Defense Expenditures Current Account Deficit and Economic Growth Relationship: The Case of NATO Countries[*]

Asst. Prof. Dr. Mustafa TORUSDAĞ
Van Yüzüncü Yıl University, Faculty of Economics and Administrative Sciences, Department of Economics, orcid id: 0000-0002-8839-0562.

Professor Dr. Ekrem GÜL
Sakarya University, Faculty of Political Sciences, Department of Economics, egul@sakarya.edu.tr, orcid id: 0000-0002-2607-9066.

ABSTRACT

In the economic literature, there are not many studies in the empirical literature on defense spending, current account deficit and its effect on economic growth. In this study, to investigate the relationship between NATO countries for the 1990-2017 period. In the analyzes, Emirmahmutoğlu and Köse (2011) and Dumitreschu-Hurlin (2012) panel causality tests were used. As a result of the analysis, one unit increase in defense expenditures increased economic growth by 0.878 units, according to the first model in which GNP variable is taken as dependent variable for NATO countries. Therefore, it has been determined that there is a positive externality relationship between defense expenditures and economic growth. According to the second model, in which defense expenditures are taken as dependent variable, a positive relationship was determined between military expenditures and arms exports and imports. According to Dumitreschu-Hurlin (2012) panel causality test, one-way causality relationship was found from current account deficit to economic growth and current

account deficit to military spending. Supporting this result, Emirmahmutoğlu and Köse (2011) found a one-way causality relationship from economic growth to military spending, from current account deficit to economic growth and from military spending to current account deficit, according to the panel causality analysis.

Keywords: Defence Expenditures, Current Account Deficit, Economic Growth, Panel Data Analysis, NATO.

INTRODUCTION

Defense spending is the budget item allocated by countries from their national income, which is unlikely to be reduced or abandoned, regardless of whether it is productive or not, in order to ensure the sustainability of countries' future, welfare levels and national assets. The statement of Adam Smith as *Defense is more important than wealth*, expression that the importance of defense spending and that it is not possible to give up. The first study on defense spending and growth was examined by Benoit (1973). According to the result of Benoit's study, it has been concluded that there is a positive relationship between defense spending and growth for developing countries, and a 1% increase in defense spending will reduce growth by 25%.

Defense spending technological development, in addition to the benefit of providing R&D, training of qualified personnel, increasing effective demand, learning new production techniques, and being seen as a precondition for economic growth and providing security, they also have a disadvantage in the prosperity and growth levels of the countries because the countries give up their resources and due to seperate their resources for defense, they also have a hindrance to the welfare and growth levels of the countries.

Considering the economic, political and strategic effects of defence spending in the literature, it has been noticed that defense spending is examined in line with factors such as strategy, security and threat, taking into account the economic, political and strategic effects. In very few studies is seen that defense spending is handled in relation to current account deficit, national savings and balance of payments.

The contribution of the study to the literature, defense spending which has effects global, national and regional level, current account deficit and growth relationship with the data of NATO countries, defense spending for the period of 1990-2017, growth, current account deficit, arms imports, arms exports and number of military personnel were used by Nazlıoğlu and Karul (2017), IPS and Breitung panel unit root tests, Peseran CCE (Common Correlated Effects) and CCEMG (Common Correlated Effects Mean Group) (2006) long-term cointegration coefficient estimator, Emirmahmutoğlu and Köse (2011) and Dumitreschu-Hurlin (2012) panel causality tests analysis is examined.

1- Defense Spending and Growth Relationship

As a public duty, defense spending is the first requirement that is seen as an indicator of states' assets and sovereignty. According to Nikolaodiu (2001), defense spending states that it was made in order to ensure national security and protect the national interests of countries. Defense services are taking deterrent measures to maintain a sense of trust and ensure their sustainability (Dağ and, 2011: 2; Güneş, 2011: 147). One of the basic duties of the states to ensure that everyone living in a country equally benefits and benefits from defense spending (Alp, 2006: 25, 26). Defense spending is defined and classified as public goods in the economy. In terms of being a public good, the existence of a threat to a particular individual and a certain region of the country is accepted for the general public and country (Durgun and Timur, 2017: 129) and precautions are taken.

The defense service takes place in two directions: While the implementation of the deterrence of a possible attack on the country before it takes place is expressed as the first method; and second method is the method of counteracting the attack (Taş, Örnek and Aksoğan, 2013: 661). Defense spending is expressed as the share that countries allocate as a function of increased threat to ensure their welfare, sovereignty and national integrity (Walther, 2002: 249). Since the level and amount of defense expenditure of each country differ according to their anxiety and priority order, the definition of defense expenditures in the literature also takes different forms. Defense expenditures are expenditures in order to deter military attack on a country or if it is counteracted, taken measures or defensive positions. Defense expenditures for

military training, equipment purchases, military personnel expenses, arms production, arms imports and arms exports are important for this purpose (Canbay and Mercan, 2017: 87).

There is no standard definition of defense spending in the literature, since the armed forces of each country consist of different institutions and have different roles. Although there are differences in the definition and scope of defense spending of different defense agencies, NATO's classification is accepted as the general definition form (Tuncay, 2017: 25). NATO's classification of defense spending is explained by quartet classification, personnel, equipment, infrastructure and other operational expenditures (Sezgin, 2003: 1). Econometric analysis conducted to examine effective factors at the level of defense spending reveals that defense spending level of developed countries does not depend on economic factors. This situation arises from the fact that developed countries are not arms importing countries, they are the countries that can produce arms with their own defense industries and that they can export (Zengin, 2010: 81).

Level of countries depends on factors such as defense spending, geopolitical position of countries, geostrategic structure of countries as well as inter-state relations, attitudes and behaviors of countries in foreign policy, population power, military education opportunities, economic development and technological development level, presence of domestic and foreign threats, national income and budget limitations of the country (Giray, 2004: 187, 188). When determining the level of defense spending for a country, the amount of resources to be allocated should also be taken into consideration by minimizing the current threats in the country, the cost of defense services and the resources allocated from other sectors to the defense sector, depending on the relations with neighboring countries, military alliances, agreements with international organizations. (Bekmez and Destek, 2015: 95).

How much share will be allocated to defense expenditures is important for all countries. While there is a possibility that the allocation of few resources may threaten the economic growth of the country by causing instability and turmoil environment, the allocation of more resources than necessary will give rise to a

preference problem on the economy by giving up other components of the goods and by making more defense spending (Alp, 2006: 28, 29). The optimal level of defense spending is as much as the sum of marginal utility (MU) is equal to marginal angels (MC). That is, the optimal level of defense spending can be expressed as $\Sigma MU = MC$. Since defense spending occurs in two ways, deterrence and protection, the optimal level of defense spending (Mc Guire, 1995: 17). However, it is not possible to find the marginal cost of deterrence from this equation.

Table 1: Determinants of Defense Spending

	National	Regional	Global
Political Reasons	* State Structure	* Regional Enemies	* Commitment to Global Force Block
Military Reasons	* Military Intereset * Civil War Pressure	* Regional Wars and Transnational Hostilities	* Foreign Military Aid
Economic and Social Reasons	* The Level of Development of Economy * Real Increase in National Income * State Budget Size * The Structure of the Military Industry * Human Rights * Political Rights * IMF Stabilization Programs	*Regional Economic Groupings	* Foreign Capital Effect * Impact of Main Donor Countries * Foreign Currency Entry into the Country

Source: Dedebek ve Meriç, 2015: 93.

In Table 1, the determining factors of defense spending are expressed in national, regional and global aspects depending on political, military and economic reasons. Between the military causes of defense expenditures, besides civil and foreign wars, unnecessary and excessive defense expenditures of neighboring countries come to the fore. Economic factors expressed as the national income levels of countries,

expenditures of central governments, growth rates of countries, income distribution, and economic crises can also be listed among internal factors. External economic factors; Foreign direct investments, openness rates of the countries, and membership in economic unions such as the European Union (EU) are expressed as factors. Political factors; There are basic indicators such as the democratization level of countries, military management, political crises, human rights and political rights (Dedebek and Meriç, 2015: 92).

How defense spending affects growth since the 1970s remains a controversial issue among policy makers and economists (Sandler & Hartley, 2007). In the literature, the negative relationship between defense spending and growth is explained by the exclusion effect, while the positive relationship is explained by the supply side and the increase in total demand. In addition, it is stated that defense spending reduces growth in less developed countries (Arshad, Syed and Shabbir, 2017: 161). When examining the effects of defense expenditures on the economy, it is stated that these expenditures are compulsory for the nations to sustain their national assets and that even if the period of recession in the economy is passed, it cannot be restricted from defense expenditures. In addition to the positive effects of defense spending on economic growth, such as military training, infrastructure spending (roads, bridges, airports, etc.), Benoit states that defense spending will also lead to moderate inflation. According to Benoit, the positive effects of defense spending on the economy are more than their negative effects (Erbaykal, 2007: 49).

Deger ve Sen states that, defense spending can affect the economy positively or negatively. Aspects of defense spending to increase the social welfare level of the society: Increasing the total factor productivity such as training of military personnel, technical advances in military research and development, and by-product effects have positive effects on the economy. The negative aspect is the budget constraint and crowding-out effect. In the event that the need for additional defense needs to be financed, the reduction of other public expenditures can lead to the loss of welfare of the society (Değer ve Sen, 1995: 294-296). The relationship between defense spending and economic growth of developing countries examined and classified them

under two headings. While defense spending of developing countries with rich resources affects their economic growth positively, it is concluded that developing countries that do not have rich resources have negative effects (Erbaykal, 2007: 49).

Two different views have been put forward on the effects of defense spending. In figure 1, the effects of defense spending on the economy are expressed as factors affecting defense spending within the framework of the keynesian and classical view. According to the first view, defense spending is seen as a way of ensuring security and prosperity. According to another view, unnecessary use of available resources seems to affect the economy negatively (Dunne & Tian, 2013: 2, 3). The effect of defense spending on growth is a nonlinear function of the presence of military threats from foreign countries and other external powers. (Aizenman and Glick, 2006: 130).

Figure 1. The Effects of Defense Spending on the Economy
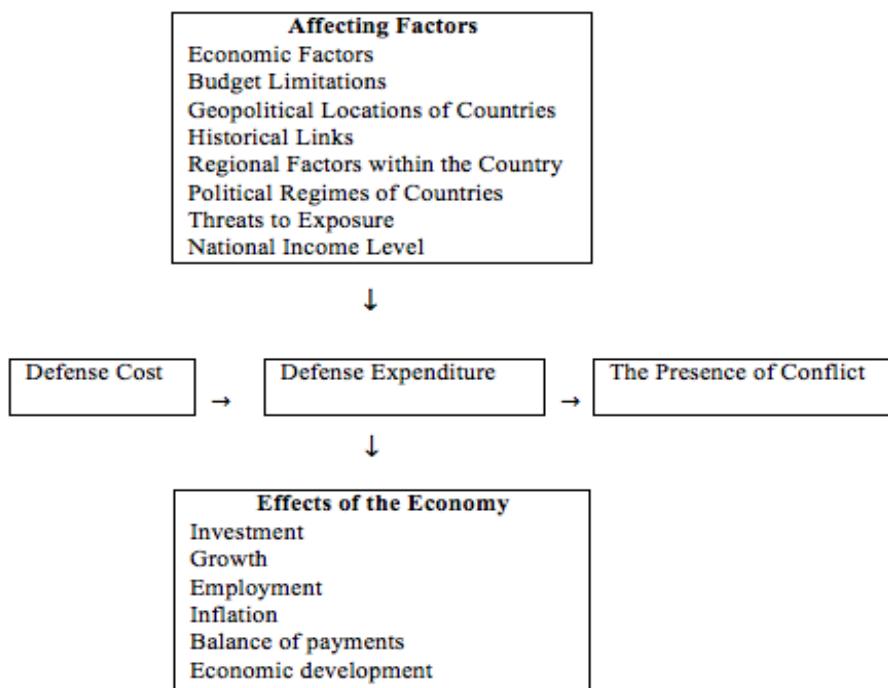
Source: Erdem, 2019: 12.

Kaya (2013), categorizes economic effects of defense expenditures into three classes as demand, supply and security effects. The demand effect, known as the Keynesian multiplier effect, is related to the level and quality of spending. The

increase in defense spending increases demand and in case of idle capacity in the economy, defense spending increases the capacity utilization rates and reduces the capacity utilization of resources. In underconsumption theories, contrary to the cause and effect relationship, defense spending is explained by the need of governments to reformation demand. The increase in defense spending constitutes opportunity costs and can exclude investment expenditures. This crowding-out effect will be determined depending on the capacity utilization quantity.

Deger and Smith (1983) suggested that the relationship between defense spending and economic growth will affect production in four different ways, namely distribution of resources, mobility, production organization, sociopolitical structure and foreign relations. The economic effects of defense spending are explained by four different views, especially in the demand and supply direction. The first of the views, which is considered in line with the demands of the Keynesian economy school, is the demand for defense spending due to the increase in direct purchases of goods and services compared to government expenditures. The second view regarding the demand side is the effect of multiplier effect on the general expenditures of consumers as direct expenditures. On the supply side, the first view is that the army reduces the unemployment rates of less educated workforce than civilian workforce. In this respect, the army offers job opportunities to the least qualified workforce and serves a social purpose aimed at providing a better standard of living. The second point of view is that defense spending on research and development increases the efficiency of the civil sector by producing new infrastructure and advanced technology (Kasalak, 2006: 24).

2- Defense Expenditures and Current Account Deficit Relations

The current account deficit is defined as consuming more than what is produced in a country in a given period, that is, the monetary gains from the exported goods and services and unilateral transfer revenues are less than the money paid to the imported goods and services and transfers. As a measure of economic performance, the current account deficit affects the national investment-savings balance, competition and exchange rate (Boya, 2013: 5). Defense spending, which puts pressure on budget

revenues, can increase the borrowing needs of states. Borrowing needs from international financial markets are defined as indirect effects. If the need for defense weapons and equipment is met through countries' arms imports, there will be different effects on the balance of payments and the current account deficit of the countries if external defense expenditure financing is provided (Canbay and Mercan, 2017: 91).

The strenght of defense spending to affect the economic growth and current account balance of the countries depends on the countries' being exporter or importer in defense spending and the development levels of the countries. Since the defense expenditures of developing countries are based on imports when compared to other public expenditures, the current account balance of their economies is negatively affected due to the use of imported inputs at the production stages, although the defense industry production meets by domestic companies (Chan, 1985: 34). Due to the scarce resources of underdeveloped and developing countries that meet their weapons and equipment needs by importing them, they direct their resources to arms imports that do not have economic returns, as well as the defense industries gaining a fragile structure, causing an imbalance in foreign payments and foreign dependency. This situation also jeopardizes the military and economic futures of the countries (Davutoğlu, 2007: 39).

Literature review

In Benoit (1973)'s studies investment, defense, the included in the model as a variable of foreign aid (Burma, Israel, except for South Vietnam) Turkey is also located the 44 least developed countries from 1950 to 1965 for the period researched economic growth relationship with' defensive expenditure and it has been concluded that it has a positive effect.

Faini, Annez and Taylor (1984) 1952-1970 period, Turkey to be included in the 69 countries examined traditional demand-side model, the defense burden of an increase of 10% occurred, would constitute 0.13% decrease on year growth and defense It was found that the effect of spending on growth was negative.

Kusi (1994), 77 developing countries were handled for the period of 1971-1989, it

was seen that the direction and significance of the cause relationship differed from country to country.

Mintz and Stevenson (1995), 103 countries (including Turkey), Feder-Ram were examined using the growth model, economic growth of defense spending between variables was concluded that there is no causal relationship.

Destek (2016), analyzed 14 NATO countries for the 1998-2014 period, the relationship between defense spending and economic growth through panel data analysis. As a result of the analysis, he found that there was a bidirectional causality relationship in defense spending and growth.

Korkmaz and Bilgin (2017), the 1961 to 2015 period, cointegration and causality analysis of the economic growth in their study examined the causal relationship between defense spending in the United States is absent, the bidirectional causality exists for Turkey have concluded.

Dunne, Nikolaidou and Vougas (2001), the period from 1960 to 1996 There has been investigated by the method of causality tests for Turkey and Greece. The impact of defense spending growth is negative in Turkey, for Greece concluded that the short-term positive.

Dritsakis (2004), Greece and Turkey defense relationship with the growth of expenditures for his analysis of cointegration and causality analysis has found that in both countries in the long term cointegration relationship. According to the findings of the study, defense spending between Turkey and Greece, where the bidirectional causality causal relationship to the growth of defense spending in both countries.

Sezgin (2004), defense spending, deficit and arms imports data for the period 1979-2000 were analyzed by Turkey's cointegration test. As a result of the analysis, it was found that the long-term relationship between defense spending and current account deficit was negative. Also, the relationship between the current account deficit and arms import variables is positive in the short term.

Canbay and Mercan (2017), the Turkey's 1986-2016 term defense spending,

examined the current account deficit and growth in relation to vector error correction model and the collapse of the growth of import-based defense spending and concluded that increasing the current account deficit.

Alozious (2015), examined the period of 1995-2011 with panel data analysis for 30 OECD countries and concluded that defense spending increased the current account deficit.

Çayın and Yapraklı (2018), in the 1970-2016 period for Turkey Toda Yammoto and Hacker-Hatami J (2005 and 2006) were examined by bootstrap analysis of causality. It was found that there is a one-way causality relationship from defense expenditures to current deficit and growth to defense expenditures.

3. Method, Model and Analysis

In this study, the 1990-2017 period, the 28 NATO countries (except for including Turkey and Montenegro), % share of GDP to defense spending for the country's current account deficit % share of GDP, annual % changes in economic growth, logarithmic functions of arms imports (lnAi) and arms export (lnAe) data and armed forces personnel (% of total workforce) are analyzed with the data obtained from SIPRI based World Bank Data database. Econometric analyzes were made using Gauss 10.0, Stata 12.0, Eviews 10.0 and Matlab 13.0 programs.

For defense spending in NATO countries is investigated by the methods of the current account deficit and growth relations with panel data analysis. For NATO countries, Nazlıoğlu and Karul (2017), one of the panel data analysis tests, IPS, Breitung panel unit root tests, and long-term coefficients between variables Peseran CCE (Common Correlated Effects) and CCEMG (Common Correlated Effects Mean Group) (2006) cointegration coefficient estimator is used. Then, Emirmahmutoğlu and Köse (2011) and Dumitreschu-Hurlin (2012) were analyzed by panel causality tests.

3.1. Analysis and Findings

3.1.1. Panel Unit Root Test Results

An important condition to be considered in order to obtain an accurate result when applying econometric analysis tests is that the series are stationary. If the series is not stationary, the series cannot maintain its average in the long run and the variance goes towards infinity over time. In case of increased number of delays, autocorrelation values move away from zero and R^2 value is high and t statistical value becomes significant. In this case, model estimation does not give correct results in the long run and there is a false regression problem. In order to avoid wrong regression problems, it is necessary to stabilize the data (Kutlar, 2000: 43).

Table 2: Unit Root Tests for NATO Countries

Variables	Nazlıoğlu ve Karul (2017) Panel Unit Root Test	IPS (2003) Unit Root Test	Breitung (2000) Unit Root Test
	I(0)	I(0)	I(0)
GDP	2.523 ***	-11.637***	-4.483***
MIEX	5.182***	-9.798***	-1.725***
AR	3.373 ***	-6.260***	-3.916***
AE	5.239 ***	-4.611***	-1.173***
AI	2.876***	-10.535***	-5.405***
CA	3.273***	-1.681**	-1.966***

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

GDP: Economic Growth, MIEX: Defense Expenditures, AR: Number of Military Staff, AE: Arms Export, AI: Arms Imports, CA: Current Account Deficit.

In table 2, H_0 hypothesis was rejected according to the panel stationary test of Nazlıoğlu and Karul (2017), IPS (2003) and Bretitung (2005), and the variables were found to be stationary. If the variables are stationary at the level value, the variables are considered to be cointegrated. Therefore, there is no need to perform cointegration analysis.

3. 1. 2. CCE and CCEMG Panel Cointegration Coefficient Estimator Results

Long-term coefficients between variables will be estimated by Pceran CCE (Common Correlated Effects) and CCEMG (Common Correlated Effects Mean Group) (2006) cointegration coefficient estimator. In CCE and CCEMG estimators, time and size sizes are not important, and autocorrelation and changing variance appear to have a consistent and asymptotic normal distribution in the presence of assumptions. The CCE estimator can also calculate the long-term coefficients for each section:

$$y_{i,t} = a'_i d_t + \beta'_i x_{i,t} + u_{i,t} \quad u_{i,t} = \gamma'_i f_t + e_{i,t} \quad x_{i,t} = A'_i d_t + r'_i f_{i,t} + v_{i,t}$$

Here i = 1.2 ...., N and t = 1.2 ...... T. Dt and ft, on the other hand, represent common effects that can and cannot be observed respectively. The cointegration coefficient valid for the panel is calculated using the CCEMG method by taking the arithmetic average of the values belonging to the groups under the assumption of homogeneity in the parameters (Pesaran, 2006):

$$\beta' \, CCEMG = \frac{1}{N} \, f(z) = \sum_{i=1}^{N} \beta_i'$$

Based on this formulation, CCE result is estimated for each β_i.

In Tables 2 and 3, Peseran (2006), one of the cointegration coefficient estimators, uses the CCE and CCEMG coefficient estimators to determine the growth variable dependent variable in the first equation, and the long-term cointegration coefficients estimates among the variables by taking the defense expenditures variable dependent variable in the second equation.

GDP= a+ $\beta_1$miex + $\beta_2$ar + $\beta_3$ca + $\beta_4$lnae β_5 lnai +u (1)

Table 3: Economic Growth and Defense Expenditures, Arms Imports, Arms Exports, Number of Military Personnel, Current Account Panel Cointegration Relations

Countries	MİEX	AR	CA	AE	AI
Belgium	8.753**	-4.05e-09	-0.045	-4.273*	4.75e-10

Denmark	3.493	4.64e-09	0.137	3.085	-9.49e-10
Canda	-3.759	-4.30e-09	-0.473**	-0.996	-6.71e-10
France	-2.215	-4.05e-10	0.594*	6.442*	-4.77e-10
Italy	-0.168	-2.41e-09	-0.498*	3.301*	1.12e-09
Norway	-0.421	5.17e-09	0.017	1.270	3.73e-10
Portugal	-7.012*	5.91e-09	0.025	-0.442	3.04e-09
Turkey	4.869*	-2.29e-08*	-1.807*	0. 739	1.11e-09
Greece	3.919	1.11e-07	0.607	-3.526	4.53e-09*
Spain	2.329	-1.01e-10	-0.382	3.588	-2.57e-09
Germany	9.639	-5.28e-08	0.065	-7.804	1.58e-09
Poland	-1.505*	6.87e-09	-0.256	-7.609*	2.60e-09
Bulgaria	-2.694	-2.76e-08	-0.309	2.487	-1.20e-08*
Slovakia	2.210*	-9.72e-09	0.150	-0.540	-4.77e-09
ABD	1.538*	3.09e-10**	-0.451	-2.390	-1.77e-09
Iceland	0.410	-5.09e-10**	0.131	-24.235	4.60e-10
Netherlands	8.006	2.06e-09*	-0.194	-3.326	-2.61e-09
Czech republic	0.942	1.75e-08	0.035	-0.498	2.23e-09
Hungary	-4.053*	1.23e-09	-0.487***	7.133***	-2.33e-09
Estonia	-5.567*	2.71e-08	-0.400	5.075	1.17e-08
Lithuania	-0.461	9.39e-07	-0.268	-1.611	-2.72e-08
Latvia	0.394	-6.67e-07	-0.619*	-2.490	-5.50e-08
Croatia	-0.461	3.23e-07	-0.154	-0.961	9.95e-09
England	-0.555	5.03e-10	0.199	0.957	-5.50e-10
Luxembourg	15.881**	-2.15e-09	0.052	-25.023**	-4.64e-08
Romania	-3.512**	-1.49e-09	-1.059	-4.911**	-6.78e-09
Slovenia	2.188*	-8.32e-09	0.169	-0.402	-5.74e-09
Albania	-5.855**	-3.16e-08	1.557***	0.856	2.45e-07
Whole Panel	0.878***	2.17e-08	-0.130	-2.004	4.08e-09
Wald chi2	8.11				
Prob > chi2	0.015**				

Note: ***, **, * indicate causality for 1%, 5% and 10% significance level, respectively.
(GDP: Growth, Miex: Defense Expenditures, Ar: Military personnel, Ca: Current account deficit, Ae: Arms export, Ai: Arms import)

In table 3, the first model in which economic growth is taken as dependent variable is statistically significant (p: $0.015 \leq 0.05$). When the panel is evaluated in general, it is seen that there is a positive and significant relationship between economic growth and defense expenditures. One unit increase in defense expenditures means 0.878 unit increase in economic growth. It is seen that the Keynesian supply-side approach, which is claimed to have a positive (externality) relationship between defense expenditures and economic growth, is valid. The reason for this situation is that most of the items within the scope of defense expenditures are Germany, USA, Netherlands, France, etc. it is thought to be exported by these countries. A statistically insignificant relationship was found in the number of military personnel, current account deficit, arms exports and arms imports. Belgium between defense spending and economic growth, the United States, Slovakia, Luxembourg, Slovenia and Turkey for a positive relationship was found.

The number of military personnel and economic growth in Turkey, USA, Luxembourg, Slovenia positive and statistically significant, were found to be negative and statistically significant relationship for Turkey and Iceland. Current account deficit and economic growth between positive and statistically significant for France and Albania, Canada, Italy, Turkey and Hungary and Latvia have concluded that there is a negative and statistically significant relationship. A positive and statistically significant relationship was found between arms exports and growth for France, Italy and Hungary, and a negative and statistically significant relationship for Belgium, Poland, Luxembourg and Romania. A positive and statistically significant relationship was found between arms imports and economic growth, while a negative and statistically significant relationship was found for Bulgaria.

$$\text{Miex} = a + \beta_1 \text{Gdp} + \beta_2 \text{ar} + \beta_3 \text{ca} + \beta_4 \text{lnae } \beta_5 \text{ lnai} + u \qquad (2)$$

Table 4: Defense Spending and Economic Growth, Arms Imports, Arms Exports, Number of Military Personnel, Current Account Deficit Panel Cointegration

Countries	GDP	AR	CA	AE	AI
Belgium	0.024**	8.46e-11	0.001	0.569***	1.53e-10
Denmark	0.024	-4.66e-10	-0.043**	0.262	-2.24e-10
Canada	-0.019	-1.21e-10	-0.041***	2.113***	-5.64e-11
France	-0.012	-8.18e-12	0.024	1.063***	-8.33e-11
Italy	-0.001	-2.59e-10	-0.037	0.323*	1.52e-11
Norway	-0.008	-1.02e-10	-0.041***	0.436**	-1.44e-10
Portugal	-0.030*	-1.10e-09*	0.023*	0.032	3.40e-10***
Turkey	0.040	4.89e-10	0.098**	0.314*	-2.15e-10*
Greece	0.003	-1.20e-09	-0.045	0.181	-1.66e-10
Spain	0.008	4.92e-13	-0.025**	0.891	6.76e-11
Germany	0.010	1.22e-09	0.026**	0.534**	9.18e-11
Poland	-0.089	2.34e-09	-0.168***	-0.675	2.36e-10
Bulgaria	-0.016	1.24e-09	-0.019	0.666***	7.00e-10
Slovakia	0.092**	-2.31e-09	-0.054*	1.005***	6.31e-09***
ABD	0.088*	-3.38e-11	-0.081	0.277***	1.34e-09***
Iceland	0.065	2.09e-10***	-0.152**	9.761	-4.92e-10
Netherlands	0.016	4.43e-13	0.0004	0.845***	2.39e-10*
Czech Republic	-0.023	5.25e-09**	-0.176***	-0.124	-1.16e-10
Hungary	-0.052	9.76e-10	-	0.180***	-4.26e-

			0.054***		10***
Estonia	-0.028*	2.50e-08	-0.013	1.351***	1.29e-08***
Lithuania	0.005	-1.62e-08	0.003	0.754***	-1.23e-09
Latvia	-0.005	7.42e-08	0.035	0.647*	8.18e-09
Croatia	-0.208	-5.42e-07	0.066	0.313	1.63e-08
England	-0.019	1.19e-10	0.007	2.150***	-1.26e-10
Luxembourg	0.018*	-5.68e-11	0.006	0.604	-1.14e-08
Romania	-0.138*	-2.24e-09	0.094	0.082	1.93e-10
Slovenia	-0.092*	-2.32e-090	0.054	1.004***	6.31e-09***
Albania	-0.097***	-7.68e-09	0.197***	0.234	3.21e-08
Whole Panel	**-0.006**	**-1.66e-08**	**-0.013**	**1.023*****	**2.52e-09***
Wald chi2	29.61				
Prob > chi2	0.000***				

Note: ***, **, * indicate causality for 1%, 5% and 10% significance level, respectively.
(Miex: Defense Expenditures, GDP: Growth, Ar: Military personnel, Ca: Current account deficit, Ae: Arms export, Ai: Arms import)

The second model, in which defense spending is taken as a dependent variable in table 4, appears to be statistically significant at 0% significance level ($0.000 \leq p = 0.05$). When the panel is evaluated in general, a positive and significant relationship has been determined between defense expenditures and arms imports and exports. A positive and statistically significant relationship was found between growth and defense spending for the USA, Belgium, Luxembourg and Slovakia, and a negative and statistically significant relationship for Portugal, Romania, Estonia, Slovenia and Albania. In relation to the number of military personnel and defense expenditures, a positive and significant relationship was found for Iceland and the Czech Republic, and a negative and significant relationship for Portugal. The current account deficit and defense spending in Portugal, Germany, has been a positive and significant

relationship for Turkey and Albania, Canada, Norway, Poland, Spain, Slovakia, were found to be negative and significant relationship to Iceland and Hungary.

In relation between arms exports and growth, for Belgium, Canada, France, Italy, Norway, Turkey, Germany, USA, Netherlands, Hungary, Estonia, Lithuania, the UK, Slovenia, Bulgaria and Slovakia positive and significant relationship while for other countries found a significant relationship could not be detected meaningful relationship. Arms exports and economic growth relation in Portugal, USA, Netherlands, Estonia, Slovenia and Slovakia a positive and significant relationship for Turkey and Hungary was found to be negative and significant relationship.

Table 5: Dumitrescu ve Hurlin (2012) Causality Test Result

Causality Direction			k=1	k=2	k=3	Causality
MIEX	→	GSYIH	0.947	2.621	3.859	No
GDP	→	MIEX	1.809**	1.630	3.224	No
CA	→	GDP	2.133***	2.999	5.308***	Yes
GDP	→	CA	1.885**	2.939	3.413	No
AE	→	GDP	1.579	2.382	2.955	No
GDP	→	AE	1.165	1.800	3.069	No
AI	→	GDP	1.389	4.233***	6.361***	Yes
GDP	→	AI	1.462	2.057	4.394	No
AR	→	GDP	1.081	2.535	4.064	No
GDP	→	AR	1.418	2.124	2.922	No
MIEX	→	CA	0.919	2.351	3.781	No
CA	→	MIEX	1.333	3.055*	4.758**	Yes
AE	→	MIEX	2.899***	4.019***	5.718***	Yes
MIEX	→	AE	2.038***	3.636***	4.833**	Yes
AI	→	MIEX	2.537***	3.667***	3.958	Yes
MIEX	→	AI	1.525	3.312**	4.618	No
AR	→	MIEX	2.032***	2.863	3.921	No
MIEX	→	AR	1.127	2.727***	7.216***	Yes

Note: k refers to the length of the lag, in accordance with the literature in this model, 1 lag, 2 lag and 3 lag are estimated separately. Accepting causality in 2 of these 3 delays means that causality exists between the two variables. (Growht: Growth, Ar: Military personnel, Ca: Current account deficit, Ae: Arms export, Ai: Arms import)

Table 5, Dumitreschu-Hurlin (2012) panel causality analysis results, one-way causality relationship from current account deficit to growth, one-way causality relationship from arms import to growth, one-way causality relationship from current

account deficit to defense spending, as well as the variables of arms export and defense spending. It is concluded that there is a one-way causality relationship from arms imports to defense expenditures, as well as a one-way causality relationship from the number of military personnel to defense spending.

Emirmahmutoğlu and Köse (2011), II. generational approach based on the heterogeneity of coefficients. This test is the panel adapted version of the Toda and Yamamoto (2015) time series analysis. Emirmahmutoğlu and Köse (2011) does not matter whether the variables are stationary levels (unit root) and whether they are cointegrated in the causality test as in the Toda and Yamoto test (Emirmahmutoğlu, 2011: 3). Also in this test, causality relationship can be examined by explaining the heterogeneity of each country for each section. On the other hand, it can be used in the case of horizontal section and no horizontal section. Under the hypothesis of heterogeneity to Emirmahmutoğlu and Köse (2011) test, the null hypothesis is tested with the following model as "H_0: A12, ij = 0" and is estimated with the VAR model for each section:

$$Z_{i,t} = u_i + A_{i1}Z_{it} + \ldots + A_{ik}Z_{i,t} + \sum^{k_i + d_{maxi}} A_{i1Z} + u_{it} \quad \dot{I} = k_i \, it-1$$

$i=1,2,\ldots,N$ ve $t=1,2,\ldots,T$ iken k_i +d$_{max}$ defines the maximum number of delays and Ain, the parameter constraints.

Tablo 6: Emirmahmutoğlu ve Köse (2011) Panel Causality Result

Causality Direction	Panel Fisher	P-val	Causality
Defense Expenditure → Economic Growth	48.584	0.749	No
Economic Growth → Defence Expenditure	96.719	0.001***	Yes
Arm Export → Economic Growth	52.053	0.625	No
Economic Growth → Arms Export	73.048	0.063*	Yes
Arms Import → Economic Growth	57.864	0.406	No
Economic Growth → Arm Import	80.765	0.017**	Yes
Current Account Deficit → Economic Growth	129.32	0.000***	Yes

Economic growth → Current Account Deficit		67.321	0.143	No
Military Personnel → Economic Growth		60.354	0.321	No
Economic Growth → Military Personnel		85.709	0.006***	Yes
Arms Export → Defense Expenditure		203.543	0.000***	Yes
Defense Expenditure → Arms Export		23.191	1.000	No
Arms Import → Defense Expenditure		203.921	0.000***	Yes
Defense Expenditure → Arms Import		50.894	0.665	No
Defense Expenditure → Current Account Deficit		124.441	0.000***	Yes
Current Account Deficit → Defense Expenditure		66.725	0.155	No
Defence Expenditure → Military Personnel		48.886	0.740	No
Military Personnel → Defense Expenditure		71.446	0.080*	Yes

Note: ***, **, * indicate causality for 1%, 5% and 10% significance level, respectively.

In Table 6, Emirmahmutoğlu and Köse (2011) causality analysis findings are given. It is observed that there is a one-way causality relationship from growth to defense expenditures, one-way causality relationship from growth to arms imports and arms exports, and a one-way causality relationship from the current account deficit to growth. In addition, there is a causal relationship from economic growth to the number of military personnel, one-way causal relationship from arms exports and imports to defense expenditures, causal relationship from defense expenditures to military personnel, and from military personnel to defense expenditures.

RESULT

The development level of the countries, their geostrategic and geopolitical positions, the need to protect internal security, the forms of management, the alliance and the institutions and organizations they are members of, are determinant in the amount of resources devoted to defense with their gdp. In this study, defense spending in the current account deficit and growth relationships in the context of NATO

countries and Turkey have been examined. It was examined by considering the period of 1990-2017. It was analyzed using new generation causality tests that developed over time. NATO Member countries, when developed countries and developing countries as assessed in two different groups, in this case payments for that exporters in terms of the production of defense equipment of advanced NATO countries balance and affect positively the growth of defense spending by Turkey in developing countries takes place in group As they are net importers, the increase in defense spending causes current deficits.

According to the panel stability test results applied for NATO countries, defense expenditure, growth, current account deficit, number of military personnel, arms export and arms imports were found to be stationary at I (0) level. According to Pesaran CCE and CCEMG (2006) cointegration test, there is a positive and significant relationship between economic growth and defense spending. It was observed that there was a one-unit increase in defense expenditures, increased growth by 0.878 units, and there was a positive relationship between defense expenditure and economic growth in Belgium, USA, Slovakia, Luxembourg, Slovenia. The reason for this situation is that most of the items within the scope of defense expenditures are Germany, USA, Netherlands, France, etc. it is thought to be exported by such countries.

Current account deficit and economic growth in Portugal, Germany, Turkey and Albania positive, statistically significant relationship was found. A negative, statistically significant relationship was found for Canada, Norway, Poland, Spain, Slovakia, Iceland and Hungary. The current account deficit, Portugal in defense spending relations, Germany, Turkey and positive for Albania, has been identified a significant relationship statistically, Canada, Norway, Poland, Spain, Slovakia, Iceland and negative for Hungary, has found a significant relationship statistically.
According to Dumitreschu-Hurlin (2012) panel causality test, there is a one-way causal relationship in NATO countries from current deficit to growth, arms imports to growth, current deficit to defense spending, arms imports to defense spending and arms exports to defense spending, and defense spending to the number of military personnel. According to the results of Emirmahmutoğlu-Köse (2011) causality test that supports this result, it has been found that there is a causality relationship from

growth to defense expenditures, from growth to arms imports and from growth to arms exports, from current deficit to growth and from growth to the number of military personnel. There is also a causal relationship from arms exports to defense spending, from arms imports to defense spending, from defense spending to the number of military personnel, and from the number of military personnel to defense spending. The increase in the resources allocated for defense causes the effect of expenditures on arms exports and imports to the current deficit and growth to be questioned.

An increase in defense expenditures can be interpreted by Keynes and Wagner's assumptions by increasing public expenditures. In both approaches, public spending and national income are associated. According to the Keynesian approach, growth is seen as an external variable and it is stated that there is a causal relationship from defense spending to economic growth. Wagner, on the other hand, considers growth as an internal factor and talks about the existence of a causal relationship from economic growth to public spending. In the Keynesian approach, defense spending creates a certain demand increase by increasing the capacity utilization rates, resulting in more efficient use of resources and workforce, and positive externalities on growth due to multiplier effects are explained by supply-side factors. The concept of factor productivity is also explored on the basis of the positive externality effect. In the literature, the analysis of defense spending and the current account deficit remains more restricted. One of the problems of many developed and developing countries is the current account deficit problem. Our study was conducted to analyze this gap in the literature by using econometric causality methods developed over time.

References

Aizenman, J. and Glick, R. (2006). Military Expenditure, Threats, and Growth. *Journal of International Trade & Economic Development*, 15(2), 129-155.

Alp, E., Ç. (2006). Socio-Economic Developments and Military Expenditures in Middle Eastern Countries. Marmara University, Middle East Studies Institute, Middle East Economics Department, Master Thesis, Istanbul.

Alozious, Juuko (2015). Fiscal Policies and Current Account Dynamics in OECD

Countries: Do Military Expenditures Matter?. Lund University, School of Economics and Management, Master's Thesis, Sweden.

Arshad, A., Syed, S. H., and Shabbir, G. (2017). Military Expenditure and Economic Growth: A Panel Data Analysis. *Forman Journal of Economic Studies*, 13, 161- 175.

Bekmez, S., Destek, M., A. (2015). Investigation of Exclusion Effect in Defense Expenditures: Panel Data Analysis. *Politics, Journal of Economics and Management Studies*, 3 (2), 91-110.

Benoit, E. (1973). *Defence and Economic Growth in Developing Countries*. Boston MA: Lexington Books.

Boya, N. (2013). Sustainability of Current Account Deficit in Turkey: Nonlinear Approach. Master Thesis, Hacettepe University Institute of Social Sciences, Economics Department, Ankara.

Canbay, Ş. and Mercan, D. (2017). The Impact of Defense Spending on Economic Growth and Current Account Balance: The Case of Turkey. *Journal of Emerging Economies and Policy*, 2 (2), 86-104.

Chan, S. (1985). The Impact of Defense Spending on Economic Performance: A Survey of Evidence and Problems. *Orbis* , 29 (2).

Çayın, M. ve S., Yapraklı (2018). *Defence Expenditures, Economic Growth and Current Account Deficit: Analysis of Causality on Turkey*. Emprical Studies on Growth, Edit: Gökhan Karhan, Mücahit Çayın, Yunus Aşçı, Gazi Bookstore.

Davutoğlu, A. (2007). *Strategic Depth: Turkey's International Position*, Istanbul: Globe Publications.

Dağ, H. (2011). Who Pays How Much to Defense?. "Http://www.stratejikboyut.com/haber/savunmaya-kim-ne-kadar-para-yatiriyor-39687.html" (Date of Access : 16.03.2017).

Dedebek, E. and Meriç, M. (2015). Economic and Social Factors Determining

Defense Spending in European Union Countries: Panel Data Analysis. *Journal of Turkish Court of Accounts* , 97 (April-June), 92-93.

Deger, S. and R., Smith (1983). Military Expenditure and Growth in Less Developed Countries. *Journal of Conflict Resolution*, 27 (2), 335-353.

Deger, S., Sen, S. (1995). *Military Expenditure and Developing Countries*. K. Hartley and T. Sandler (Editor), Handbook of Defence Economics I, Amsterdam, Elsevier Science B.V., 275-307.

Destek, M., A. (2016). The Relationship Between Military Expenditures And Economic Growth In Nato Countries: Panel Data Analysis Under Cross-Section Dependency. *International Journal Of Management Economics & Business*, 12(28), 209.

Dumitreschu, E., I. and Hurlin, C., (2012). Testing for Granger non-causality in heterogeneous panels. *Economic Modelling*, 29(4), 1450-1460.

Dunne, J.P. and Tian, N. (2013). Military Expenditure and Economic Growth: A Survey. *The Economics of Peace and Security Journal*, 8(1), 5-11.

Dunne, Paul, Eftychia, Nikolaidou and Dimitrios, Vougas (2001). A Defense Spending and Economic Growth: A Causal Analysis for Greece and Turkey. *Defence and Peace Economics*, 12: 5-26.

Durgun, Ö. and Timur, M., C. (2017). The Relationship Between Defense Spending and Economic Growth: Analysis of Turkey. Dumlupınar University Journal of Social Sciences, 54, 126-137.

Emirmahmutoğlu, F., and Köse, N. (2011). Testing for Granger Causality in Heterogeneous Mixed Panels. *Economic Modelling*, 28, 870-876.

Erbaykal, E. (2007). Defense Spending and Economic Growth Relationship in Turkey. M.Sc., Balikesir University, Economics Department, Balikesir.

Erdem, Y. (2019). Defense Expenditure Growth Economic Relations with Turkey on

an Application. Haci Bektas Veli Nevsehir University, Institute of Social Sciences, Master Thesis, Ankara.

Faini, Riccardo, Patricia, Annez and Lance, Taylor (1984). Defense Spending, Economic Structure and Growth: Evidence among Countries and Over Time. *Economic Development and Cultural Change*, 32(3), 487-498.

Giray, F. (2004). Defense Expenditures and Economic Growth. *Cumhuriyet University Faculty of Economics and Administrative Sciences Journal* 5 (1), 181–99.

Kasalak, S. (2006). Military Spending Multiplier of Turkey: An Empirical Analysis for Turkey. MA Thesis in Management, Bilkent University, Turkey.

Kaya, S. (2013). Economic Effects of Causality Analysis of Defense Spending in Turkey (1970-2010). *Trakya University Journal of Social Science*, 15 (2).

Kusi, N., K. (1994). Economic Growth and Defense Spending in Developing Countries A Causal Analysis. *The Journal of Conflict Resolution*, 38. 152-159.

Kutlar, Aziz (2000), *Econometric Time Series*, Gazi Bookstore, Ankara.

McGuire, M., C. (1995). *Defense Economics and International Security. Handbook of Defense Economics I*, (Ed: Keith Hartley ve Todd Sandler) (13-43). Amsterdam: Elsevier Science B.V.

Nazlıoğlu, Ş., Ç, Karul (2017). A Panel Stationary Test with Gradual Structural Shifts: Re-Investigate the International Commodity Price Shcoks. *Economic Modelling*, 61, 181-192.

Taş, S., Örnek, İ. and Aksoğan, G. (2013). Defense Spending in Turkey, Growth and Income Inequality, 1970-2008: An Econometric Analysis. *Gaziantep University Journal of Social Sciences*, 12 (3), 659-682.

Sandler, T. ve K, Hartley (1995). *Defence Economics*, Oxford University Press.

Sezgin, S. (2003). Defense Expenditures, Terrorism and Economy. *Stradigma Monthly Strategy and Analysis E – Journal*, 5, 1-5.

Sezgin, S. (2004). An Empirical Note on External Debt and Defence Expenditures in Turkey. *Defence and Peace Economics*, 15(2), 199-203.

Tuncay, Ö. (2017). Economic Analysis of Defense Spending in the Period After Financial Liberalization. *Journal of International Economic Research*, 3 (1), 23-37.

Walther, Ted (2002). *World Economy*. (Trans. Ünal Çağlar), Alfa Publications, Istanbul.

Zengin, R. (2010). The Defense Industry Development and Economic Impact of Defense Spending in Turkey. Master Thesis, Süleyman Demirel University, Institute of Social Sciences, Isparta.