IJCEAS

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume :9, Issue: 1, Year:2019, pp. 1-24
DOI: 10.5281/zenodo.3262188

ANALYSIS OF THE EFFECTS OF DEFENSE EXPENDITURES ON INCOME DISTRIBUTION AND ECONOMIC DEVELOPMENT WITH PANEL ASYMMETRIC CAUSALITY TEST: BRICS COUNTRIES AND TURKEY CASE

Ekrem GÜL[1]

Mustafa TORUSDAĞ[2]

Received: 06.01.2019, Accepted: 06.03.2019

Abstract

In this study, for BRICS countries and Turkey defense spending economic development and income distribution relationship is examined for the period 1995-2015. High defense expenditures are on the agenda as an important research topic in the world and in our country. Therefore, the effects of defense expenditures on income distribution and economic development of countries can be determined by examining these three variables. For the BRICS countries and Turkey, to examining the impact of defense spending and income distribution to economic development too much work not found. Westerlund (2008) found that the cointegration relationship between the main variables and the negative components was not detected in the long term, whereas long-term relationship was found between the positive components.

According to the results of the asymmetric panel causality analysis, only one-way causality from economic growth to defense expenditures was determined between economic growth and defense expenditures in the period 1995-2010, while there was no causality from defense expenditures to economic growth. One-way causality from income inequality to defense expenditures was identified between 1995 and 2010 in terms of income inequality and defense expenditures, while bi-directional causality was detected in 1996-2011 period. In the period of 2000-2015, it is concluded that there is a one-way causality from defense expenditures to income inequality.

[1] Prof. Dr., Department of Economics, Sakarya University, Turkey, egul@sakarya.edu.tr, http://orcid.org/0000-0002-2607-9066

[2] Res. Asst., Social Sciences Institute, Department of Economics, Sakarya University, Turkey, mtorusdag@gmail.com, http://orcid.org/0000-0002-8839-0562

Keywords: *Defense Expenditures, Income Distribution, Economic Development, Panel Astmmetric Casuality Test*

Jel Codes: E01, E24, P44, E64

Introduction

At the end of the 19th century, Adolph Wagner expressed an opinion known as Wagner's Law that public expenditures would increase over time. According to this law, as the per capita income increases, the share of the public in the economy also increases. Although this law does not find enough support in the later periods, the share of public expenditures in the developed countries in income is supported by the data that have a higher share compared to the underdeveloped countries. While the share of central governments in developed countries is 32%, this rate is 17% in low-income countries (Baer and Galvao, 2008, Dişbudak, 2017: 2).

According to the Wagner's Law, the causality relationship will be directed from economic growth to public expenditures, and the increase in public expenditures with increasing prosperity due to economic growth will result in the increase in public expenditures together with the increase in total public expenditures. The Keynes hypothesis is that the increase in public spending will bring economic growth along with the direction of causality between public spending and economic growth; it is stated that it is towards the direction of economic growth from public expenditures (Şanlısoy, Sunal, 2016: 103).

Many factors such as budget deficits, inflation level, economic crises, level of technological progress, globalization of the world economy, education level of the country's labor force and population, social rules, distribution of labor force, privatizations are listed. Nowadays, it is also wondered whether the increase in the amounts allocated to the arms of their countries from their budgets will create income inequality. While countries are making defense expenditures, they allocate budget for defense expenditures by choosing between education, health and social transfer expenditures and defense budgets (Taş, et al., 2013: 669). The studies on defense expenditures and income distribution are based on the studies of Taş et al., 2013, Aksoğan, Elveren, 2012.

This study consists of three parts. In the first part, the relationship between defense expenditures and income inequality, and the second

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume :9, Issue: 1, Year:2019, pp. 1-24
DOI: 10.5281/zenodo.3262188

part, the relationship between income inequality and economic growth is discussed. In the third section, horizontal section dependence, homogeneity tests, Hadri and Kuruzomi panel unit root test, Hatemi-J (2012) panel cointegration and panel asymmetric causality tests are performed by using econometric analysis. The contribution of the importance of the study and the literature has to offer, military spending, economic development and income inequality in relation, for the 1995-2015 period, the BRICS countries and Turkey that investigated using current data and Hatami-J (2012), the panel reserved cointegration and panel examined by asymmetric causality tests It is the first study in the literature.

Relationship Between Defense Spending and Income Inequality

The relationship between defense spending and income inequality, which is basically explained by four different approaches (Lin ve Ali, 2009, s.673, Töngür, Elveren, 2012: 4, 5, Dixon ve Moon 1986, Dunne 2000; Yıldırım ve Sezgin Taşıran, 2002, Elveren, 2017):

The first is based on the *Traditional Keynesian Approach*. According to this approach, defense spending increases the total demand and employment opportunities by stimulating effective demand in defense-related sectors. Increased income inequality during the recession period of the economy has improved in the period of development. The increasing demand for defense spending increases the economic development. Economic development will affect low-income groups more and will have a reducing effect on income inequality (Beach, 1977, p.56).

The second is explained within the framework of basic microeconomic theory. The fact that the defense sector provides employment for higher wage labor force compared to other sectors will have an expansion in this area in general, which will increase the inter-sectoral wage inequality (Ali, 2007, p.520).

Thirdly, total defense expenditures consist of personnel, equipment, research and development, and operational expenses. Each of these expenditure items has an effect on inequality. For example, military personnel expenditures in the defense industry are directed towards a less qualified labor force group and more qualified labor force is employed for R & D activities. Expenditure on military personnel will reduce inequality, while higher R & D expenditure will lead to a further wage gap between qualified and unskilled labor (Lin and Ali, 2009, p.674).

Fourth, the main purpose of the welfare and social states is to redistribute income in order to allow for a more equitable income distribution. One of the most basic tools used to redistribute revenue is transfer expenditures. In this respect, high defense spending creates a burden on the budget and decreases transfer expenditures. There is a trade-off relationship between the budget expenditure items. The size of the budget allocated for defense causes a lower budget to be allocated to income distribution and a lower budget for education, health and social transfer expenditures (Taş, et al., 2013: 669, 670).

The size of defense spending and the factors affecting these expenditures in developed and developing countries are reported to have structural differences. It can be concluded that the defense spending level could not be explained by economic factors in developed countries, which have established the defense industry and which can produce and sale the weapon. In developing countries, defense expenditures are directly proportional to income levels. Most of these countries are dependent on the countries producing weapons for their defense needs since they cannot establish their own defense industries. The common result obtained from these studies is that countries will not be able to give up their defense expenses as long as the borders between the countries and the free and independent living will continue (Erbaykal, 2007: 5).

The relationship between military expenditure and income inequality is described in the context of three causal relationships (Lin and Ali 2009, Elveren 2012, Rufael 2016): i) inequality reduction, ii) inequality enhancer, and iii) is expressed by the neutrality hypothesis (Caruso, Biscione, 2017: 3):

Hypothesis That Narrows Inequality

Higher military spending may lead to higher aggregate demand growth and increased employment. If the military industries are labor intensive and defense productions are indigenous, there may be an employment-enhancing effect in the whole economy. Economic growth generates benefits for the poor population in terms of income and allows for the improvement of income distribution (Hirnissa et al 2009; Lin and Ali 2009; Elveren 2012, Biscione, 2017: 3).

Hypothesis Expanding Inequality

IJCEAS
International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume :9, Issue: 1, Year:2019, pp. 1-24
DOI: 10.5281/zenodo.3262188

This hypothesis is based on the idea that military industries prefer the productive workforce with higher wages than the less skilled workers in the civil sector, and military spending may have an increasing impact on inter-sectoral wage differences (Ali, 2007, Biscione, 2017: 3).

Impartiality Hypothesis

According to the neutrality hypothesis, the impact of military expenditures on income inequality is considered unimportant for two reasons; i) defense expenditure refers to a small portion of total government expenditures. ii) The labor force employed in the military industry sector is the amount of labor that can be ignored within the total labor force.

Demiryürek Ürper, (2018: 1), as stated by the redistributive effect of public expenditures varies according to the type of expenditure. Benefits such as defense and justice, which cannot be measured and divided, are generally not affected by redistribution. No definite interpretation can be made about the effects of public services such as defense and justice on the distribution of income because they cannot be measured and divided. Since these services are presented to the society as a whole, its effect on income distribution is considered to be neutral (Tuncer, 1970: 60, Demiryürek Ürper, 2018: 32). Public expenditures such as defense expenses do not have income distributive features (Eker, 2005: 292, Ürper Demiryürek, 2018: 46).

In the theoretical framework, there are many ways to integrate defense expenditure and income inequality (Hirnissa et al., 2009: 96):

1) It will have an equalizing effect on a possible increase in defense spending and will have a reducing effect on public expenditures for social programs such as health, education and so on.
2) Taxes on support of military expenditures may be disproportionately reduced for the middle class and the risk of post-tax income inequality may be eliminated.
3) The high level of military expenditures and the use of violence against trade unions as a control tool are seen as an area where higher military spending should be sacrificed in the social context.
4) The army receives low-skilled labor from the market, and this may lead to an increase in wages for young and unskilled labor. As the equipment intensive defense spending increases, the effects that increase the inequality inequality are dominant. As labor and labor-

intensive soldiers produce and military production increases, inequality in income inequality data can be seen.

5) If there is good governance, the cointegration relationship can be eliminated. If government policies and budgets are carefully carried out, the share of defense expenditures allocated from the budget will not have to be used for other public expenditures such as education and health.

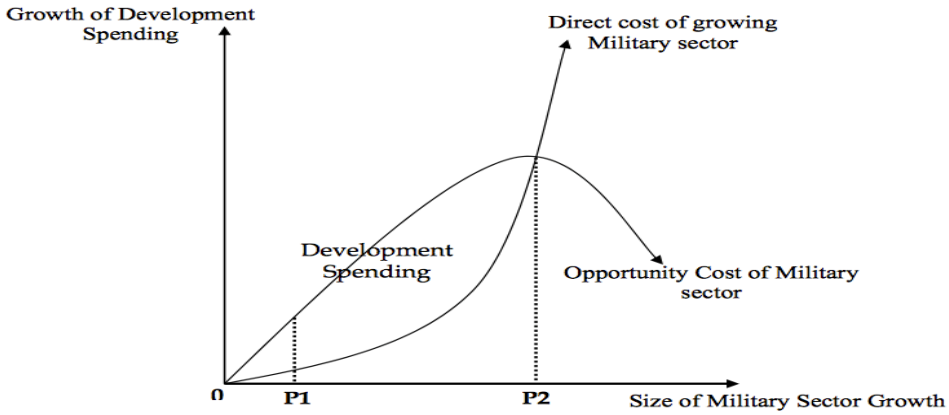

Figure 1. Opportunity Cost Burden Effect

Source: Vadlamannati, 2008: 3.

The literature on the relationship between military expenditure and income inequality is very limited (Abell 1994; Seiglie 1997; Ali 2007; 2012; Vadlamannati 2008; Hirnissa et. ve diğerleri 2009; Lin ve Ali 2009; Elveren 2012; Kentor vd. 2012, Töngür, Elveren, 2012: 5). Ali (2002) investigated the effect of income distribution injustice with the help of Theil statistics. As a result of the study, countries with more equitable income distribution have concluded that they have less defense spending (Destek, 2014. 30, 31). Taş et al. (2013), for the period of 1970-2008, defense spending in Turkey, income inequality is examined the relationship between growth. Using VAR model and causality analysis, a one-way causality from defense spending to income inequality has been identified. Within the framework of the VAR model, defense spending shows that it is very strong in explaining income inequality. Aksoğan, Elveren (2012), aims to contribute to the literature by using cointegration and causality methods for the period of 1970-2008 and examining more variables. According to this study, growth and social transfers, defense spending, while the healing effect on income inequality in Turkey is

IJCEAS
International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume :9, Issue: 1, Year:2019, pp. 1-24
DOI: 10.5281/zenodo.3262188

increasing inequality. Destek (2014), panel data regression method and panel cointegration tests, the effects of defense expenditures on growth and the factors determining defense expenditures are examined. According to the findings, defense expenditures positively affect the economy in all country groups in a negative way with the level of development of countries. In addition, it was concluded that other public expenditures were more efficient than defense expenditures. Caruso, Biscione (2017), for the period 1990-2015, examines the relationship between military spending and income injustice for European countries and concludes that there is a positive relationship between military expenditures and income inequality. Shahbaz et al. (2015) examined the period 1971-2011 for Iran. The results of the analysis suggest that defense expenditures have a positive effect on income distribution in Iran and economic growth leads to income inequality in defending expenditures according to the granger causality analysis, while decreasing income inequality and defining an inverse U form between defense expenditures and income inequality. Töngür and Elveren (2012) has been examined for 37 countries for the period of 1988-2003. It is stated that there is a positive relationship between income inequality and the central government budget share of military expenditures, and that terrorist incidents are an important factor affecting both the level of military spending and the level of inequality. Tongür and Elveren (2013), for the 1963-2008 period, analyzed for Turkey. According to the results of the analysis, it can be concluded that, although income inequality has a positive effect on economic growth, military expenditures do not have a significant effect. Ali and Galbraith (2003), was examined for the period 1987-1997 and we have obtained consistent estimates that military spending has a positive effect on wage inequality. Given the close relationship between wage and income, the decrease in military spending of a country as a result shows that it can reduce income inequality. Vadlamannati (2008) examined the four major South Asian economies by using panel regression constant impact analysis of 1975-2005 and found that there was a direct relationship between wartime military spending and income inequality; It is suggested that the decrease in military expenditures for South Asia could reduce income inequality and lead to economic growth. Ali (2011) examined the period of 1987-2005 for MENA countries and stated that military expenditures had a strong and negative effect on inequality, and that the increase in military expenditures in MENA countries decreased the level of inequality and also inequality and income per capita It is concluded that it affects the level of military spending. Anoruo, Sawhney, Murthy (2018), 1960-2012

period are examined with DOLS technique for the USA and it is stated that the change in per capita income creates a decrease in income inequality and the increase in military expenditures increase income inequality. It also shows that policy makers need to consider military spending in developing policies to reduce income inequality.

Income Inequality and Economic Growth

One of the criteria of development and prosperity is the distribution of income. The higher the national income per capita of a country, the more the country's annual national income is not shared in a balanced and equitable manner between individuals and production factors, the social, political and economic balance of countries cannot be mentioned seriously. Injustice in the distribution of income is not only presented as an economic problem but it is also expressed as a socio-economic event that can affect the welfare levels of the citizens living in that country as a whole (Veil et al., 2016: 137).

There is an unequal distribution in income distribution arising from regional income level differences as well as qualifications and education levels of employees (Kanberoğlu, Oğuz, 2016: 397).

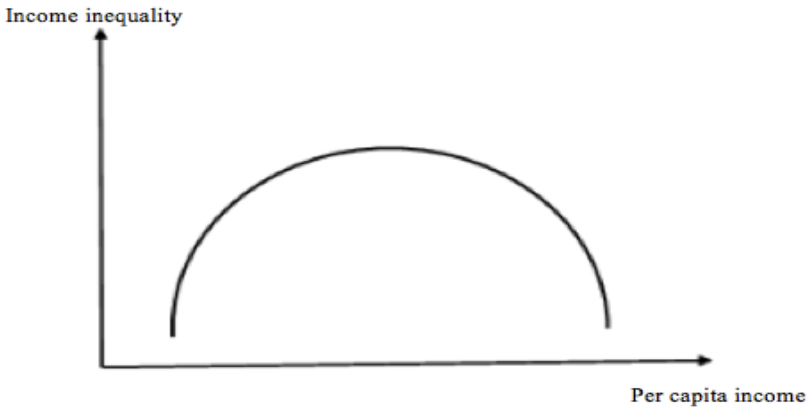

Figure 2. Kuznet's Curve

Source: Weil, 2016: 389, Çakmak, Tosun, 2017: 34.

In the economics literature, the distribution of the total incomes produced in a certain period in a country among individuals, groups or production factors is called as income distribution. When income distribution types are listed as functional, personal, sectoral and regional income distribution. The level of education (primary, secondary and higher education) by professional groups (engineer teacher, doctor, lawyer, administrator, etc.), according to social groups (wage-salary,

IJCEAS
International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume :9, Issue: 1, Year:2019, pp. 1-24
DOI: 10.5281/zenodo.3262188

retired, trades, traders, entrepreneurs, etc.) and according to gender income distribution (Üzümcü, Korkat, 2014: 137).

In the literature, Kuznets hypothesis refers to the relationship between growth and income distribution. The Kuznets hypothesis (1995) is also known as the inverse U relation (Kanberoğlu, Arvas, 2014: 107). According to the hypothesis, in the underdeveloped countries, a small number of people in the economy benefit from this income distribution, with the transition from agriculture to the industrial economy at the beginning of growth and the use of new technologies. In the development period, the increase in growth is shared more fairly with the widespread use of new production methods. According to the Kuznets curve, growth initially leads to inequality distribution in income distribution, then income distribution increases in the following periods and income inequality decreases according to the initial level (Töngür, Elveren, 2016: 4). In short, in the early stages of growth, wealth is divided in the final stages of poverty (Salvato et al., 2006, Karhan, Güdelci, 2017: 2143).

The economic growth performance of the countries and the unfair distribution of income distribution are the determinants of the economic policies of the countries. The inequality in income distribution, together with the economic growth performance of countries, has a large share in determining the economic policies.

Theoretical discussion in relation to the distribution of income and economic growth is explained in two ways; classical and political economy approach. The first approach suggests that the savings rate will increase with the increase in wealth so that the inequality increases the incomes of the rich population and that inequality promotes capital accumulation and economic growth, whereas the inequality increases in the inequality by increasing the inequality to express. These policies also adversely affect physical and human capital accumulation and ultimately increase economic growth (Delbianco et al., 2014: 384).

There are different channels in which inequality in income distribution affects growth. Kaldor (1957) argued that a higher inequality would lead to higher savings, capital accumulation and growth, arguing that the marginal tendency of the rich to save is higher than that of the poor. In contrast, Persson and Tabellini (1994) and Alsenia and Rodrick (1994) emphasize four channels in which income inequality has reduced growth rates (Tabassum, Majeed, 2008: 733). Second, unequal societies have more difficulty in actions that require collective action. This situation leads to more uncertainty about possible political instability and

tendencies and policies for populist re-income distribution policies. Third, in a more unequal society, voters support a lower income and higher inefficient tax burden. Fourth, credit markets are defective and income and wealth distribution is not fair, but low-income individuals are likely to invest in their human and physical capital, resulting in a long-term negative growth.

To explain the relationship between income distribution and economic growth;

Sheikh et al. (2017), 1972-2016 period for Pakistan with GMM method are examined. According to the results of the analysis, it is concluded that there is a positive relationship between military expenditures and growth and inequality has a negative relationship with growth. Topuz, Dağdemir (2016) divided the countries between 1995 and 2011 into four different groups according to their level of development, including low- and low-middle-income countries, upper-middle-income countries, high-income countries and all countries. The validity of the U hypothesis is tested. Economic growth and income inequality have increased in low- and low-middle-income countries and upper-middle-income countries; It is concluded that economic growth and income inequality are reduced in high-income countries. Çakmak, Tosun (2017), 2002-2013 period for 25 countries by examining the validity of the reverse U hypothesis was tested with panel data analysis. According to the results of the analysis, unlike the kuznets hypothesis, there is a U-shaped relationship between economic growth and income distribution, as income per capita increases, income inequality decreases; after a certain turning point increases. A situation where the concept of social state is ignored and injustice prevention instruments in income distribution weakens. Şahin (2018) was examined by Dumiterschu-Hurlin analysis of 15 developed countries for the period 1995-2014. It is concluded that there is no causal relationship between economic growth, commercial openness and income inequality. Erkal et al. (2015) was analyzed by panel data analysis for 11 countries between 1998 and 2010, and it is concluded that the increase in income inequality and poverty lead to growth according to the results of the analysis. Akıncı and Akıncı (2016), for the 1960-2014 period Turkey, Enders-Siklos cointegration analysis and TAR and M-TAR analysis and examined and variables according to the analysis results in the long term also associated and that the Toda-Yamamoto causality analysis based on the results reverse in Turkey It can be said that the U hypothesis is valid. Ak, Altintas (2016), for the 1986-2012 period, of Turkey, in the period examined by the

IJCEAS
International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume :9, Issue: 1, Year:2019, pp. 1-24
DOI: 10.5281/zenodo.3262188

ARDL approach to the inverse relationship instead of relationship decreased applies where that economic growth in the previously increasing per capita income inequality in income distribution and then deteriorated again. Tabassum, Majeed (2008), 1965-2003 period was examined for 69 developing countries. There is a strong negative relationship between income inequality and economic growth. In the short term, the relationship between growth and income inequality may be positive, but over time, income inequality decreases economic growth. Delbianco et al. (2014), 20 Latin American and Caribbean countries for the period of 1980-2010, and the income distribution and economic growth in relation to the income level are emphasized. It is concluded that inequality is detrimental to economic growth and that income distribution in richer countries encourages growth in high inequality, and that redistribution policy for poor population supports economic growth in low-income economies. Meng, Lucyshyn, Li (2013), 1989-2012 period is examined by China for cointegration and causality analysis and it can be concluded that China's military expenditures have an effect on inequality in income distribution.

Methodology and Findings

In this study, we examined the period of 1995-2015 for the BRICS countries and Turkey, income distribution, economic development and military expenditure within the framework of the relationship; LM (Breusch & Pagan 1980), CDlm (Pesaran 2004), CD (Pesaran 2004), LMadj cross-sectional dependency tests, and homogeneity tests, Hadri and Kuruzomi (2012) unit root test, Hatemi-J (2012) panel-hidden cointegration test and panel asymmetric causality test, Milex (GDP), HDI (Human Development Index) and Income Distribution data. Milex data and income distribution data (World Bank Data) and HDI (UNDP-Human Development Reports) are compiled from databases. In this study, Gauss 14.0 and Eviews 10.0 programs were analyzed.

Which econometric analysis will be performed in the study can affect the reliability of the analyzes. In this context, first of all, the cross-sectional dependence and homogeneity of the models will be examined. Horizontal analysis of the results of the cross-sectional analysis in the analysis of CD Pesaran (2004) analysis ($Gini_{it=}\ a_0+\beta_1 Milex_{it}+e_i$ and $Hdin_{it=}\ a_0+\beta_1 Milexn_{it}+e_i$) except for all models in the horizontal H the ayes have it. In this context, second generation analyzes should be used in the models considering the assumption of cross-sectional dependence. The $H_{:0}$ hypothesis that the models are homogeneous for the

homogeneity test has been rejected and it has been accepted that the models show heterogeneity.

	Model	LM (Breusch & Pagan 1980)		CDlm (Pesaran 2004)		CD (Pesaran 2004)		LMadj	
		Stat.	Prob.	Stat.	Prob.	Stat.	Prob.	Stat.	Prob.
Basic Variables	$Hdi_{it=}\ a_0+\beta_1 Milex_{it}+e_i$	593.480	0.000[a]	18.712	0.000[a]	23.041	0.000[a]	22.679	0.000[a]
	$Gini_{it=}\ a_0+\beta_1 Milex_{it}+e_i$	355.556	0.000[a]	7.102	0.000[a]	-0.904	0.183	27.446	0.000[a]
Positive Variables	$Hdip_{it=}\ a_0+\beta_1 Milexp_{it}+e_i$	436.831	0.000[a]	11.068	0.000[a]	16.519	0.000[a]	10.233	0.000[a]
	$Ginip_{it=}\ a_0+\beta_1 Milexp_{it}+e_i$	496.949	0.000[a]	14.002	0.000[a]	1.590	0.056[c]	43.500	0.000[a]
Negative Variables	$Hdin_{it=}\ a_0+\beta_1 Milexn_{it}+e_i$	309.173	0.000[a]	4.839	0.000[a]	0.157	0.438	16.611	0.000[a]
	$Ginin_{it=}\ a_0+\beta_1 Milexn_{it}+e_i$	340.685	0.000[a]	6.377	0.000[a]	4.640	0.000[a]	28.272	0.000[a]

Table 1. Horizontal Cross-Section Dependence Test Results

Homogeneity Test					
		Delta Tilde		Delta Tilde$_{adj}$	
		Stat.	Prb.	Stat.	Prb.
Basic Variables	$Hdi_{it=}\ a_0+\beta_1 Milex_{it}+e_i$	4.512	0.000[a]	4.855	0.000[a]
	$Gini_{it=}\ a_0+\beta_1 Milex_{it}+e_i$	3.719	0.000[a]	4.002	0.000[a]
Positive Variables	$Hdip_{it=}\ a_0+\beta_1 Milexp_{it}+e_i$	18.67	0.000[a]	20.02	0.000[a]
	$Ginip_{it=}\ a_0+\beta_1 Milexp_{it}+e_i$	18.52	0.000[a]	19.93	0.000[a]
Negative Variables	$Hdin_{it=}\ a_0+\beta_1 Milexn_{it}+e_i$	12.64	0.000[a]	13.60	0.000[a]
	$Ginin_{it=}\ a_0+\beta_1 Milexn_{it}+e_i$	17.97	0.000[a]	19.34	0.000[a]

Note: a sequence shows that the models contain horizontal cross-sectional dependencies and that the models are heterogeneous.

Stability of the variables used in the study were examined by Hadri and Kuruzomi (2012), which take into account the cross-sectional dependence of second-generation unit root tests. Hadri and Kuruzomi (2012) test was developed as a panel version of KPSS unit root test which is one of the time series.

Two types of test statistics are calculated for this test. These are the Z_A^{spac} ve Z_A^{la} statistics. Both are assumed to have a normal distribution when they are close to infinity. Thus, even in cases where $CADF$ is weak, the counterfeit unit is a validation test that is being applied in order not to cause root. In addition, the hypothesis of this test is inverse and the basic hypothesis is that the variables do not have a unit root. In the case of p> 0.10, the basic hypothesis is assumed, that is, the unit is considered to be rootless. In the opposite case, if p <0.10, the variable is considered to be unit rooted.

Data generation process is in a Y series as below;

$$y^{+}_{it} = z_t{}'\delta_i + f_t\gamma_i + e^{+}_{i,t}$$
$$e^{+}_{i,t} = \theta e^{+}_{it-1} + v_t$$

IJCEAS

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume :9, Issue: 1, Year:2019, pp. 1-24
DOI: 10.5281/zenodo.3262188

$y^{-}_{it} = z_t' \delta_i + f_t \gamma_i + e^{-}_{i,t}$
$e^{-}_{i,t} = \theta e^{-}_{it-1} + v_t$ is calculated as.

Table 2. Hadri ve Kuruzomi Stationary Test Result

	I(0)				I(1)			
	Z_A^{spac}	Prob.	Z_A^{la}	Prob.	Z_A^{spac}	Prob.	Z_A^{la}	Prob.
Hdi	0.1498	0.4404[a]	1.3801	0.038	-1.3481	0.9112[a]	-1.2194	0.8886[a]
Hdip	2.6272	0.004	0.1183	0.4529[a]	-0.1135	0.5452[a]	37.02	0.3556[a]
Hdin	35.404	0.000	40.938	0.000	-2.7392	0.003	1.243	0.1068[a]
Milex	-1.485	0.931[a]	-1.225	0.889[a]	-	-	-	-
Milexp	-1.753	0.960[a]	-0.027	0.5108[a]	-	-	-	-
Milexn	-1.026	0.847[a]	-1.422	0.922[a]	-	-	-	-
Gini	9.8432	0.000	16.952	0.000	-0.537	0.704[a]	-0.283	0.611[a]
Ginip	13.658	0.000	24.587	0.000	0.604	0.272[a]	0.546	0.292[a]
Ginin	1.364	0.0862[a]	-1.858	0.9684[a]	-1.452	0.073[a]	0.110	0.4562[a]

According to Hadri and Kuruzomi (2012) static test results, except the milex variable, the other two variables were unit rooted at the basic level and became static in the first difference situation. To examine the long-term relationship between variables, Westerlund (2008) Durbin-H co-integration test, which takes into account the cross-sectional dependence, was used. The important point in this test is that the dependent variable has a unit value at the level value and it is not important that the stationary levels of the independent variables are I (0) or I (1). On the other hand, there are two statistics, Dhg and Dhp. Dhg statistics are used in the case of heterogeneity and Dhp statistics are used in homogeneity status. (Westerlund, 2008).

Hatemi-J (2011) econometric structure of the hidden cointegration analysis can be explained as follows.

First, the negative and positive components for each panel are as follows;

$$e^{+}_{i1,t} = \max (e_{i1,t}, 0)$$
$$e^{+}_{i2,t} = \max (e_{i2,t}, 0)$$
$$e^{-}_{i1,t} = \min (e_{i1,t}, 0)$$
$$e^{-}_{i2,t} = \min (e_{i2,t}, 0)$$

In the light of this information, the y_{it} ve x_{it} equations of positive and negative components can be arranged and expressed as follows:

$$y^{+}_{i,t} = y^{+}_{i,0} + e^{+}_{i1,t} = y^{+}_{i,0} + \sum_{j=1}^{t} e^{+}_{i1,j}$$
$$x^{+}_{i,t} = x^{+}_{i,0} + e^{+}_{i2,t} = x^{+}_{i,0} + \sum_{j=1}^{t} e^{+}_{i2,j}$$
$$y^{-}_{i,t} = y^{-}_{i,0} + e^{+}_{i1,t} = y^{-}_{i,0} + \sum_{j=1}^{t} e_{i1,j}$$

$$x^{-}_{i,t} = x^{-}_{i,0} + e^{+}_{i2,t} = x^{-}_{i,0} + \sum_{j=1}^{t} e^{+}_{i2,j}$$

Assuming that the independent variable is y, the positive and negative panel cointegration equivalence is calculated as follows:

$$y^{+}_{i,t} = \propto_1^{+} + \beta_i^{+} x^{+}_{i,t} + e^{+}_{i1,t}$$
$$y^{-}_{i,t} = \propto_1^{-} + \beta_i^{-} x^{-}_{i,t} + + e^{-}_{i1,t}$$

In the light of this information, the operation of the test first starts with the separation of the positive and negative shocks of the panel into two parts. In the next step, the shredded shocks of Westerlund (2008) Durbin-H cointegration test were applied. Thus, it can be determined whether there is a cointegration relationship between both positive and negative shocks in the panels. The strongest aspect of this method is that there is a relationship between positive and negative components, although there is no relationship between the basic components.

Table 3. Durbin –H Cointegration Test

	Models	**DHg**	**Prob**	**DHp**	**Prob**
Basic Variables	$Hdi_{it=}\ a_0+\beta_1 Milex_{it}+e_i$	-0.296	0.383	-0.662	0.254
	$Gini_{it=}\ a_0+\beta_1 Milex_{it}+e_i$	0.770	0.779	-0.597	0.275
Positive Variables	$Hdip_{it=}\ a_0+\beta_1 Milexp_{it}+e_i$	1.379	0.016[b]	0.880	0.011[b]
	$Ginip_{it=}\ a_0+\beta_1 Milexp_{it}+e_i$	-1.428	0.077[c]	-1.172	0.121
Negative Variables	$Hdin_{it=}\ a_0+\beta_1 Milexn_{it}+e_i$	23.938	0.999	14.173	0.999
	$Ginin_{it=}\ a_0+\beta_1 Milexn_{it}+e_i$	-0.417	0.338	1.301	0.903

Note: b and c refer to cointegration at the significance level of 5% and 10%, respectively.

According to the Westerlund (2008) Durbin-H cointegration test results, the cointegration relationship between the main variables and the negative components, ie the long-term relationship was not detected, but the long-term relationship between the positive components was determined. As a result of the cointegration analysis, the long-term correlation between the positive variables was estimated only by the long-term coefficients between the positive variables. The estimation of the AMG (Augmented Mean Group Estimator), which was developed by Eberhardt and Bond (2009) and which considers the cross-sectional dependence, was estimated. The AMG estimates the long-term co-integration coefficient, which will apply to the overall panel, by weighting the arithmetic mean of the long-term cointegration coefficients of the horizontal cross-sections (countries). In this respect, it gives more reliable results than CCE (Common Corelated Effects) estimator developed by Pesaran (2006).

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume :9, Issue: 1, Year:2019, pp. 1-24
DOI: 10.5281/zenodo.3262188

Table 4. AMG Estimator Result

	$Hdip_{it=} a_0+\beta_1 Milexp_{it}+e_i$		$Ginip_{it=} a_0+\beta_1 Milexp_{it}+e_i$	
Countries	**Coefficient**	**Prob.**	**Coefficient**	**Prob.**
Brazil	0.015 (1.35)	0.176	0.693 (5.07)	0.089[c]
Russia	0.005 (2.40)	0.016[b]	-2.115 (-0.55)	0.008[a]
China	0.013 (0.89)	0.373	-14.078 (-1.42)	0.155
India	-0.001 (0.005)	0.725	-7.987 (-0.97)	0.334
South Africa	-0.132 (-5.25)	0.000[a]	62.346 (3.87)	0.000[a]
Turkey	-0.006 (1.79)	0.074[c]	0.017 (0.07)	0.942
Panel	-0.172 (-1.74)	0.046[b]	6.248 (0.55)	0.085[c]

Note: a, b, and c mean 1, 5, and 10%, respectively.

According to the results of the AMG estimator, a one-unit increase in defense expenditure in the first model resulted in a decrease of 0.172 units in economic growth. When the first model examined in some countries the impact on economic growth of defense spending in Turkey and South Africa negatively, while this effect was positive way in Russia. This finding can be explained by Keynesian approach. According to the Keynesian approach, arms importing countries create various innovations and these innovations shift to other production areas and contribute to the economic growth of the country. In this context, the economy in Turkey and South Africa, which exports weapons of defense spending is negative, it is not surprising positively affect the economy of a country like Russia, which imported weapons. According to the results of the AMG estimator, in the second model, it was determined that an increase in the defense expenditures increased the gini coefficient, in other words income inequality increased 6,248 units. When the panel is examined across countries, defense spending for Brazil and South Africa increased income injustice and for Russia, income inequality was observed to decrease in a long period parallel to the increase in economic growth. Turkey, India and could not detect a relationship between the number of the gun for defense spending and China.

In this study, asymmetric causality relationship between positive components will be examined by Dumitrescu and Hurlin (2012) analysis. The most important advantages of this method are; to give effective results in unbalanced data sets, both in the case of cross-sectional dependency and in case of no cross-sectional dependence, and to be able to produce results when the time dimension is larger than the unit size (Dumitrescu and Hurlin, 2012: 1457). In this test, the causality relationship between Y and X is analyzed using a linear model as follows. In the first step of the causality test, the following seemingly unrelated regression is calculated:

$$Y_{1t}^{+} = \mathrm{a}_{1,1} + \sum_{j=1}^{ly1} B_{1,1,j}\, Y_{i,t-j}^{+} \quad + \quad \sum_{j=1}^{lx1} \delta_{1,1,j}\, X_{i,t-j}^{+} \quad + \varepsilon_{1,1,t}^{+}$$

$$Y_{2t}^{+} = \mathrm{a}_{1,2} + \sum_{j=1}^{ly1} B_{1,2,j}\, Y_{i,t-j}^{+} \quad + \quad \sum_{j=1}^{lx1} \delta_{1,2,j}\, X_{i,2t-j}^{+} \quad + \varepsilon_{1,2,t}^{+}$$

$$Y_{N,t}^{+} = \mathrm{a}_{1,\mathrm{N}} + \sum_{j=1}^{ly1} B_{1,N,j}\, Y_{i,t-j}^{+} \quad + \quad \sum_{j=1}^{lx1} \delta_{1,N,j}\, X_{i,t-j}^{+} \quad + \varepsilon_{1,N,t}^{+}$$

and

$$X_{1t}^{+} = \mathrm{a}_{2,1} + \sum_{j=1}^{ly1} B_{2,1,j}\, Y_{i,t-j}^{+} \quad + \quad \sum_{j=1}^{lx1} \delta_{2,1,j}\, X_{i,t-j}^{+} \quad + \varepsilon_{2,1,t}^{+}$$

$$X_{2t}^{+} = \mathrm{a}_{2,2} + \sum_{j=1}^{ly1} B_{2,2,j}\, Y_{i,t-j}^{+} \quad + \quad \sum_{j=1}^{lx1} \delta_{2,2,j}\, X_{i,t-j}^{+} \quad + \varepsilon_{2,2,t}^{+}$$

$$X_{N,t}^{+} = \mathrm{a}_{1,\mathrm{N}} + \sum_{j=1}^{ly1} B_{1,N,j}\, Y_{i,t-j}^{+} \quad + \quad \sum_{j=1}^{lx1} \delta_{1,N,j}\, X_{i,t-j}^{+} \quad + \varepsilon_{1,N,t}^{+}$$

It is the optimal delay length that can be selected using the Akaike or Schwarz information criteria. The error terms may be interrelated. Wald tests are used to examine the causality relationship.

Panel Asymmetric Causality Results

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume :9, Issue: 1, Year:2019, pp. 1-24
DOI: 10.5281/zenodo.3262188

According to the findings, only one-way causality from economic growth to defense expenditures was determined between 1995-2010 in economic growth and defense expenditures, no causality from defense spending to economic growth could be determined.

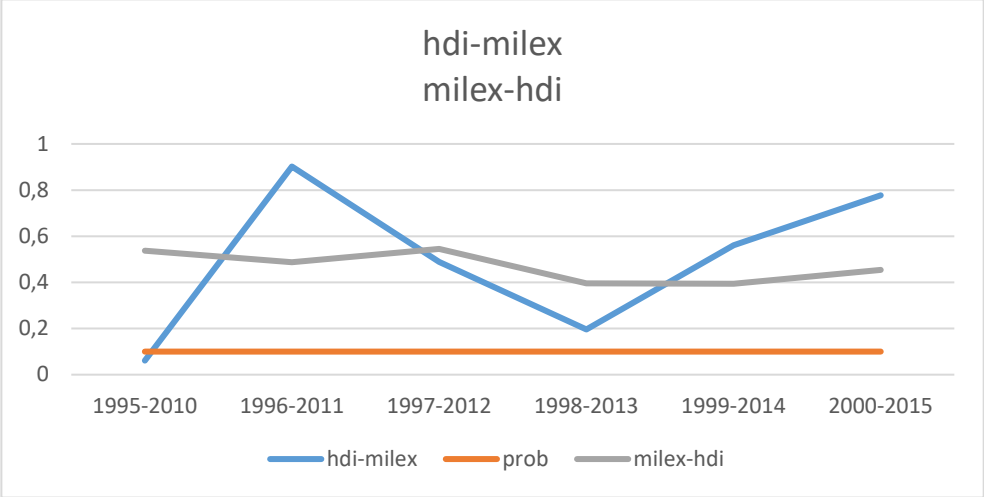

Figure 3. One-way Causality from economic growth to defense expenditures

One-way causality from income inequality to defense expenditures was identified between 1995 and 2010 in terms of income inequality and defense expenditures, while bi-directional causality was detected in 1996-2011 period. In the period 2000-2015, a one-way causality from defense expenditures to income inequality has been identified.

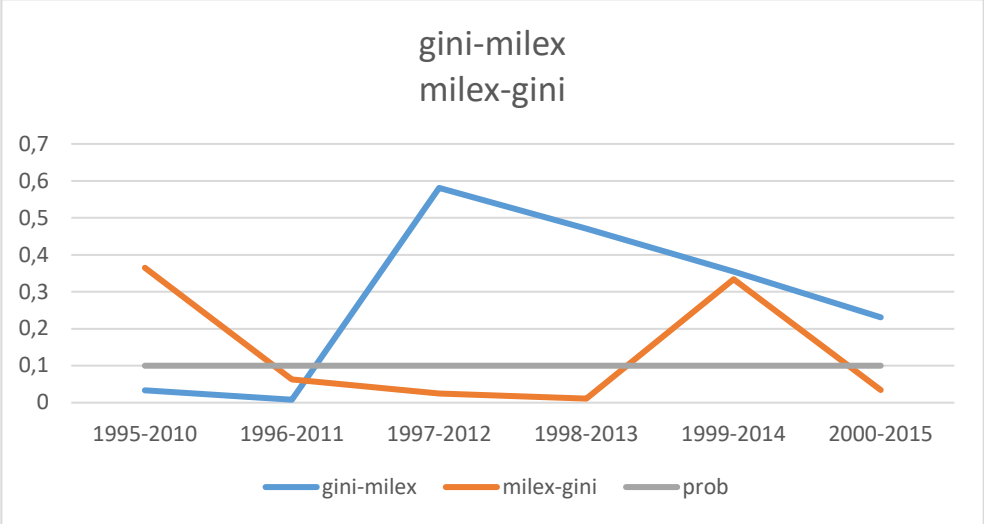

Figure 4. One-way Causality income inequality to defense expenditures

Results and Discussion

There are many factors affecting the income distribution of countries. In the literature, there is an ongoing debate on whether budget spending and defense spending in countries allocated for military spending will generate income inequality. The most fundamental feature of being a welfare state is to provide a fair income distribution. In this study, the 1995-2015 period, for the BRICS countries and Turkey are examined with Hatemi-J (2012) panel cointegration and asymmetric panel causality test. Stability of the variables used in the study were examined by Hadri and Kuruzomi (2012), which take into account the cross-sectional dependence of second-generation unit root tests. According to Hadri and Kuruzomi (2012) static test results, except for the milex (military expenditures) variable, the other two variables are unit rooted at the level and become stationary in the first difference situation. According to the results of the Durbin-H cointegration test Westerlund (2008), the cointegration relationship between the main variables and the negative components, in the long-term relationship was not detected, but the long-term relationship between the positive components was determined.

As a result of the cointegration analysis, the long-term correlation between the positive variables was estimated only by the long-term coefficients between the positive variables. The estimation of the AMG (Augmented Mean Group Estimator), which was developed by Eberhardt and Bond (2009) and which considers the cross-sectional dependency, was estimated. According to the results of the AMG estimator, a one-unit increase in defense expenditure in the first model resulted in a decrease of 0.172 units in economic growth.

When the first model in the country are examined on the basis, the impact on economic growth of defense spending in Turkey and South Africa negatively, while in Russia this effect is positive that this situation can be explained by way Keynesian approach. According to the results of the AMG estimator, in the second model, it was found that an increase in defense expenditures increased the income inequality by 6.248 units. When the panel is examined across countries, defense spending for Brazil and South Africa increased income injustice and for Russia, income inequality was observed to decrease in a long period parallel to the increase in economic growth. In Turkey, India and China could not be

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume :9, Issue: 1, Year:2019, pp. 1-24
DOI: 10.5281/zenodo.3262188

identified a causal relationship between defense spending and number of gini coefficient.

According to the results of the asymmetric panel causality analysis, only one-way causality from economic growth to defense expenditures was determined between economic growth and defense expenditures in the period 1995-2010, while there was no causality from defense expenditures to economic growth. One-way causality from income inequality to defense expenditures was identified between 1995 and 2010 in terms of income inequality and defense expenditures, while bi-directional causality was detected in 1996-2011 period. In the period of 2000-2015, it is concluded that there is a one-way causality from defense expenditures to income inequality.

References

Abell, J.D. (1994), "Military Spending and Income Inequality", *Journal of Peace Research*, 31(1), 35– 43.

Alesina, Alberto and D. Rodrick (1994), "Distributive Politics and Economic Growth", *Quarterly Journal of Economics* (108), 465–90.

Ali, H.E. and Galbraith, J., (2003), "Military Expenditures and Inequality: Empirical Evidence from Global Data", *UTIP Working Paper,* No.24, October 10.

Ali, H.E. (2011), "Military expenditures and human development: Guns and butter arguments revisited: A case study from Egypt", *Peace Economics, Peace Science and Public Policy*: 17(1) 1–19.

Anoruo E. et al. (2018), "Military Spending and Income Inequality in the United States, International Journal of Economics", *Commerce and Management,* Vol. VI, Issue 8, 118-129.

AK Z., N. Altıntaş (2016), "Kuznets Curve Reverse Income Inequality and Economic Growth Relationship in Turkey: 1986-2012", *Journal of Financial Research*, Volume 2, Number 3, 93-102.

Akıncı, G. Y. & Akıncı, M. (2016), "On Economic Growth, Financial Development and Income Inequality Mechanisms in the Context of Reverse-U Hypothesis", *Financial Political & Economic Interpretations* 53 (622): 61-77.

Aksoğan G. and Elveren A.Y. (2012), "In Turkey Defense, Health and Education Expenditure and Income Inequality (1970-2008): An Econometric Analysis", *Socioeconomics*, 263-280.

Ali, H.E. (2007), "Military expenditures and inequality: Empirical evidence from global data", *Defense and Peace Economics* 18(6), 519–535.

Ali E. H. (2012), "Military Expenditures and and Inequality in the Middle East and North Africa: A Panel Analysis", *Defence and Peace Economics* 23: 6, 575-589.

Baer Werner ve Galvao Antonio Fialho Jr. (2008), "Tax burden, government expenditures and income distribution in Brazil", *The Quarterly Review of Economics and Finance* 48 (2008) 345–358.

Beach, C. M. (1977), "Cyclical sensitivity of aggregate income equality", *The Review of Economics and Statistics*, *59*(1), 56–66. doi:10.2307/1924904.

Caruso R., A. Biscione (2017), "Military Expenditures And Income Inequality Evidence From A Panel Of European Countries", Erişim Tarihi: 10.09.2018, (http://www.siecon.org/online/wp-content/uploads/2017/04/Caruso-Biscione.pdf).

Çakmak A. İ., B. Tosun (2017), "Relationship between Economic Growth and Income Distribution: Investigation of Kuznets Hypothesis on Selected Countries", *Kocaeli University Journal of Social Sciences*, KOSBED (33), 33 - 44.

Delbianco, F., Dabus, C. ve Caraballo, M. (2016) "Growth, Inequality and Corruption: Evidence from Developing Countries", *Economics Bulletin* 36(3): 1-11.

Demiryürek Ürper T., "The Impact on Income Distribution of Public Expenditure: The Case of Turkey", Hacettepe University Institute of Social Sciences, Master Thesis, Ankara, 2018.

Destek M. A., "Comparison of Economic Impacts of Defense Expenditures for Countries with Different Income: Panel Data Analysis", Gaziantep University Institute of Social Sciences, Master's Thesis, 2014 Gaziantep.

Dişbudak C. (2017), "Income Distribution and Welfare Effects of Public Expenditure Composition: The Case of Turkey", V. Anatolia in Economics International Conference May 11-13 2017, Eskisehir, Turkey.

Dixon, W.J. and Moon, B.E. (1986), "The military burden and basic human needs", *The Journal of Conflict Resolution* 30(4), 660–684.

International Journal of Contemporary Economics and Administrative Sciences
ISSN: 1925 – 4423
Volume :9, Issue: 1, Year:2019, pp. 1-24
DOI: 10.5281/zenodo.3262188

Dunne, J.P. (2000), "The Economic Effects of Military Expenditure in Developing Countries", http://carecon.org.uk/Chula/MILLDCSnew.pdf, Erişim Tarihi: 01.08.2018.

Eker, A. (2005), Public Finance, Anadolu Press, Izmir.

Elveren, A. Y. (2012), "Military Spending and Income Inequality: Evidence on Cointegration and Causality for Turkey, 1963-2007", *Defence and Peace Economics*, 23(3): 289 - 301.

Erkal, Gökhan, Merter Akıncı, and Ömer Yılmaz (2015), "Poverty, Income Inequality and Economic Growth: An Empirical Analysis for Selected Eastern European and Latin American Countries", *TISK Academy*, 10 (19): 66-87.

Erbaykal, E. (2007), "Defense Spending and Economic Growth Relationship in Turkey", MS Thesis, Balikesir University, Economics Department, Balikesir.

Hirnissa, M.T., M.Z. Habibullah ve A.H. Baharom (2009), "Defense Spending and Income Inequality: Evidence from Selected Asian Countries", *Modern Applied Science*, 3(5), 96 - 111.

Kaldor, N. (1957), "A Model of Economic Growth", *Economic Journal* 57, 591–624.

Kanberoğlu, Z., A. Oğuz (2016), "Income Distribution And Sustainable Growth For Afro-Eurasian Region: The Case Of Turkey", *Dumlupınar University Social Sciences Journal*, 396-403.

Kanberoğlu Z., M. A. Arvas (2014), "Financial Development and Income Inequality: The Case of Turkey, 1980-2012", *Socioeconomics,* 21 (21), 105-122.

Karhan, G. and Güdelci, E. N. (2017), "Income Distribution and Economic Development Relationship (Kuznet Humans Hypothesis): Soft Transition Panel Regression (PSTR) Analysis", *Journal of Social And Humanities Sciences Research*, 4 (15), 2143-2148.

Kentor, J., Jorgenson, A. and Kick, E. (2012), "The 'new' military and income inequality: A cross national analysis", *Social Science Research* (41), 514–526.

Lin, E. S. and Ali, H. E. (2009), "Military Spending and Inequality: Panel Granger Causality Test", *Journal of Peace Research* 46(5) 671 - 685.

Meng, B., Lucyshyn, W., & Li, X. (2015) "Defense expenditure and income inequality: Evidence on co-integration and causality for China", *Defence and Peace Economics, 26*(3), 327–339.

Peçe, M. A., Ceyhan, M. S. & Akpolat, A. (2016), "The Effect of Economic Growth in Turkey An Econometric Analysis on Income Distribution", *International Journal of Cultural and Social Studies* (IntJCSS), 2 (1), 135-148.

Persson, Torsten and Tabellini (1994), "Is Inequality Harmful for Growth?", *American Economic Review* 84, 600-621.

Rufael, Y.W. (2016), "Defence Spending and Income Inequality in Taiwan", *Defence and Peace Economics*, 27 (6): 871 - 884.

Seiglie, C. (1997), "Deficits, defence, and income distribution", *CATO Journal* 17(1) 11–18.

Salvato, M. A.; Alvarenga, P. S.; França, C. S.and Araújo Jr, A. F. (2006), "Crescimento e Desigualdade: evidências da Curva de Kuznets para os municípios de Minas Gerais" – 1991/2000. Ibmec MG Working Paper. WP33.

Shahbaz, M., Loganathan, N., Tiwari, A. K., & Sherafatian-Jahromi, R. (2015), "Financial development and income inequality: Is there any finanacial kuznets curve in Iran?", *Social Indicators Research*, *124*(2), 357–382. doi:10.100711205-014-0801-9.

Sheikh M. R vd. (2017), "Military Spending, Inequality and Economic Growth: Evidence from Pakistan", *Pakistan Economic and Social Review*, 55 (2), 491 - 509.

Şahin D. (2018), "The Relationship Between Financial Development and Income Inequality in Developed Countries", *Iğdır University Journal of Social Sciences* (15), 299 - 322.

Şanlısoy S. Sunal, O. (2016), "Public Expenditure Growth-Eknoomik Relationship: The Case of Turkey", GÜSBEED, *Gümüşhane University Institute of Social Sciences Electronic Journal*, 7 (17), 102 - 122.

Tabassum A., M. R. Majeed (2008), "Economic Growth and Income Inequality Relationship: Role of Credit Market Imperfection", *The Pakistan Development Review*, 47: 4 (2), 727 - 743.

Topuz, S, Dağdemir, Ö. (2016), "Economic Growth and Income Inequality Relationship: Validity of the Kuznets Ters-U Hypothesis", *Eskişehir Osmangazi University Journal of Economics and Administrative Sciences*, 11 (3), 115-130.

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

Töngür, Ü. and Elveren, A.Y. (2012) Military Expenditures, Inequality, and Welfare and Political Regimes: A Dynamic Panel Data Analysis. The University of Texas Inequality Project Working Paper No: 61, Erişim Tarihi: https://www.tandfonline.com/doi/pdf/10.1080/10242694.2013.848577?needAccess=true, 10.08.2018.

Töngür, U., Elveren, A.J. (2015), "Military Expenditures, Inequality and Welfare and Political Regimes: A Dynamic Panel Data Analysis", *Defence and peace Economics*, 26 (1) : 49-74.

Töngür, U., Elveren A.J. (2017), "The Nexus of Economic Growth, Military Expenditure and Inequality Income", *Quality & Quantity*, 51(4): 1821 - 1842.

Töngür, Ü. and A. Y. Elveren (2016), "The Impact of Military Spending and Income Inequality on Economic Growth in Turkey", *Defence and Peace Economics* 27 (3): 433 - 452.

Tuncer, S. (1970), Redistribution of Income, Economic Research Foundation, Istanbul.

Üzümcü A., M. Korkat (2014), "Income Distribution Injustice in Turkey and Poverty Development of Social Assistance in Struggle (2003-2012)", *Kafkas University Journal of the Faculty of Economics and Administrative Sciences*, Volume 5, Number 8, 135- 166.

Vadlamannati, K.C. (2008), "Exploring the Relationship between Military Spending & Income Inequality in South Asia", William Davidson Institute Working Paper No. 918, The University of Michigan.

Yıldırım, J. ve S. Sezgin (2002), "Defense, Education and Health Expenditures in Turkey, 1924 - 1996", *Journal of Peace Research*, 39(5), 569–580.