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RELATIONSHIPS BETWEEN DEFENCE EXPENDITURES AND ECONOMIC GROWTH IN G7 COUNTRIES: PANEL BOOTSTRAP CAUSALITY ANALYSIS

G7 Ülkelerinde Savunma Harcamaları ile İktisadi Büyüme Arasındaki İlişkiler: Panel Bootstrap Nedensellik Analizi

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Abstract

It is important to reveal the relationship between defence expenditures and economic growth for both developed countries and developing countries. Dynamic political and economic developments affect defence expenditures. Many macroeconomic variables of countries are affected by the change in defence expenditures. Economic growth comes first among these macroeconomic variables. This study aims to determine the relationships between the economic growth and defense expenditures of the G7 countries for the period 1988-2018. For this purpose, the relationships between variables were examined using bootstrap panel causality analysis developed by Kónya

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(2006). According to the analysis results, it was found that there is a unidirectional causality relationship from defense expenditures to economic growth in the USA, Germany, Japan, England, and Canada. The sign of causality relationships is negative in the USA, UK, and Canada, and positive in Germany and Japan. On the other hand, in the findings of the study, an insignificant causality relationship was found between variables in France and Italy. Besides, for the G7 countries, an insignificant causality relationship has been determined from economic growth to defense expenditures. Economic and political inferences were made based on the findings obtained at the end of the study.

Keywords: Defence spending; per capita income; economic growth; bootstrap panel causality; G7 countries

Jel Codes: O40; F52; F62; C33

Öz

Savunma harcamaları ile iktisadi büyüme arasındaki ilişkilerin ortaya konulması hem gelişmiş ülkeler hem de gelişmekte olan ülkeler için önem arz etmektedir. Dinamik siyasi ve iktisadi gelişmeler savunma harcamalarını etkilemektedir. Savunma harcamalarının değişmesiyle birlikte ülkelerin birçok makroiktisadi değişkenleri de etkilenmektedir. Bu makroiktisadi değişkenlerin başında iktisadi büyüme gelmektedir. Bu kapsamda çalışmanın amacı G7 ülkelerine ait 1988-2018 dönemine ait savunma harcamaları ile iktisadi büyüme arasındaki ilişkileri tespit etmektir. Bu amaç doğrultusunda değişkenler arasındaki ilişkiler Kónya (2006) tarafından geliştirilmiş bootstrap panel nedensellik analizi yardımıyla incelenmiştir. Analiz sonuçlarına göre ABD, Almanya, Japonya, İngiltere, Kanada'da savunma harcamalarından iktisadi büyümeye doğru tek yönlü bir nedensellik ilişkisi olduğu bulgusuna ulaşılmıştır. Nedensellik ilişkilerinin işareti ABD, İngiltere ve Kanada'da negatif, Almanya ve Japonya'da pozitiftir. Diğer taraftan çalışmanın bulgularında Fransa ve İtalya'da değişkenler arasında istatistiki olarak herhangi bir nedensellik ilişkisi tespit edilememiştir. Ayrıca G7 ülkeleri için iktisadi büyümeden savunma harcamalarına doğru istatistiki olarak herhangi bir nedensellik ilişkisi saptanmamıştır. Çalışmanın sonunda elde edilen bulgulara dayanarak iktisadi ve politik çıkarımlar yapılmıştır.

Anahtar Kelimeler: Savunma harcamaları; Kişi başına düşen milli gelir; İktisadi büyüme; Bootstrap panel nedensellik; G7 ülkeleri

Jel Kodları: O40; F52; F62; C33

1. Introduction

War and peace phenomena are the main subjects of international discipline. The history of war and peace is as old as human history and is the main theme of history. The understanding of defense develops within the framework of both preparations for a war situation and deterrence in a possible war (Bulutoğlu, 2003). This assumption has arisen with more protection instinct since ancient times. Troy Walls, the Great Wall of China, Hadrian's Wall, Istanbul Walls, and many more examples are important for deterring the enemy and for the development of prosperity in a sheltered environment. People's economic relations also develop after the need for security and protection (Maslow, 1964) which is one of the most important basic needs in human needs, is realized.

Defined by Butterfield (1951) as the "Hobbesian fear", the defense-worried side strengthening its defense is not seen as a "benevolent" behavior by other parties. According to Herz (1950), having the same fears on the other side is an orientation stemming from the anarchic structure of the international system. Mutual suspicion, on the other hand, pushes states to consider the worst-case scenario (worst-case thinking), this situation is effective in the decision-makers' decision for arming. Herz (1950) describes the armament motive as the "manic-depressive cycle". The inevitable outcome will be war. The reason for the fight request is to attack without being attacked. Hertz's "kill or die" idea describes the main political basis of the arms race that continued throughout the cold war. It is observed that the "Security dilemma" thesis, which is found in the literature as an armament dilemma, is no longer a global problem. As states started to abandon a global armament with the end of the cold war, the changing threat perception caused significant changes in not only the structure of armament barely also armed forces as a concept. The share of armament and defense expenditures in national income has also changed in this direction.

According to the data of the Stockholm International Peace Research Institute (SIPRI, 2020a and 2020b), the total defense expenditures worldwide were 1917 billion dollars in 2019 and it is 2.2%

of the world gross domestic product. This figure corresponds to an increase of 3.6% compared to 2018. 62% of these expenditures belong to the top five spending countries, the USA, China, India, Russia, and Saudi Arabia. Defence spending for 2019 is at the highest level now since the 2008 global financial crisis. Defence expenditures of the USA, the country with the highest defense spending in the world, increased by 5.3% in 2019 and reached 732 billion dollars. Defence expenditures of the USA are 38% of all world defence expenditures. The increase in the US defense spending in 2019 was equal to all of Germany's defense spending in that year. Despite this, Germany is the leading country in defence spending growth in Europe. Germany's military spending increased by 10% in 2019 to $ 49.3 billion. On the other hand, defense spending increases in France and Britain remained more stable. SIPRI's (2020a) data reveal a picture that defense expenditures have increased recently.

This study aims to determine the relationships between defense spending and economic growth. Canada, France, Germany, Italy, Japan, United Kingdom, and the USA, G7 countries, which have the 7 most developed economies in the developed country category, are among the countries with the highest defense expenditures worldwide. In this context, G7 countries that can be considered to be homogeneous in their economic development levels will be included in the analysis to better determine whether there is any relationship between defense expenditures and economic growth. Relationships between variables will be analyzed with the help of annual data of the G7 countries for the period 1988-2018 and bootstrap panel causality analysis developed by Kónya (2006). For this purpose, firstly, theoretical approaches, and literature studies on this subject will be included in the study. Afterward, the relationship between defense spending and economic growth will be analyzed within the scope of bootstrap panel causality analysis, and in the conclusion part, economic and political inferences will be made based on the findings of the analysis.

2. Theoretical Framework and Literature Review

One of the earliest known primitive state structures, the main purpose of contemporary state formations is the struggle for existence. The struggle for the existence of states, in its simplest form, passes through having a deterrent defence force against threats. Defence services, which are so important for the continuation of sovereignty, are today considered as traditional full public services carried out under the monopoly or control of the state. With this aspect, all members of society can benefit from advocacy services equally (Bulutoğlu, 2003: 240). Being a full public service requires the financing of defence expenditures mainly with taxes. This is a sign that the defence power of states is proportional to their economic power. Therefore, as long as the defence power is not supported by economic power, it may not be sufficient for the protection of sovereignty on its own. Therefore, some researchers, realizing that there is an important interaction between defence and economic power, have attempted to examine the relationships between defence and economic growth.

Research has concluded that defense expenditures, which are financed by the public and have a significant share in the national income of many countries, may have negative externalities along with positive externalities to economies. This determination led to the emergence of two basic approaches between defense expenditures and economic growth. The first of these approaches is the Supply Side "Military Keynesian" approach, which argues that defense spending positively affects economic growth with the effect of positive externalities. In this approach, the view that defence expenditures can create a significant multiplier effect is at the forefront. It is based on the view that this multiplier effect will have a positive effect on economic growth through a cycle that creates more demand will increase capacity utilization and output level (Looney, 1994: 46-47). Especially with the effect of positive externalities such as infrastructure of defence spending and technological progress, it will affect the economic growth positively.

Some studies (Benoit (1978), Deger ve Smith (1983), Gyimah-Brempong (1989), Sezgin (1997), Yildirim, Sezgin, and Öcal (2005),

Feridun, Sawhney, and Shahbaz (2011), Shahbaz, Afza, and Shabbir (2013) and Augier et al. (2017) which deal with the relationship between defence expenditures and economic growth as the subject of his empirical studies, yielded results indicating that defence expenditures have a positive effect on economic growth. These findings of the researchers support the Military Keynesian approach.

The other approach is the demand-side "Neo-Classical Theoretical" approach, which criticizes the fact that resources are not invested in more productive areas and that defence spending negatively affects economic growth (Dunne and Nikolaidou, 2001: 5). In this approach, it is based on the view that the allocation of scarce resources to such expenditures rather than production and investments is a factor that prevents economic growth. Dunne and Vougas (1999), Yakovlev (2007), Hou and Chen (2013), Dunne and Tian (2015), Khalid and Razaq (2015), Korkmaz (2015), Zhao, Zhao and Chen (2017), on the other hand, obtained results indicating that defence expenditures had a negative effect on economic growth. Therefore, these researchers obtained results that support the Neo-Classical Theoretical approach.

It is possible to encounter some findings obtained other than these two approaches. For example, while Tiwari and Shahbaz (2013) found a bidirectional causality relationship between defence spending and economic growth, Joerding (1986), Dritsakis (2004), Kalyoncu and Yucel (2006) determined a unidirectional causality relationship from economic growth to defence spending. Biswas and Ram (1986), Payne and Ross (1992), Mintz and Stevenson (1995), Kollias and Makrydakis (2000), Heo (2010) could not detect any causality relationship between both variables in their studies. However, the analysis results of the studies conducted by Chowdhury (1991), Kollias, Manolas, and Paleologou (2004), Yildirim and Öcal (2006), Pan, Chang and Wolde-Rufael (2015), Zhong et al. (2017) revealed different results in terms of countries and country groups of the relationship between defence expenditures and economic growth. According to the results, it was found that there is no relationship between variables in some countries. If these studies are evaluated generally, the findings obtained revealed different results according to the economic development levels of the countries. While defence expenditures of

specially developed countries have a positive effect on economic growth, they can have negative effects on the economies of developing countries (Mylonidis, 2006).

Although many empirical studies have been conducted on the relationship between defence expenditures and economic growth, no clear conclusion has been reached in the direction of the interaction between defence expenditures and economic growth. The data taken as variables of specific studies revealed different results from each other. In addition, as in the study of Bayrak (2019), there is a need for threshold value studies on what should be the optimal value of defense expenditure.

3. Data

In line with the purpose stated in the study, the variables of G7 countries (Canada, France, Germany, Italy, Japan, UK, and the USA) taken from the World Bank Database, representing the economic growth, the per capita income (LGPC) and the ratio of military expenditures in national income (MEGDP) are used in the analysis. The review period in the study was determined as 1988-2018. Descriptive statistics for the variables of countries are included in Table 1.

Table 1: Descriptive Statistics

Variables	LGPC_CAN	LGPC_FRA	LGPC_GER	LGPC_ITA	LGPC_JAP	LGPC_UK	LGPC_US
Mean	10.731	10.305	10.361	10.227	15.147	10.130	10.787
Median	10.735	10.335	10.358	10.243	15.148	10.198	10.822
Maximum	10.948	10.449	10.567	10.332	15.283	10.320	10.993
Minimum	10.490	10.093	10.113	10.066	14.945	9.870	10.545
Std. Dev.	0.165	0.105	0.125	0.0722	0.082	0.155	0.140
Jarque-Bera	3.305	3.218	1.203	1.970	1.149	3.471	2.822
J-B robability	0.191	0.200	0.547	0.373	0.562	0.176	0.243
Observations	31	31	31	31	31	31	31
Variables	MEGDP_CAN	MEGDP_FRA	MEGDP_GER	MEGDP_ITA	MEGDP_JAP	MEGDP_UK	MEGDP_US
Mean	0.013	0.026	0.015	0.016	0.009	0.024	0.038
Median	0.012	0.024	0.013	0.016	0.009	0.022	0.038
Maximum	0.019	0.035	0.028	0.020	0.009	0.037	0.057
Minimum	0.009	0.022	0.011	0.012	0.008	0.017	0.029
Std. Dev.	0.003	0.004	0.004	0.002	0.001	0.005	0.007
Jarque-Bera	5.543	4.518	22.443	0.478	0.132	6.234	2.799
J-B robability	0.062	0.104	0.0001	0.787	0.935	0.044	0.246
Observations	31	31	31	31	31	31	31

According to the information in Table 1, it is seen that the highest per capita income is in Japan while the lowest per capita income is in England. While the rate of military expenditures in national income is highest in the USA, the lowest rate is in Japan.

4. Method

In this study, the relationships between variables are examined using bootstrap panel causality analysis developed by Kónya (2006). The bootstrap panel causality analysis developed by Kónya (2006: 982) analyzes the relationships between variables using the Seemingly Unrelated Regression (SUR) estimator proposed by Zellner (1962). According to Kónya's (2006: 983) is that SUR estimator is a more

efficient estimator than the OLS (Ordinary Least Squares) estimate. The SUR system of LGPC and MEGDP variables used in the study, whose causality relationships are examined, is shown as follows:

$$\left.\begin{aligned}
LGPC_{1,t} &= \varphi_{1,1} + \sum_{l=1}^{\text{ml_LGPC}_1} \alpha_{1,1,l} LGPC_{1,t-1} + \sum_{l=1}^{\text{ml_}MEGDP_1} \beta_{1,1,l} MEGDP_{1,t-1} + \xi_{1,1,t} \\
LGPC_{2,t} &= \varphi_{1,2} + \sum_{l=1}^{\text{ml_LGPC}_1} \alpha_{1,2,l} LGPC_{2,t-1} + \sum_{l=1}^{\text{ml_}MEGDP_1} \beta_{1,2,l} MEGDP_{2,t-1} + \xi_{1,2,t} \\
&\vdots \\
LGPC_{N,t} &= \varphi_{1,N} + \sum_{l=1}^{\text{ml_LGPC}_1} \alpha_{1,N,l} LGPC_{N,t-1} + \sum_{l=1}^{\text{ml_}MEGDP_1} \beta_{1,N,l} MEGDP_{N,t-1} + \xi_{1,N,t}
\end{aligned}\right\} \quad (1)$$

and

$$\left.\begin{aligned}
MEGDP_{1,t} &= \varphi_{2,1} + \sum_{l=1}^{\text{ml_}MEGDP_2} \beta_{2,1,l} MEGDP_{1,t-1} + \sum_{l=1}^{\text{ml_LGPC}_2} \alpha_{2,1,l} LGPC_{1,t-1} + \xi_{2,1,t} \\
MEGDP_{2,t} &= \varphi_{2,2} + \sum_{l=1}^{\text{ml_}MEGDP_2} \beta_{2,2,l} MEGDP_{2,t-1} + \sum_{l=1}^{\text{ml_LGPC}_2} \alpha_{2,2,l} LGPC_{2,t-1} + \xi_{2,2,t} \\
&\vdots \\
MEGDP_{N,t} &= \varphi_{2,N} + \sum_{l=1}^{\text{ml_}MEGDP_2} \beta_{2,N,l} MEGDP_{N,t-1} + \sum_{l=1}^{\text{ml_LGPC}_2} \alpha_{2,N,l} LGPC_{N,t-1} + \xi_{2,N,t}
\end{aligned}\right\} \quad (2)$$

Equation system number 1 *(Model 1)* is used to test the causality relationship from *MEGDP* to *LGPC*, and equation system number 2 (*Model 2*) is used to test the causality relationship from *LGPC* to *MEGDP*. The lag lengths of the *ml_LGPC* and *ml_MEGDP* variables in the models, *l* denotes the lag length.

These lag lengths are determined by a combination that minimizes the values of Akaike Information Criteria (AIC) and Schwartz Information Criteria (SC). As stated by Kónya (2006: 980), in every equation system, there is a Vector Autoregressive (VAR) equation developed by Sims (1980) as much as the number of countries (N). In SUR system, variables do not have to be either stationary or cointegrated as in VAR equations. Thus, before this test, it is not necessary to perform unit root tests and investigate the cointegration relationship between variables. The reason for this is that there is a simultaneous correlation between VAR models belonging to countries. In the causality test, Wald test statistics are calculated for each VAR

equation belonging to countries. Critical values are obtained by the bootstrap method to test the significance of Wald test statistics. The following constraints applied to the coefficients and the findings obtained when the obtained Wald test statistics values are greater than the calculated bootstrap critical values:

i. While the coefficient $\beta_{1,i}$ is not equal to zero for all countries, if the coefficient $\alpha_{2,i}$ is equal to zero for all countries, there is a unidirectional Granger causality relationship from *MEGDP* to *LGPC*.

ii. While the coefficient $\beta_{1,i}$ is equal to zero for all countries, if the coefficient $\alpha_{2,i}$ is not equal to zero, there is a unidirectional Granger causality relationship from *LGPC* to *MEGDP*.

iii. If both coefficients are not equal to zero simultaneously, there is a bidirectional Granger causality relationship between *LGPC* and *MEGDP*.

iv. If both coefficients are equal to zero simultaneously, there is no Granger causality relationship between *LGPC* and *MEGDP*.

Finally, there are some prerequisites for performing this test. The first of these is that there is a cross-sectional dependency in the models, and the second is that the models have a heterogeneous structure, that is, the slope coefficients must change from country to country.

For this reason, before Kónya (2006) bootstrap panel causality analysis, the cross-section dependency of models was first BP_{LM} test developed by Breusch and Pagan (1980), CD_{LM} test developed by Pesaran (2004), LM_{adj} test developed by Pesaran, Ullah, and Yamagata (2008) and finally determined by LM_{BC} tests developed by Baltagi, Feng, and Kao (2012).

To test the second prerequisite for the slope coefficients, namely, the homogeneity/heterogeneity of the models, the asymptotically strong $\tilde{\Delta}$ and $\tilde{\Delta}_{adj}$ statistics, which are developed by Pesaran and Yamagata (2008), are used frequently in panel data econometrics.

5. Findings

The findings obtained using the methods mentioned above are included in this part of the study. Firstly, Table 2 contains the cross-section dependency test results, which is the first condition required for bootstrap panel causality analysis. In the cross-section dependency tests, it is "H_0: there is no cross-section dependence in the model". This H_0 hypothesis is rejected because the probability values of the test statistics shown in the table are lower than the statistical significance levels. This means that there is cross-section dependency in both Model 1 and Model 2. Kónya (2006) provided the first condition for bootstrap panel causality analysis.

Table 2: Cross Section Dependency Test Results

Models	**Model 1**		**Model 2**	
Test	**Test Statistic**	**Probability**	**Test Statistic**	**Probability**
BP_{LM}	242.73*	0.0001	355.59*	0.0001
CD_{LM}	33.13*	0.0001	50.54*	0.0001
LM_{BC}	33.01*	0.0001	50.43*	0.0001
LM_{adj}	5.69*	0.0001	9.94*	0.0001

*shows the cross-section dependence at the level of %1 significance.

Secondly, Kónya (2006) homogeneity test results, which is the second condition required for bootstrap panel causality analysis, are shown in Table 3. The "H_0: model is homogeneous" hypothesis is tested with both test statistics in this test. This H_0 hypothesis is rejected because the probability values of the test statistics shown in the table are lower than the statistical significance levels. This means that the slope coefficients for both models differ from country to country, that is, the models are heterogeneous. In other words, the effect of a change in MEGDP of a country on LGPC or the effect of a change in LGPC on MEGDP differs from other countries. Again, this result provides the second condition required for the Kónya (2006) panel causality test.

Table 3: Homogeneity Test Results

Models	Model 1		Model 2	
Test	**Test Statistic**	**Probability**	**Test Statistic**	**Probability**
$\tilde{\Delta}$	4.76*	0.0001	18.61*	0.0001
$\tilde{\Delta}_{adj}$	5.00*	0.0001	19.55*	0.0001

*shows the heterogeneity at the level of %1 significance.

Table 4 shows the results of the Kónya (2006) bootstrap panel causality analysis. According to these results, it is seen that there is a unidirectional causality relationship from MEGDP to LGPC for Canada, Germany, Japan, England, USA. Because the Wald test statistics values calculated for the relevant hypotheses of these countries are greater than the bootstrap critical values. The sign of causality relationships is seen as negative in Canada, England, and the USA, and positive in Germany and Japan. According to the findings of the analysis, an insignificant causality relationship could be determined between the variables in France and Italy. There are insignificant causality relationship was detected for G7 countries from LGPC to MEGDP. As can be seen from the results, both the existence of causality relationships and the coefficients of the relations vary from country to country.

Table 4: Kónya (2006) Bootstrap Panel Causality Analysis Result

H_0: MEGDP is not the Granger cause of LGPC. *(Model 1)*					
Countries	**Coefficients**	**Test Statistic**	**Critical Values******		
	MEGDP	Wald	10%	5%	1%
CANADA	-3.38	7.68**	4.52	6.58	12.05
FRANCE	-1.03	1.06	4.53	6.68	12.48
GERMANY	3.08	6.33***	4.86	7.45	16.18
ITALY	1.14	0.94	4.85	7.08	14.09
JAPAN	32.17	8.89**	4.97	7.02	13.13
ENGLAND	-3.30	22.81*	4.62	6.63	12.23
USA	-0.84	11.27**	4.52	6.68	12.03
H_0: LGPC is not the Granger cause of MEGDP. *(Model 2)*					
Countries	**Coefficients**	**Test Statistic**	**Critical Values******		
	LGPC	Wald	10%	5%	1%
CANADA	0.0011	0.82	8.89	12.51	20.81
FRANCE	0.0023	0.19	11.17	14.74	25.07
GERMANY	-0.0024	4.56	6.30	9.18	15.83
ITALY	-0.0001	0.79	8.17	11.44	19.30
JAPAN	0.0004	0.89	5.93	8.46	15.16
ENGLAND	0.0041	3.31	11.34	15.26	25.73
USA	0.0084	6.06	8.75	12.29	20.50

*,**, *** It expresses causality at 1%, 5% and 10% significance level, respectively.

**** Critical values were derived by making 10000 bootstraps.

6. Conclusion

In the study, the relationship between economic growth and the ratio of military expenditures to national income was investigated with the help of Kónya (2006) bootstrap panel causality analysis by using the data of the G7 countries for the period 1988-2018. According to the results of the analysis, it was found that there is a unidirectional causality relationship from defence expenditures to economic growth in Canada, Germany, Japan, England, and the USA. The sign of causality relationships is negative in the USA, UK, and Canada, and positive in Germany and Japan. On the other hand, according to the

analysis findings, an insignificant causality relationship was determined between the variables in France and Italy. Besides, for the G7 countries, an insignificant causality relationship has been determined from economic growth to defence expenditures.

The results of the study show that there is a negative relationship between defence spending and economic growth in the USA, England, and Canada. As stated in the theoretical part of the study, these findings reveal the results of the adverse effects of defence spending on economic growth, namely the validity of the demand-side Neo-Classical Theoretical approach. According to SIPRI (2020a) data, the USA is the country with the highest fixed defence spending and the highest arms exporter in the world. Although the USA was the highest arms exporter in the period 1988-2019, the USA was the 13th largest weapon importer in the same period. Besides, it has a rate of 3.4%, well above the world average of 2.2% in terms of the share of defence expenditures in national income. However, the share of other countries in the G7 countries for defence expenditures is below the world average. In this context, allocating such a high share of the national income of the USA to defence may have been a separate burden for the economy. Similar to the findings of the study, Khalid and Razaq (2015), who worked for the USA, found that defence expenditures had a negative effect on economic growth.

Similar to the US results, it has been found that defence expenditures in the UK and Canada have a negative effect on economic growth. Britain ranks 7th and Canada 14th in the world defence expenditures ranking. The share allocated to defence expenditures from the national income has a share below the world average. While this rate is 1.7% for the UK, it is 1.3% for Canada. On the other hand, the UK ranks 5th among the top arms exporters for 2019. According to these findings, scarce resources are transferred to defence expenditures and diverges from productive investments and human capital accumulation. Therefore, this situation will have a decreasing effect on private sector expenditures as well as non-defence public expenditures (Looney, 1994: 36). This situation will adversely affect economic growth. Fontanel (1995: 572) claims that one of the reasons for the decrease in productivity of the USA compared to Japan is due

to high defence spending. On the other hand, it is not possible to talk about a market price for defence spending, which is a full public service and includes high costs. These types of expenditures are mainly publicly financed. Along with the tax structure, financing defence expenditures with taxes may negatively affect growth by reducing the amount of consumption and investment (Giray, 2004: 191). In this context, considering the effects of defence spending on economic growth in the USA, Canada, and the UK, it is necessary to make arrangements in their defence policies. On the other hand, according to the findings of the study, a positive relationship from defence expenditures to economic growth has been determined in Germany and Japan. As stated in the theoretical part of the study, these findings reveal the validity of the Military Keynesian approach, which is based on supply-side factors that defence expenditures have positive effects on economic growth. Germany and Japan rank 7th and 9th, respectively, in terms of defence spending worldwide. For 2019, the shares of defence expenditures in national income were 1.3% and 0.9%, below the world average. However, according to SIPRI (2020a) data, Germany is the 4th largest arms exporter in the period 1988-2019. Japan, on the other hand, is the 6th largest weapon importer for the same period. These countries, which are among the countries with the highest national income in the world, have a low share of their national income for defence expenditures. This may mean that resources are shifted to areas that can be more efficient. Germany and Japan are among the most industrialized and high-tech countries in the world. This technological know-how can increase the production volume, especially by increasing the interaction of defence and manufacturing industry. Despite making the highest defence spending in the world, these expenditures, which have a low share in the national income, have a productivity-enhancing effect on the manufacturing industry in these two countries.

In France and Italy, two other G7 countries, the causality relationship was not found between defence spending and economic growth. Although France is the 6th country with the highest defence expenditure in 2019, it is the country with the highest share of the G7 countries, after the USA, with a share of 1.9% from the national income.

France is also the third-largest arms exporter in the period 1988-2019. Italy is the 12th country with the highest defence spending. The share allocated for defence from the national income is 1.4% in Italy. It is the 9th country with the highest arms exports in the period 1988-2019. In light of all these data and findings, the relationships between these two variables in these two countries can be considered from another perspective. As a conclusion, although the G7 countries have a homogeneous structure in their economic development levels, empirical findings on the relationship between defence expenditures and economic growth have revealed different results. Despite their high defence spending, the place of these countries' defence sector in their national income may be a determining factor in their preference. On the other hand, the fact that countries are exporters and importers of weapons, the accumulation of knowledge between the high-tech defence sector and other sectors are important factors.

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