (0.000)*
tax	125.002 (0.000)*	538.949 (0.000)*	500.311 (0.000)*		380.970 (0.000)*	96.513 (0.000)*
gspending	179.659 (0.000)*	122.932 (0.000)*	286.572 (0.000)*	430.026 (0.000)*		13.339 (0.000)*
monetary	25.919 (0.000)*	271.857 (0.000)*	285.399 (0.000)*	84.825 (0.000)*	228.082 (0.000)*	
*** and ** denotes 1% and 5% statistically significance level, respectively.** **Ho: Excluded variable does not Granger-cause Equation variable**						

When the causality estimation results are examined in Table 6, it is seen that all variables are mutually causal. According to the results, there is a very clear causal relationship between EF and GDP in the G-7 country group.

Figure 1 shows the stability of the PVAR application. This chart, created with Eigenvalue-Modulus values, shows all variables with a point. In short, the stability of PVAR analysis is that all points are inside the circle.

Figure 1. Roots Of Companion Matrix

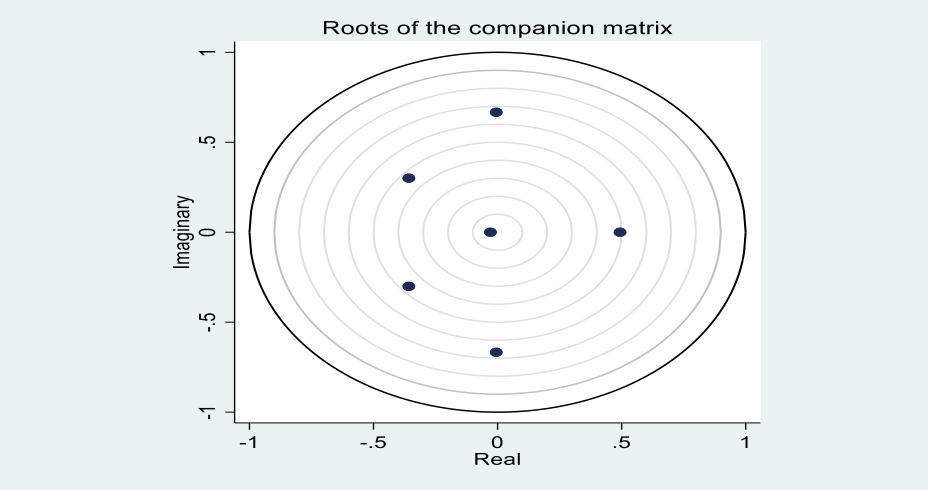
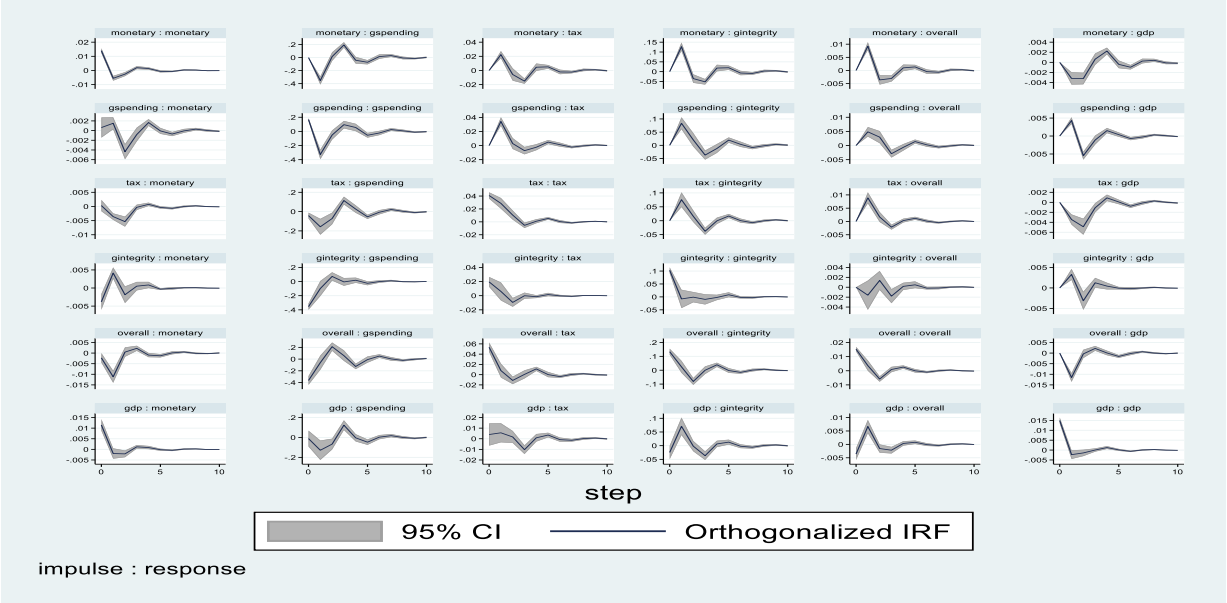


Figure 2 shows graphs of impulse-response analysis showing aspects of variables affecting each other and how long variables can stabilize.

Figure 2. Impulse-Response Graph



Variance decomposition is applied as the last step of the analysis. Variance decomposition is an analysis produced from the moving average variances of the variables and showing a 10-year time frame. At this stage, the aim is to determine how much the variables affect and explain themselves and each other with shocks.

Table 7. Variance Decomposition Analysis

gdp (Response)	**Impulse**					
Forecast horizon (years)	**gdp**	**overall**	**gintegrity**	**tax**	**gspending**	**monetary**
0	0	0	0	0	0	0
1	1	0	0	0	0	0
2	.5545653	.3213668	.0262372	.0286607	.044586	.0245839
3	.4723453	.2715752	.0421668	.0730405	.0990302	.0418419
4	.4635524	.2762448	.0445665	.0740889	.0996819	.0418656
5	.4576316	.2708247	.0440991	.0742237	.1022381	.0509829
6	.4551161	.2742132	.0438623	.0738236	.1019798	.051005
7	.453638	.2729576	.0436963	.0746493	.1024731	.0525856
8	.4531202	.2734826	.0436461	.0745978	.1024994	.0526541
9	.4528651	.27325	.0436466	.0746846	.1026233	.0529304
10	.4527674	.2733676	.0436374	.0746689	.1026197	.052939

When Table 7 is examined closely, growth explains itself by an average of 45% over a 10-year period. In other words, the primary reason for changes in growth stems from itself. As the total score, EF explains the GDP variable by 27%. Finally, government expenditures explain the growth by 10%. As a result, GDP is most affected by the shocks from it.

5.Conclusion

The aim of this study is to examine the relationship between EF and GDP in the G-7 country group in terms of regression and causality relationships. PVAR analysis method was applied for this purpose. Government expenditures, monetary freedom, tax burden, government integrity and freedom total scores were used. The period 1996-2019 was chosen as the observation interval in the study.

When looking at regression estimates, surprising results are seen. Contrary to the generally accepted positive relationship in the literature, a negative relationship was found between the total freedom score and improvement but other EF sub-sectors positive effect improvment. Causality estimates show that there is a mutual relationship between both variables. In this case, EF should be restricted in order to increase GDP in these seven developed countries. On the contrary, GDP should be decreased in order to increase the EF variable. The fact that the causality relationship is bidirectional and these two variables affect each other negatively requires a more detailed study since it is useless to comment in such a relationship. Two other variables that have a negative impact on GDP are tax and monetary variables. It is expected that any increase in the tax burden will have a negative effect on GDP as it will reduce consumption and investment expenditures. The tax variable used in this research may cause confusion. The tax used in the EF index is defined as tax burden, not income tax. When looking at the regression results, the content of the variable should be fully understood in order to interpret the negative relationship between tax and GDP correctly. The negative relationship between GDP and tax in the seven economies studied is an expected result. Because in developed economies, justice in taxation is applied perfectly to individuals and companies. Therefore, it is an expected result that the tax burden of individuals with increased income decreases. On the other hand, consumption and investment expenditures are effective on GDP. In these seven developed economies, if the tax burden is increased with the increase in income, it may have negative effects on growth. The two variables that have a positive effect on GDP are gintegrity and gspending variables, respectively. State integrity can directly affect the political, social and cultural structure and commercial relations. From this perspective, ensuring integrity is vital. With its perfectly working institutions, judicial system and political structure, the state mechanism, which functions like a clock that works smoothly, can prevent the mistakes of individuals, investors and the elected. For this reason, serious investments, foreign exchange flows and immigration are experienced in developed and integrated countries. To prove this situation, it is sufficient to look at African countries.

In this case, it is concluded that there is an absolute relationship between EF and GDP. Although the interpretation of coefficients and probabilities should be taken into account in regression results, causality analysis reveals the direction of the relationships.

As a result, it is clear that there is a relationship between EF and GDP both as regression analysis and as a causality relationship. Since the total score, one of the EF sub-variables, consists of the sum of the other variables, it is undesirable to comment on the explanation of the negative relationship. Because it is not possible to know which sub-variables are more dominant and which is more effective. On the other hand, the two-way causality relationship makes it difficult to comment on the results. For this reason, the relationship between the two variables will be examined in other studies with different analysis methods in different country groups.

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