

## **THE RELATIONSHIP BETWEEN MILITARY EXPENDITURES, DEMOCRACY AND ECONOMIC DEVELOPMENT**

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### **Abstract**

From the 1950s and onwards, the relationship between democracy and economic development remains a matter of curiosity. In this study, the relationship between democracy and economic development as institutional determinants of military expenditures is investigated by Dumitrescu-Hurlin (2012) time-varying panel causality test for 34 OECD countries for the period of 1990-2017. As a result of the analysis, between 1995-2015 period there was a two-way causal relationship between military expenditures and economic development, military expenditures and democracy, and a one-way causality running from development to democracy. In the period between 2002 and 2016, there was a one-way causal relationship from democracy to military spending and from democracy to development. In the period of 2003-2017, it was revealed that there was a one way causality from democracy to development and the compatibility perspective is valid.

**Keywords:** Military Expenditures, Democracy, Development, Time-Varying Panel Causality

**JEL Classification Codes:** H10, O47, 043, B25

### **Introduction**

Lipset (1959) states that “the more wealthy a nation, the greater the chances of maintaining democracy” and democracy will take place after a certain economic development in 1959, which has made serious repercussions by expressing the impact of economic development on

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democracy (Cevizli, 2013: 1). Democracy, by definition, has the right to speak of the people in the administration as well as the rights and freedoms of individuals takes into account (Beşkaya and Manan, 2008: 3).

Democracy, income distribution, government policies, macroeconomic stability, institutional factors and so on. notion (Arslan and Doğan, 2004: 1) and the corporate approach to the development concept defined by various expressions (Acemoglu et al., 2004). In terms of cultural approach, the geographical features of the countries are explained with the differences of belief, honor and social structure. On the other hand, the concept of development in terms of institutional approach is explained by the institutional differences of the countries in terms of infrastructure (Acemoglu and Robinson, 2012; Erkuş and Karamelikli, 2016). As Huntington puts it, although the concept of democracy is not necessary for economic development (Erkuş and Karamelikli, 2016), Huntington (2006) states that, the weak and fragility of political institutions in developing countries is high. He states that the relationship between economic development and democracy is consecutive and, if expressed in a sequence, the priority is economic development and that democracy occurs later (Koçak and Uzay, 2017: 708). Sen (1999: 3) states that the increase of the GNP or per capita income is important for the expansion of the freedoms of the individuals constituent the society, and that the freedoms depend on social and economic arrangements such as education and health services and political and civil rights such as freedom of participation in public debate of democracy. In other words, the concept of development is also expressed by political freedoms as well as institutional freedoms (Attar, 2006: 42, 43).

The relationship between economic growth and democracy is explained by three basic approaches (Sirowy and Inkeles, 1990: 4, 5). According to Huntington and a group of researchers, the conflict approach, which argues that democracy negatively affects economic growth, states that democracy and economic growth cannot occur simultaneously. It is stated that after economic growth, growth will contribute to democratization (Bariş and Erdoğan, 2018: 89, 90). According to the compassion approach proposed by Olson (1996), where democracy is positively affecting economic growth, democratic processes are explained with the view that economic growth is complementary and supportive (Şahin, 2017: 47; Acaravcı et al. 2015: 120). Lipset (1959) argues that the level of growth in the relationship

between democracy and economic development has a positive effect on the sustainability of democracy. The prerequisite and encouraging component of democracy are welfare, urbanization, industrialization, education and so on. socio-economic factors (Aleksanyan, 2013: 4), the channels that affect the growth of democracy, political instability, governance quality, public sector size, human capital level, income inequality, trade openness and physical capital level (Tavares and Wacziarg, 2001: 45). According to this approach, it is stated that democracy can increase growth by reducing inequality in income distribution by balancing human capital accumulation, as well as preventing growth by decreasing physical capital accumulation and increasing public expenditures (Tavares and Wacziarg, 2001: 1343; Doğan, 2005: 10). Skeptical approach asserts that it is not very strong relation between two variables (Arslan and Doğan, 2004: 2; Acaravcı et al., 2015: 120).

Another reason why democracies can be expected to have lower military expenditures is that they are less likely to go to war. The Democratic Peace Theory, dating back to the philosopher Immanuel Kant (1795), argues that democracies do not go to war with other democracies (Doyle, 1986; Russet 1993; Brauner, 2014: 2). Immanuel Kant (1775) argues that the spread of democracy reduces the likelihood of wars to continue and provides an incentive to reduce military spending (Kant, [1795] 1917; Rota, 2015: 2). In general, it is believed that democratic states are more peaceful and less likely to be involved in international conflicts. Solberg and Wolfson (1999), James et al. (1999), Oneal and Russet (1997), starting from this point of view, the increase in the level of democracy in a country that can be expected to decline in defense spending (Lebovic, 2001; Yıldırım and Sezgin, 2002: 3). In autocratic societies, with the concern of maintaining their power to support a small elite group, human capital is given importance in order to be re-elected in democratic societies. Democratization positively affects education, health expenditures and public expenditures in general, while it negatively affects military expenditures (Riedel and Sommerstein, 2013: 2).

The level of military spending may be higher in unlawful forms of dictator administration. A strong army can reduce the possibility of military revolt, as well as strengthen the possibility of organizing military coups. Therefore, in order to ensure the adherence of the army, dictatorial forms of governance must give the army more privileges (Brauner, 2014: 3). Given that the political importance of military power is more than democracy in the form of dictatorial administration, the transition to

power in dictatorships cannot be ensured by a formal mechanism and violence comes to the forefront for the protection of power. Therefore, military expenditures tend to be high. Empirically, Dunne et al. (2008), Albalade et al. (2012) and Töngür et al. (2015) support a strong negative relationship between the democracy index and military spending (Kotera and Okada, 2015: 4).

Harrison and Wolf (2012) state that democratic forms of government are less likely to carry out war and military spending, and that government spending must be further constrained. Also stated that democracy improves the state's ability to increase public spending in the event of war. According to Firdmuc, democracy promotes economic freedoms. Economic freedoms are defined as the situation where individuals can perform freely without any obstacles when performing their economic activities (Beskaya and Manan, 2009: 48). Because the contribution of economic freedoms to growth is positive, the contribution of democracy to economic growth is positive (Firdmuc, 2003: 596; Doğan, 2005: 15).

Contributions of the study to the literature, as stated firstly by Aleksanyan (2013: 21), the economic freedom index, which measures democracy, consists of ten economic indicators such as freedom of employment, commercial freedom, monetary freedom, state expenditures and financial freedom, property rights, investment and financial freedom. It is shown that the average of freedom indices can be used as the index of democracy. Inspired by the study, the average of these ten economic measures as a democracy index was taken as a variable. Secondly, the time-varying panel causality test developed by Dumitrescu-Hurlin (2012), which has not been previously applied in this regard, is used as econometric analysis in this study. Thirdly, the relationship between democracy, military spending and economic development for the 1990-2017 period and OECD countries has not been discussed before and it aims to contribute to the literature in terms of the time period is examined.

### **Literature Review**

Many studies on the relationship between democracy and military expenditures are available in the literature. Leblang (1997) examined the impact of democracy on economic growth for the 1960-1989 period for 70 countries and concluded that the impact of democracy on economic growth is positive (the approximation approach) by reducing the income inequality of democracy and increasing human capital accumulation. Barro (1999) examined the relationship between economic growth and

democracy in 100 countries for 1960-1995 period with the LSQ method. It is concluded that it affects the growth negatively (current conflict approach). Ken Farr et al. (1998) examined the 20 industrialized and 78 industrializing countries by using panel granger causality analysis for the period 1975-1995 and concluded that there was a one-way causality relationship from economic welfare to democracy in both groups. Narayan and Smith (2006), 1972-1999 period for China, by using ARDL, VEC and causality tests, and variance decomposition analysis has been discussed, democracy in the short and long term growth negatively (conflict approach is valid) is concluded. Jaunky (2013) examined the 1980-2005 period for 28 Sub-Saharan African countries and concluded that there is a bi-directional causal relationship between democracy and economic growth. Acemoglu et al. (2014) examined the period of 1960-2010 with the GMM method for 175 countries and concluded that the adaptation approach was valid. Rota (2011), evaluates the relationship between military expenditures and political regime/democracy within the framework of the 'peace dividend', in which public revenues increased as a result of the decrease in defense expenditures will be used in different areas other than defense, while Alesina and Spolore (2005, 2006). It proposes a model where the concept of peace dividend is not as effective as expected and emphasizes that increased democracy will result in the emergence of more nations and increase the possibility of regional conflict. Hess and Orphanides (2001) argue that democratization does not produce a "peace dividend" and that wars can also occur in administrations with a democratic regime (Tongur et al., 2013: 4). Fordam and Walker (2005) argue that, in the context of Immanuel Kant's liberal views, the decrease in military spending will increase the wealth and prosperity of the countries. Brauner (2014) examined whether the democratic countries for the 1960-2000 period allocated less resources to military spending than the dictatorship-led countries. They argue that democratic administrations allocate less and less resources to military expenditures as a percentage of GDP, and that the causality relationship is one-way from the regime form to military expenditures. In the literature discussed to investigate the relationship between democracy and military spending and for Turkey does not have a lot of work received. Beşkaya and Menan (2009) examined for the 1970-2005 period for Turkey, democracy showed the uncertainty of economic growth relationship, the relationship between economic growth with economic freedom is positive but not reached a clear conclusion for the impact on the economic growth of democracy. Erkuş and Karamelikli the (2016)

examined the 1950-2010 period, the ARDL test for Turkey and has reached the conclusion that the income level of democracy is negatively affected. Demirkan ve Kaya (2012), 1980-2006 period for Turkey analyzed with Johansen- Juselius (1990) cointegration and Granger causality tests, It is concluded that there is a cointegration relationship between democracy and economic growth and that there is a one-way causality (coherence approach) from democracy to economic growth. Koçak and Uzay (2017), for the 1975-2014 period, in their study dealt with the Johansen (1988, 1991) and Maki (2012) tests for Turkey, It is stated that fertility rates in democratic societies will be low, education and investment expenditures will be higher and in this case, it will affect economic growth positively.

#### **Econometric Application: Data set**

In this study, an econometric analysis is conducted<sup>3</sup> using Milex (Military Expenditure of % GDP), HDI (Human Development Index) and Democ (Democracy Index) variables for 34 OECD countries between 1995 and 2017, excluding Iceland and Korea. Heritage Foundation and the Wall Street Journal, which consist of 10 economic measures of freedom; commercial freedom, monetary freedom, government spending and financial freedom, property rights, investment and financial freedom, labor freedom and so on. By scoring the average freedom score using a scale between 0 and 100, where various factors are weighted equally, economic freedom index and property rights are generally expressed and accepted as one of the indicators used to measure democracy (Aleksanyan, 2013: 21)<sup>4</sup>. In this study, Gauss 14.0 and Eviews 10.0 programs were analyzed.

Equation (1) expresses the effect of the index of democracy and human development on military expenditures.

$$\text{Milex}_{i,t} = B_0 + B_1.\text{HDI}_{i,t} + B_2.\text{Democ}_{i,t} + u_{i,t} \quad (1)$$

The term  $B_0$  in the model refers to the fixed term and  $B_1$  refers to the slope coefficient of HDI.  $B_2$  indicates the slope coefficient of Democ.  $u_{i,t}$  is the error term of model (1). In both models,  $i$  ( $i = 1, 2, \dots, N$ ) is the cross-sectional data dimension and  $t$  ( $t = 1, 2, \dots, T$ ) is the time series dimension. In this study,  $i = 1, 2, \dots, n$  and  $t = 1995, 1996, \dots, 2017$ .

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<sup>3</sup>Democracy index data was obtained from heritage.org – Index of Economic Freedom (<https://www.heritage.org/index/visualize>).

<sup>4</sup> Milex data was compiled from “Word Development Index Based on World Bank Data” and HDI data was compiled from “UNDP-Human Development Reports” databases.

### **Methodology**

In this study, the causal relationship between military (defense) expenditures, economic development and democracy in OECD member countries is investigated with a time-varying panel causality analysis, which allows the examination of the causal relationship. In the first stage, whether the variables have horizontal cross-sectional dependence is found in Breusch-Pagan, CDlm (Pesaran 2004), CD (Pesaran 2004), Pesaran et al. (2008) tests. In the second stage, stationary levels of the variables were determined with the help of panel unit root test developed by CADF test. In the third stage, the cross-sectional dependence for the models and homogeneity for the models were examined with the help of delta test. And fourth and last stage, the results of the causal relationship between the variables and the periods were determined with the help of the figures.

Cross-section dependence is an important factor in determining the techniques to be used in panel data analysis. Recently, most of the analyzes that we can express recently take into account the state of horizontal cross-sectional dependence analysis - II. generation analysis. Horizontal section dependence indicates the existence of correlation between error terms calculated for each section (Tatoglu, 2013: 9; Gul and Inal, 2017: 75). It can also be stated that a shock coming to one of the cross-sectional units affects the other cross-sectional units.

Horizontal cross-sectional dependence Breusch and Pagan (1980), CDlm (Pesaran 2004), CD (Pesaran 2004), Pesaran et al. (2008) tests. In this study, the presence of horizontal cross-sectional dependence was investigated with the help of four tests. When the results of the cross-sectional dependence analysis were examined, the H<sub>0</sub> hypothesis, which asserts that the variables do not include the cross-sectional dependence for all variables except the milex variable, was rejected and the alternative hypothesis was accepted in CD Pesaran (2004) analysis. In this context, it is necessary to use second generation unit root analyzes which take the assumption of horizontal cross-section dependence into account for the stability of the variables.

In the study, Pesaran (2007) CADF panel root analysis was used which takes into account the stationarity and horizontal cross-sectional dependence of the variables. The CADF test calculates both the test statistic value for each section and the test statistic for the overall panel. If the calculated test statistic is higher than the critical values of Pesaran

(2007), Ho hypothesis is rejected and the variable is considered to be stationary.

**Table 1:** Horizontal Section Dependency Test for Variables

Model	Breusch & Pagan 1980	CDIm (Pesaran 2004)	CD (Pesaran 2004)	Pesaran vd.(2008)
HDI	708,099 (0,000)***	4,392 (0,000)***	-1,891 (0,029)**	4,273 (0,000)***
Milex	725,834 (0,000)***	4,921(0,000)***	-0,291 (0,386)	10,203(0,000)***
Democracy	839,970 (0,000)***	8,328 (0,000)***	-2,569 (0,005)***	3,745 (0,000)***

Note: \*\*\* indicates that horizontal cross-sectional dependence is accepted at the significance level of 1% and 5%, respectively.

In this context, when Table 1 is examined, the test statistic for the overall panel is -1,872, and since this value is smaller than the critical values calculated for Pesaran (2007) panel statistic, HDI variable was found to be non-stationary. When the HDI variable is examined on a cross-sectional basis, it is found that the unit is rootless only for Canada, Luxembourg, Czech Republic and England. When the first difference of HDI variable was taken, the test statistic was found to be greater than the critical value, ie the unit became rootless when the HDI difference was taken.

The Milex variable, like the HDI variable, has become stationary in the first difference case while the unit value is not rooted, ie, stationary. When the Milex variable is examined for cross-sectional level values, only the Netherlands and Portugal are stationary.

Because the test statistic calculated for the democracy variable was -2,222, the critical value calculated for Pesaran (2007) panel at 10% significance level was greater than (-2,21), it was found that this variable was unit rootless, ie stationary. When this variable level value is examined in cross-sectional dimension; In Austria, England, Estonia, the Netherlands, Italy, Hungary and New Zealand, the unit was found to be unit rootless.



**Table 2: CADF Panel Unit Root Test**

Country	I(0)		I(1)		I(0)		I(1)		I(0)		I(1)	
	lags	CADF-stat	lags	CADF-stat	lags	CADF-stat	lags	CADF-stat	lags	CADF-stat	lags	CADF-stat
ABD	1,000	-2,101	1,000	-2,102	1,000	-0,584	1,000	-2,472	1,000	0,132	1,000	-2,747
Almanya	1,000	-0,656	1,000	-3,461 <sup>b</sup>	1,000	-1,527	1,000	-1,971	1,000	-2,511	1,000	-2,867
Avusturya	1,000	-1,640	2,000	-1,199	1,000	-1,595	1,000	-3,593 <sup>b</sup>	1,000	-3,272 <sup>c</sup>	3,000	-1,735
Avusturalya	3,000	-1,013	1,000	-3,021 <sup>c</sup>	1,000	-1,685	1,000	-2,070	1,000	-1,918	1,000	-1,962
Belçika	1,000	-2,544	1,000	-3,667	3,000	-2,126	3,000	-1,893	1,000	-2,954	1,000	-4,648 <sup>a</sup>
Çek Cum.	1,000	-6,129 <sup>a</sup>	1,000	-6,010 <sup>a</sup>	1,000	-1,720	3,000	-2,191	1,000	-2,087	1,000	-4,700 <sup>a</sup>
Danimarka	1,000	-1,720	1,000	-3,202 <sup>c</sup>	1,000	-2,445	1,000	-4,916 <sup>a</sup>	1,000	-2,119	1,000	-2,023
Estonya	2,000	-0,186	2,000	-4,658 <sup>a</sup>	2,000	-1,109	1,000	-3,535 <sup>b</sup>	1,000	-1,548	3,000	-1,249
Finlandya	1,000	-1,455	1,000	-4,251	1,000	-1,264	1,000	-2,667	1,000	-3,094 <sup>c</sup>	1,000	-2,922
Fransa	1,000	-2,249	1,000	-3,374 <sup>b</sup>	1,000	-0,780	1,000	-1,266	1,000	-1,553	1,000	-5,048 <sup>a</sup>
Hollanda	1,000	-2,194	1,000	-2,880	1,000	-3,732 <sup>b</sup>	1,000	-2,707	1,000	-2,754	1,000	-2,266
İngiltere	1,000	-4,338 <sup>a</sup>	1,000	-6,676 <sup>a</sup>	1,000	-1,797	1,000	-2,036	1,000	-3,374 <sup>b</sup>	3,000	-3,125 <sup>c</sup>
İrlanda	1,000	-2,640	1,000	-2,359	1,000	-2,801	1,000	-2,190	3,000	-1,914	2,000	-1,628
İspanya	1,000	-0,878	1,000	-3,773 <sup>b</sup>	1,000	-1,821	1,000	-3,826 <sup>b</sup>	3,000	-1,531	3,000	-1,969
İsrail	1,000	-2,110	1,000	-3,576 <sup>b</sup>	1,000	-2,889	1,000	-1,995	1,000	-2,707	2,000	-1,412
İsveç	1,000	-1,645	1,000	-2,153	3,000	-0,807	3,000	-0,790	1,000	-1,206	1,000	-3,888 <sup>b</sup>
İsviçre	3,000	-2,064	3,000	-2,562	1,000	-0,799	1,000	-2,889	1,000	-1,136	1,000	-3,034 <sup>c</sup>
İtalya	2,000	0,469	1,000	-3,242 <sup>c</sup>	1,000	-2,876	1,000	-2,608	1,000	-2,311	1,000	-2,801
Japonya	1,000	-2,222	1,000	-3,529 <sup>b</sup>	1,000	-1,109	1,000	-1,340	3,000	-5,723 <sup>a</sup>	3,000	-4,644 <sup>a</sup>
Kanada	1,000	-3,268 <sup>c</sup>	1,000	-2,175	1,000	-1,895	1,000	-3,089 <sup>c</sup>	2,000	-2,073	2,000	-2,429

Letonya	2,000	-1,185	2,000	-3,333 <sup>c</sup>	1,000	-1,833	1,000	-0,988	2,000	-1,435	1,000	-2,925
Litvanya	2,000	-1,550	1,000	-3,306 <sup>c</sup>	1,000	-2,401	1,000	-1,946	2,000	-0,535	1,000	-2,751
Lüksemburg	1,000	-3,027 <sup>c</sup>	3,000	-1,902	1,000	-1,316	1,000	-3,759 <sup>b</sup>	1,000	-2,798	1,000	-2,656
Macaristan	1,000	-0,787	1,000	-3,303 <sup>c</sup>	1,000	-2,002	1,000	-2,343	3,000	-2,671	1,000	-2,785
Meksika	1,000	-2,666	1,000	-5,110 <sup>a</sup>	1,000	-2,179	1,000	-2,124	1,000	-4,001 <sup>b</sup>	1,000	-4,634 <sup>a</sup>
Norveç	2,000	-2,709	1,000	-2,921	1,000	-1,292	1,000	-3,688 <sup>b</sup>	3,000	-2,389	3,000	-1,288
Polonya	1,000	-1,550	1,000	-2,591	1,000	-1,976	1,000	-3,422 <sup>b</sup>	1,000	-2,843	1,000	-2,501
Portekiz	1,000	-1,011	1,000	-3,047 <sup>c</sup>	1,000	-2,285	2,000	-3,308 <sup>b</sup>	3,000	-1,054	1,000	-3,553 <sup>b</sup>
Slovakya	1,000	-2,287	1,000	-1,196	1,000	-6,208 <sup>a</sup>	1,000	-3,061 <sup>c</sup>	1,000	-2,805	1,000	-3,251 <sup>b</sup>
Şili	1,000	-1,218	1,000	-5,561 <sup>a</sup>	3,000	-2,459	3,000	-2,135	1,000	-0,635	1,000	-1,717
Türkiye	1,000	-1,318	1,000	-2,885	1,000	-0,961	1,000	-4,131 <sup>a</sup>	3,000	-1,135	1,000	-3,642 <sup>b</sup>
Yeni Zelanda	1,000	-1,418	1,000	-2,789	1,000	-1,420	1,000	-1,982	1,000	-2,846	1,000	-3,551 <sup>b</sup>
Yunanistan	1,000	-1,319	1,000	-2,529	1,000	-2,468	1,000	-2,973 <sup>c</sup>	2,000	-3,428 <sup>b</sup>	1,000	-1,510
Slovenya	1,000	-1,028	1,000	-3,207 <sup>c</sup>	1,000	-0,809	1,000	-2,897	1,000	-1,335	1,000	-1,958
Panel Kritik Değer	-1,872		3,281 <sup>a</sup>		-1,911		-2,612 <sup>a</sup>		-2,222 <sup>c</sup>		-2,818 <sup>a</sup>	

Note: CADF statistic critical values, constant model -4.11 (1%), -3.36 (5%) and -2.97 (10%) (Pesaran 2007, Table I (b), p: 275), Panel statistics critical values, -2.57 (1%), -2.33 (5%) and -2.21 (10%) in fixed model (Pesaran 2007, table II (b), p: 280). a, b and c are 1%, 5% and 10% respectively.

Horizontal cross-section dependence and homogeneity of the models are important for choosing the right model. In this context, if the models include horizontal cross-sectional dependence, it is important to use second generation analyzes that take this into account in order to obtain more reliable results. On the other hand, homogeneity and heterogeneity is one of the issues that should be considered in model selection. When Table 3 is examined, Ho hypothesis that does not include horizontal cross-section dependence for all models was rejected and alternative hypothesis could not be rejected. For the homogeneity test, Ho hypothesis that the models are homogeneous was rejected and the models were assumed to show heterogeneity.

**Table 3: Horizontal Section Dependency Test for Models**

Model	Breusch & Pagan (1980)	CDlm (Pesaran 2004)	CD (Pesaran 2004)	Peseran vd. (2008)
HDI - Milex	2859,985 (0,000)***	68,634 (0,000)***	39,253 (0,000)***	134,038 (0,000)***
Milex - HDI	1867,091 (0,000)***	38,992 (0,000)***	4,513 (0,000)***	133,306 (0,000)***
Democracy - Milex	1862,185 (0,000)***	38,846 (0,000)***	16,403 (0,000)***	116,049 (0,000)***
Milex - Democracy	2122,410 (0,000)***	46,614 (0,000)***	16,255 (0,000)***	115,923 (0,000)***
Democracy - HDI	1992,240 (0,000)***	42,728 (0,000)***	6,428 (0,000)***	55,568 (0,000)***
HDI - Democracy	4019,586 (0,000)***	103,253 (0,000)***	57,178 (0,000)***	55,618 (0,000)***

Note: \*\*\* For horizontal cross-section dependence, it is accepted that horizontal cross-section dependence is accepted at 1% significance level and homogeneity is rejected at 1% significance level for homogeneity test.

### Homogeneity Test

The homogeneity or heterogeneity of coefficients in panel data studies is an important factor in determining cointegration and causality analyzes. Homogeneity in all countries/regions and so on. It indicates that the slope coefficients calculated for units such as  $\beta_i$  are equal to  $\beta$ , which is a single slope coefficient, whereas in heterogeneity, at least one of the units  $\beta_i$  aits is different. Pesaran and Yamagata (2008) are homogeneity  $\tilde{\Delta}$  ve  $\widetilde{\Delta}_{adj}$  statistics. In this study, this test was analyzed and the results are presented in Table 4.

**Table 4: Delta (Homogeneity) Test Results for Models**

Model	Delta_tilde	Delta_tilde_adj
HDI - Milex	29,824***	31,983***
Milex - HDI	30,923***	33,162***

Democracy Milex	-	12,549***	13,458***
Milex Democracy	-	15,331***	16,441***
Democracy - HDI		19,064***	20,444***
HDI - Democracy		15,757***	16,898***

Note: \*\*\*, \*\*, \* represent 1%, 5% and 10% significance levels, respectively.

### Time-varying Panel Causality Test

According to the time-varying panel causality analysis developed by Dumitrescu and Hurlin (2012), it should be strong against horizontal cross-sectional dependence and  $\beta_i$ 's should be different and their coefficients should be heterogeneous for each country. For this reason, homogeneity tests are applied to the models to be established first. Dumitrescu and Hurlin (2012), whose basics were developed by Granger (1969), are panel data forms of a time-varying causality test.

$$y_{i,t} = \alpha_{i,t} + \sum_{k=1}^K Y_i^{(k)} Y_{i,t-k} + \sum_{k=1}^K \beta_i^{(k)} x_{i,t-k} + \varepsilon_{i,t} \quad (2)$$

It is shown as (Dumitrescu and Hurlin, 2012: 1451; Gül and Inal, 2017: 76). (2) Y represents the HDI in model 1, MILEX in model 2, DEMOCRACY in model 3, and k represents the lag length. The delay coefficients of the Y dependent variables  $\beta$  represent the latency coefficients of the independent variables and these variables should also be stationary (Gül and Inal, 2017: 75-77; Öncel et al. 2017: 411).

$H_0: \beta_i = 0, \forall_i = 1, \dots, N$  (There is causality for all units)

$H_1: \beta_i = 0, \forall_i = 1, \dots, N_1$  (There is no causality for all units)

$$\beta_i \neq 0, \forall_i = N_1 + 1, N_1 + 2, \dots, N$$

Dumitrescu and Hurlin (2012) developed Wald ( $W_{N,T}^{Hnc}$ ) ve  $Z_{N,T}^{Hnc}$  statistics to test these hypotheses. Statistics are calculated as follows (Dumitrescu and Hurlin, 2012: 1453, 1454; Gül and Inal, 2017: 76; Öncel et al. 2017: 411):

$$W_{N,T}^{Hnc} = \mathbf{1}/N \sum_{i=1}^N W_{i,T}$$

$$Z_N^{Hnc} = \frac{\sqrt{N} [W_{N,T}^{Hnc} - N^{-1} \sum_{i=1}^N E(W_{i,T})]}{\sqrt{N^{-1} \sum_{i=1}^N Var(W_{i,T})}} \xrightarrow{N,T \rightarrow \infty} N(0,1).$$

If the calculated test statistics are greater than the critical values or the probability values of the test statistics are less than 5-10% significance

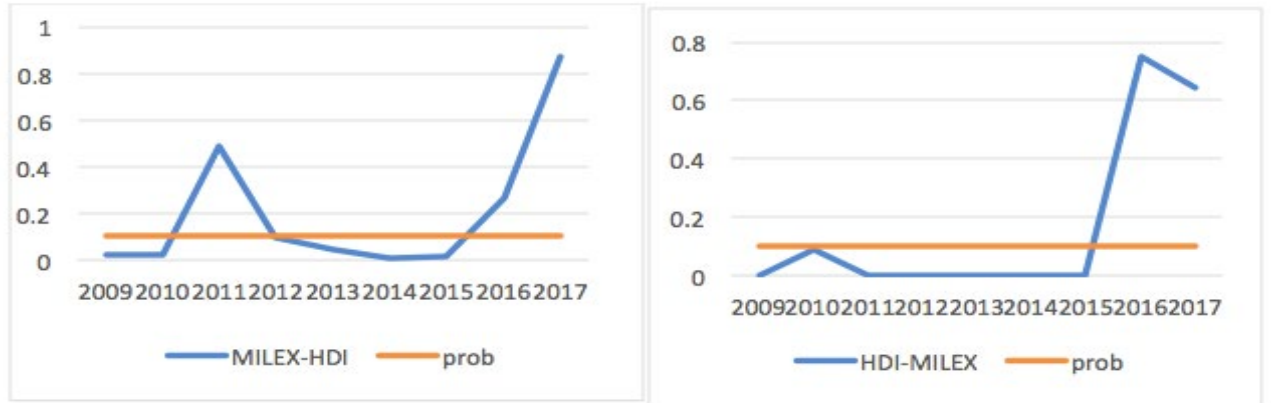
level, the null hypothesis is rejected and “there is causality for some units kabul. Arslantürk et al. (2011) and Gul and Inal, 2017: 76, 77), there may not be a causal relationship between the variables discussed for each period under investigation. While there is a causality relationship in one period period examined, a causality relationship may not exist in another period period. For this reason, it is stated that the period period examined is divided into sub-periods and causality analyzes are performed. For this study, the number of windows was taken as 15 and Dumitrezchu-Hurlin (2012) causality analysis was applied and graphs were drawn according to the significance level of 10% and it was seen that there was a causality relationship in periods below 10%. 1990-2004, 1991-2005, 1992-2006, 1993-2007, 1994-2008, 1995-2009, 1996-2010, 1997-2011, 1998-2012, 1999-2013, 2000-2014, 2001-2015, 2002- 2016 is rounded up to 2003-2017 and each period progresses by one year compared to the previous period. Because of this method applied, this analysis is called as time-varying causality test. An important feature of the time-varying panel causality test is that it allows to examine the causality relationship as sub-periods rather than expressing the period in question as a single period interval and to test the stability in the analysis.

**Table 5:** Time-varying Causality Analysis Result

Model	HDI - MILEX	MILEX - HDI	DEMOC - MILEX	MILEX - DEMOC	DEMOC - HDI	HDI - DEMOC
Year	<b>Prob</b>	<b>Prob</b>	<b>Prob</b>	<b>Prob</b>	<b>Prob</b>	<b>Prob</b>
1995-2009	0,000***	0,019**	0,0927*	0,0004***	0,229	0,000***
1996-2010	0,090*	0,021**	0,0316**	0,0069***	0,011	0,067*
1997-2011	0,0001***	0,484	0,006***	0,000***	0,685	0,081*
1998-2012	0,000***	0,099*	0,015**	0,000***	0,679	0,006***
1999-2013	0,000***	0,044**	0,005***	0,002***	0,585	0,002***
2000-2014	0,000***	0,005***	0,012**	0,000***	0,722	0,000***
2001-2015	0,000***	0,016**	0,012**	0,010*	0,491	0,000***
2002-2016	0,747	0,2672	0,019**	0,486	0,034**	0,462
2003-2017	0,644	0,8737	0,966	0,933	0,466	0,097*

Note: \*\*\*, \*\*, \* express the significance of causality at 1%, 5% and 10% significance levels, respectively.

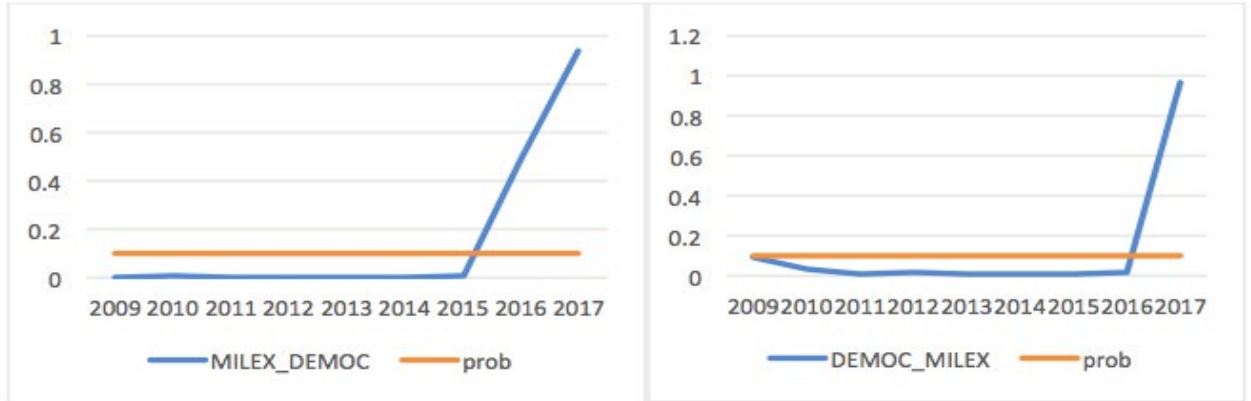
In Figure 1, when the changing causal relationship between military expenditures and development is examined; Between 1995-2009, 1996-2010, 1997-2011, 1998-2012, 1999-2013, 2000-2014, 2001-2015, a two-way causality was determined, while the causality relationship between development and military expenditures in 2002-2016 and 2003-2017 has disappeared.



**Figure 1:** Time-varying Causality Relationship Between Military Expenditures and Development

Note: While the areas below the critical value have causality, the areas above the critical value have disappeared.

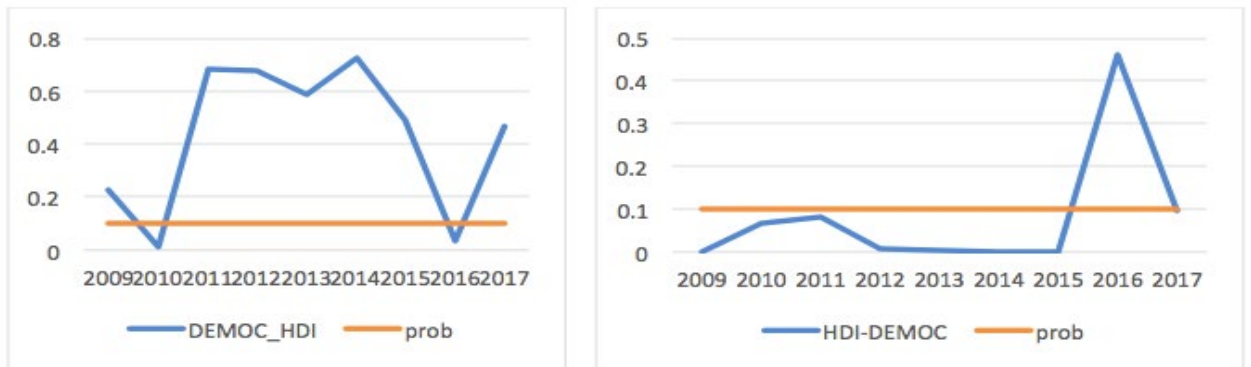
In Figure 2, when the changing causality relationship between military expenditures and democracy is examined, there is a two-way causality between 1995-2009, 1996-2010, 1997-2011, 1998-2012, 1999-2013, 2000-2014, 2001-2015 periods. In 2016 period, it was determined that there was only one-way causality from democracy to military expenditures, but the causality relationship disappeared in 2003-2017 period.



**Figure 2:** Time-varying Causality Relationship Between Military Expenditures and Democracy

Note: While the areas below the critical value have causality, the areas above the critical value have disappeared.

When the relationship between development and democracy is examined in Figure 3, there is a one-way causality from development to democracy in 1995-2009, 1996-2010, 1997-2011, 1998-2012, 1999-2013, 2000-2014, 2001-2015 periods. and a one-way relationship from democracy to development has been determined. In the 2003-2017 period, a one-way causality from democracy to development was identified. In other words, it can be concluded that the compatibility approach is valid for these periods.



**Figure 3:** Time-varying Causality Relationship between Development and Democracy

Note: While the areas below the critical value have causality, the areas above the critical value have disappeared.

## **Results**

In this study, it is aimed to contribute to the literature in the framework of the relationship between democracy and economic development which is one of the main indicators of the institutional structure and determinants of military expenditures between 1995 and 2017 in 34 OECD countries. The foundations of economic development have been tried to be explained by economic factors for many years. However, as well as economic factors, there are non-economic and democracy factors that directly and indirectly affect economic development. The idea of Kantian-liberalism, which asserts that the existence of democracy reduces the increase of war and military expenditures in the world, necessitates the examination of the idea. Democracy is also important for economic development and progress and for the sustainability of economic stability.

In this study, the period of 1995-2017 in 34 OECD countries, the relationship between military expenditures, democracy and economic development has been examined with the help of panel changing causality tests. Pesaran (2007) CADF panel root analysis was used in the study. When the HDI variable is examined on a cross-sectional basis, it is found that the unit is rootless only for Canada, Luxembourg, Czech Republic and England. When the first difference of HDI variable was taken, the test statistic was found to be greater than the critical value, ie the unit became rootless when the HDI difference was taken. The Milex variable, like the HDI variable, has become stationary in the first difference case while the unit value is not rooted, ie, stationary. When the Milex variable is examined for cross-sectional level values, only the Netherlands and Portugal are stationary. Democracy variable was found to be stationary without root and level. When this variable level value is examined in cross-sectional size; In Austria, England, Estonia, the Netherlands, Italy, Hungary and New Zealand, the unit was found to be rootless. Horizontal cross-sectional dependence between the series was investigated and the homogeneity test was determined whether the coefficients were homogeneous or heterogeneous, and the models showed heterogeneity. A time-varying panel causality test based on Dumitrescu-Hurlin (2012), which considers homogeneity or heterogeneity context, was used.

According to the results of time-varying causality analysis, the relationship between military expenditures and economic development; Between 1995-2009, 1996-2010, 1997-2011, 1998-2012, 1999-2013, 2000-2014, 2001-2015 periods, a two-way causality was determined, in



other words, military keynesian approach, which was expressed as a supply-side approach, from defense expenditures to economic growth. While it is suggested that there is a correct and positive (externality) relationship (Giray, 2004: 189), the causal relationship between development and military expenditures has disappeared in 2002-2016 and 2003-2017 periods. In explaining the effects of defense expenditures, the neutrality hypothesis, which states that defense spending is not a positive or negative relationship with economic growth and development, is valid (Aytaç, 2017: 41). This situation has negative effects on economic development due to the fact that military expenditures in OECD countries have a negative effect on capital formation and decrease economic growth rates (Duyar, Koçoğlu, 2014: 714).

The level of democracy, political regime forms and types of governance are considered as the determining factors of defense expenditures. When the changing causality relationship between military expenditures and democracy is examined, it is observed that there is a two-way causality between 1995-2009, 1996-2010, 1997-2011, 1998-2012, 1999-2013, 2000-2014, 2001-2015 periods. it was determined that there was a one-way causality towards military expenditures, but the causality relationship disappeared in the 2003-2017 period. As Garfinkel (1994) points out, this can be explained by the change in the democratization level of the countries due to the fact that democratic countries spend less defense compared to the countries that are governed by other regimes (Gökbunar and Yanıkkaya, 2004: 167).

When the relationship between development and democracy was examined, a unidirectional causality from development to democracy was determined in the periods of 1995-2009, 1996-2010, 1997-2011, 1998-2012, 1999-2013, 2000-2014 and 2001-2015. Demirkan and Kaya (2012), Leblang (1997) and Acemoglu et al. (2014), a one-way causality from democracy to development (compability approach is valid) has been identified in OECD countries.

When the relationship between military expenditures, democracy and economic development in OECD countries is examined by considering the results obtained from the study, military expenditures in the democracy relationship between the years 2002-2016 (1995-2009, 1996-2010, ..., 2001-2015) There is a one-way causality relationship to expenditures. Despite the spread of global democracy, military institutions continue to exercise their administrative, judicial and legislative powers over citizenship (Kentor and Kick, 2008: 143; Dunne,

2000: 440, Kılıç et al., 2018: 137), as well as to maintain the defense security and stability of countries. It is not possible to give up the need for defense. When the relationship between development and democracy is taken into consideration, the transformation of the two-way causality relationship from the previous period ranges from democracy to economic development in 2002-2016 and 2003-2017 is due to the fact that democracy is supporting economic development in OECD countries.

If the causality relationship in the context of military expenditure, democracy and economic development is interpreted for OECD countries, both variables have a double-sided causality in the period of 1995-2009, 1996-2010, ..., 2001-2015, but as the democratization levels of these countries increase, both countries There has been an increase in the expenditure rate (2002-2016 period) as well as the economic development levels of these countries (2002-2016 and 2003-2017 periods) due to the increase in democratization level, but the increase in military spending rates has increased to the level of economic development (2002- 2016 and 2003-2017). This situation can be explained that the direct effect of military expenditures on the economic development of OECD countries has been lost and that the increase in the democratization levels of these countries has led them to realize their economic development.

As a policy proposal, it is seen that there is a complementary relationship between democracy to military expenditures and democracy to economic development. For this reason, OECD countries should accept democracy as an indispensable basic motive for sustainable economic development. In addition to all these statements, there is still a need for further research in the context of the relationship between democracy, military expenditures and economic development.

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