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Unemployment Effects of Military Spending in Turkey

Türkiye'de Savunma Harcamalarının İşsizlik Oranı Üzerine Etkisi

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Abstract: The impact of military spending on macroeconomic performance has been a long-debated issue. In this context, there are a vast number of studies focused on the impact of military spending on the economies and the direction of this impact. Most of these studies have examined the relationship between military spending and economic growth. Unemployment, however, is a macroeconomic indicator that cannot be separated from economic growth. Hence, this study aims to reveal the relationship between military spending and the unemployment rate of Turkey, which is a developing country. To this end, Bounds Testing approach based on the structural break Autoregressive Distributed-Lag Model (ARDL) has been performed to suggest the impact of the military spending on the unemployment rate, using the 1988-2017 period data of Turkey. The findings demonstrate that there is no statistically significant correlation between the military spending and unemployment rate in the short run; however, it is determined that the military spending decreases the unemployment rate in the long run.

Keywords: Military Spending, Unemployment Rate, ARDL Bound Test

Jel Classification: C24, E24, H56

Öz: Askeri harcamaların gelişmiş ve gelişmekte olan ülkelerin makroekonomik performanslarına olan etkileri uzun süredir tartışılan bir konudur. Bu amaç doğrultusunda askeri harcamaların ülke ekonomilerine katkısının olup olmadığı, varsa bu etkinin yönünün nasıl olduğu konusunda yapılmış bir çok çalışma mevcuttur. Bu çalışmaların çoğu askeri harcamalar ve iktisadi büyüme ilişkileri üzerinden yapılmıştır. İşsizlik sorunu ise iktisadi büyümeden ayrı tutulamayacak makroekonomik bir göstergedir. Bu çalışmanın amacı da gelişmekte olan ülkeler içinde bulunan Türkiye'nin askeri harcamaları ile işsizlik oranı arasındaki ilişkileri saptamaya yöneliktir. Bu amaç doğrultusunda çalışmada Türkiye'ye ye ait 1988-2017 dönemi verilerinden hareketle askeri harcamaların işsizlik oranı üzerindeki etkilerini tespit etmek maksadıyla yapısal kırılmalı Otoregresif Gecikmesi Dağıtılmış Modeline (ARDL) dayalı Sınır Testi yapılmıştır. Çalışmanın test sonuçlarında, kısa dönemde Türkiye'de askeri harcamalar ile işsizlik oranı arasında istatistiki olarak anlamlı bir ilişki bulunamamış fakat uzun dönemde askeri harcamaların işsizlik oranını negatif yönde etkilediği tespit edilmiştir.

Anahtar Kelimeler: Askeri Harcamalar, İşsizlik Oranı, ARDL Sınır Testi

Jel Sınıflandırması: C24, E24, H56

1. Introduction

Military spending began to decrease worldwide following its peak in 1987 at the end of the Cold War, which its end started with the reforms of the USSR leader Gorbachev, first showed its influence in Eastern Europe and then led to the unification of Germany and the dissolution of the USSR. However, military spending began to increase worldwide again in 1998. The ongoing conflict in Afghanistan and Iraq, especially after the September 11 attacks in the

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United States, has fueled this trend until today. According to the SIPRI Military Expenditure Database (SIPRI, 2019), worldwide military spending is estimated to be around $1822 billion in 2018. This figure was 2.6% higher than that of 2017 in real terms. Global military spending is currently 76% higher than the lowest level in the post-Cold War in 1998. Military spending per capita increased from USD 230 in 2017 to USD 239 in 2018. However, the 1.1% increase in the world population exceeds the increase in military spending.

It is examined over the years; military spending has always been an essential part of the budget in Turkey. However, Turkey, which is in the middle of the Balkans, Middle East and Caucasus triangle and has always been the scene of turmoil throughout history, has not been able to cut its military spending due to its strategic position, despite the end of the Cold War. Turkey's military spending for 2018 amounted to USD 1.8 billion. With this level, it ranks 15th among the countries with the highest military spending in the world. As of 2018, Turkey's military spending increased by 65% compared to 2009 and by 24% compared to 2017. Turkey's military operations performed in Syria are one reason for this increase in Turkey's military spending in 2018 compared to the previous year. When we look at Turkey's statistical figures, it is seen that Turkey is one of the countries which has remarkable military spending in the world. One primary reason for this spending at remarkable rates is a large number of perceived threats originated from the geography, as well as the investments made in the defence industry, which became state policy, especially in the 1990s.

As seen in Turkey's economic performance in the last 15 years, Turkey has achieved a steady economic growth trend. Turkey economy has achieved an average annual GDP growth rate of 5.8% from 2003 to 2017. GDP levels increased from USD 238 billion in 2002 to USD 851 billion in 2017, with GDP per capita reaching USD 10,537 from USD 3,589 in the same period. This performance enhancement in such a short time has led to the attention focused on Turkey on the global economics scale. However, Turkey's macroeconomic performance has started to be negative as of 2018, and the unemployment rate had increased from 10.8% in 2018 to 14.7% in 2019. The main reason for this negative picture is decreased household consumption and increased inflation as of 2018. At the moment, high inflation and high unemployment rates are Turkey's most pressing problems. In particular, the current government considers investment and activities in the defence industry as a separate political tool to be used for reducing unemployment rates.

There are many studies on the effects of defence spending on macroeconomic indicators. However, in particular, the studies investigating the relationship between defence spending and unemployment are very few in Turkey. This study aims to determine the impact of

military spending on the unemployment rate in Turkey. The paper differs from previous studies in terms of the method used and its Turkey-specific aspect. The model covers the period starting from the establishment of the Turkish Defense Industry Development and Support Administration (DIDSA-SaGeB) in 1985, which has been established to ensure the production of weapons, weapon systems and military equipment for the Turkish Armed Forces using national facilities in particular, and is called as Presidency of Defence Industries today. For this purpose, after reviewing the related literature, the relationship between Turkey military spending and the unemployment rate in the 1988-2017 period has been examined to perform a time series analysis. In the last section of the study, economic and political implications are discussed based on the results.

2. Theory and Literature Review

Some researchers make claims that defence spending has a stimulating effect on the economy due to an increase in demand. Especially the increasing expenditures of developed countries towards defence expenditures support this claim. (Baran, Paul and Sweezy, 1966). The researchers conducted studies mostly about the US for this argument which is called Military Keynesianism. Findings obtained from all these researches indicate that defence spending can be a solution to stagnation and unemployment problems and have the potential to provide stability in the economy (Dunne and Smith, 2010: 429). There are several channels through which defence spending may influence the labour market. First, the construction of military infrastructures and productivity improvements due to technological spillovers to the private sector will increase the demand for labour. Second, reallocation effects in the defence sector will generate frictional unemployment and, hence, increase the labour supply in the private sector. Third, the tax burden required to finance military spending, which is paid by employers and workers will also affect both labour demand and supply, respectively. These alternative channels imply that there is no clear-cut prediction of the sign of the effects of military spending on unemployment rates. (Sanso-Navarro and Zaragoza, 2015: 3).

There are a vast number of studies investigating the effects of military spending on the macroeconomic performance of countries. These studies are mainly aimed at determining the relations between defence spending and economic growth. Therefore, there are much more studies investigating the correlations between military spending and economic growth than the studies investigating the correlation between military spending and unemployment. In these studies, unemployment is generally used as an indicator reflecting economic growth (Qiong and Junhua, 2015:499).

Since military spending affects economic growth, it can also affect unemployment. Traditional macroeconomic models suggest that changes in military spending can affect economic activity, albeit in the short-term. The mechanism by which military spending affects the production varies depending on the economic models. In the Keynesian model, military spending affects production through changes in total demand. Other models emphasise the reallocation of resources that arise when there is spending between sectors of the economy and highlight the increase in production loss and unemployment measured during this transition period (Hooker and Knetter, 1994:1). Therefore, relations between military spending and unemployment can either be positive or negative.

The study to be discussed between military spending and unemployment have been conducted by Baran, Paul and Sweezy (1966). The authors have examined the role of military spending in preventing economic stagnation in monopolistic capitalist countries through the model they established over the 18 richest capitalist countries. In the unemployment section of their study, they concluded that the higher the role of military spending in an economy, the lower the unemployment rate. Chester (1978) conducted a study based on Smith's (1977) article on the military spending of countries have high capital. Smith concluded that increased military spending led to increased unemployment.

On the other hand, Chester retested Smith's study over 8 OECD countries and found that none of his results was consistent with Smith's study. As a result, no convincing evidence of a direct link between military spending rates and high unemployment rates has been found. In another study, Dunne and Smith (1990) concluded that military spending had no significant impact on the unemployment rate in 9 out of 11 OECD countries, but stated that military spending of the UK and US had a significant impact on unemployment. Wing (1991) concluded in his study for Indonesia that defence spending created significant employment in the 1978-1980 period. Barker, Dunne and Smith (1991) examined the economic consequences of cuts in defence spending for the UK and stated that these cuts could lead to a significant reduction in unemployment and an increase in production. In their study, Payne and Ross (1992) did not find a connection between military spending and unemployment.

Abell (1992) conducted a study of the effects of U.S. military spending on employment in the 1970s and the 1980s by considering race and gender. While military spending was generally associated with increases in the unemployment rate of each group and minority in the 1980s, it was found that mostly the black men were affected by such spending, contrary the white men, who were least affected. Likewise, in a study using 1962-1988 data from 18 OECD countries, Paul (1996) found that military spending in Germany and Australia has a

positive impact on unemployment. However, military spending in Denmark brings down unemployment. Also, military spending has been a regulatory tool for changes in the unemployment rate, only in the UK. However, there was no statistically significant relationship between military spending and unemployment rate in Japan, the Netherlands, Italy, Spain, Austria, New Zealand, Sweden, Canada and the United States.

In their study covering 1963-1994 period data of the U.S. states, Hooker and Knetter (1997) have found that military procurement spending explains some variation in the employment growth among states. Another finding is that cuts in military procurement spending reduce the rate of employment growth. In their study of South Africa, Dunne and Watson (2000) suggest that the military burden influences employment in the manufacturing industry, while Yildirim and Sezgin (2003) found that military spending negatively affects employment in Turkey. In their study covering the period 1966-2002 in Taiwan, Huang and Kao (2005) concluded that military spending harmed employment in the short-term, but could help employment in the long-term. Using 1988-2004 data from 46 developed and developing countries, Tang et al. (2009) found that unemployment has no statistically significant effect on military spending; however, there is causality from military spending to unemployment, especially in moderate-low income countries or non-OECD countries.

Malizard (2014) has revealed that military spending reduces unemployment in France in the period 1975-2008. Qiong and Junhua (2015) and Korkmaz (1991) have found that military spending increases the unemployment rate. Using data covering 1990-2013 period, Azam et al. (2015), however, suggests that military spending brought down the unemployment rate and increased the employment in India, Nepal, Pakistan, Sri Lanka, selected countries from the South Asian Association for Regional Cooperation (SAARC). Analysing G7 countries for the period 1988-2012, Zhong et al. (2015) have found a one-way causality relationship from military spending to unemployment in Canada, Japan and the United States, and a one-way causality from unemployment to military spending in France and Germany. Sanso-Navarro and Cabello (2015) analyzed the causal relationship between defence spending and unemployment rates using data from the 15 EU countries for the period 1991-2012. As a result of the study, while the causality relationship was found for the countries with a high rate of labour expenditures in the defence expenditures among the countries examined, in general little evidence was obtained about the presence of a statistically significant causality between defence expenditures and unemployment rates. Besides, a two-way causality relationship has been found between military spending and unemployment in Italy and the UK. Finally, analysing Turkey for the period 1980-2014, Üçler (2017) have found the

existence of a negative relationship between defence expenditures and unemployment rates.

As a result of these studies, no clear conclusion can be drawn due to the variations in the direction of the effects of military spending on the unemployment rate. The most important reason for this is the differences in the period, country, group of countries, and the method used in the studies. Despite the difficulty in determining the direction of this relationship, it is not possible to ignore the effects of military spending on employment.

3. Model and Data

To investigate the relationship between the unemployment rate and military spending in Turkey, unemployment rate and military spending data covering 1988-2017 period have been taken from World Bank and Stockholm International Peace Research Institute (SIPRI), respectively. Graphs of variables are shown in Figure 1.

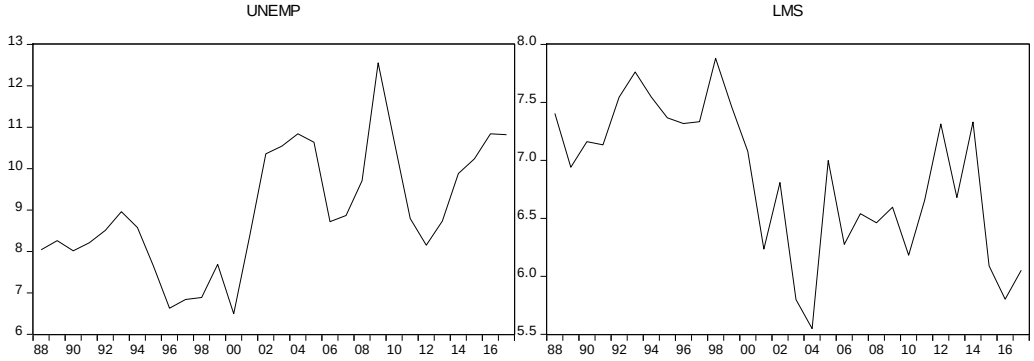

Figure 1. Graphs of variables

In the study, the relationship between variables is modelled as follows:

$$UNEMP_t = \beta_0 + \beta_1 LMS_t + u_t \quad (1)$$

In Equation 1, UNEMP and LMS represent the unemployment rate and the logarithm of military spending, respectively. The t index at the end of the variables indicates that the variables are a time series. β_0 refers to the constant term coefficient, and β_1 refers to the model's slope coefficient. β_1 refers to the change in UNEMP induced by a 1% change in LMS. u_t is the error term of the model.

5. Methodology and Empirical Results

In this study, which investigates the effect of military expenditure on the unemployment rate, empirical correlations between variables were investigated in two stages. In the first stage, the steady-state levels of the variables were examined by the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests; and, in the second stage, the existence of long-term

relationships between the variables were examined with the help of Bounds Testing based on Autoregressive Distributed Lag (ARDL) model.

In time series analysis, it is crucial to test the stationarity of the variables. This is because non-stationary variables cause the spurious regression problem in the regression analysis to be performed with these variables. Spurious regression is, in a sense, false correlations. For this reason, many unit root tests have been developed to test the stationarity. In this study, ADF and PP unit root tests have been used to test the stationarity of the series. Table I shows the results of the ADF and PP unit root test for the variables used in the analysis.

Table 1. ADF and PP Unit Root Test

	Intercept				**Trend and Intercept**			
Variable	**t-Statistic**		**Probability**		**t-Statistic**		**Probability**	
	ADF	**PP**	**ADF**	**PP**	**ADF**	**PP**	**ADF**	**PP**
UNEMP	-1.912	-1.790	0.322	0.377	-3.478	-1.921	0.061	0.617
ΔUNEMP	**-4.456***	**-6.875***	0.001	0.001	**-4.384***	**-6.974***	0.008	0.001
LMS	-2.579	-2.593	0.108	0.105	-3.446	-3.453	0.064	0.063
ΔLMS	**-7.703***	**-7.802***	0.001	0.001	**-7.614***	**-7.726***	0.001	0.001

* Expresses stationarity according to 1% level of significance.

Also, In this study, it was aimed to determine the degree of integration of the variables using single-break unit root test. Table 2 shows the results of the single-break ADF unit root test for the variables used in the study.

Tablo 2. Single-Break ADF Unit Root Test *

Variable	**t-Statistic**	**Probability**	**Date of break**
UNEMP	-3.664	0.730	2000
ΔUNEMP	**-5.685*** **	**0.011**	**2009**
LMS	-4.738	0.144	2000
ΔLMS	**-9.125****	**0.001**	**2005**

* The unit root test was performed in constant and trend models by taking into account the breaks.
, * Expresses stationarity according to 1% and %5 level of significance, respectively.

According to the results of the ADF and PP unit root test in Table 1, both variables become stationary at the 1% level of statistical significance if the first differences I(1) are taken. ARDL Bounds Testing, developed by Pesaran et al. (2001), is a method developed to examine the long periods between variables. The most important advantage of this test compared to the other cointegration tests is that it allows an analysis of long-term relationships between the variables that are stationary at different levels. In other words, some of the variables can be I(1), and others can be I(0). However, one of the most important

conditions that should be paid attention is that the dependent variable should be I(1); and the second one is that any of the variables should not be stationary higher-order than I(1). According to the results of the single-break ADF unit root test in Table 2, variables become stationary at the 1% and 5% level of statistical significance if the first differences I(1) are taken. ARDL models allow the inclusion of both the dependent variables and the delays of the independent variables in the same model.

$$UNEMP_t = \Theta_0 + \sum_{i=1}^{m} \Theta_{1i} UNEMP_{t-i} + \sum_{i=0}^{n} \Theta_{2i} LMS_{t-i} + e_t \quad (2)$$

In Equation 2, the ARDL model we have established using our variables is given. θs in the model show the coefficient matrix of the independent variables. The terms *m*, *n* and *l* refer to the different delay values that the variables can take. *i* refers to the delay number. e_t is the error term of the model. The lag length in Equation 2 is determined with the help of various information criteria. In this study, it is determined by the Schwarz Information Criterion (SIC).

According to the SIC, it has been determined that the ARDL(4,1) is a suitable model. It is essential in the test that this model is suitable. Thus, descriptive tests have been performed to test whether there are any problems in the model.

Table 3. ARDL (4,1) Model Prediction

Variable	Coefficient	Stand. Error	t-Statistics	Prob.
UNEMP(-1)	0.623*	0.179	3.479	**0.002**
UNEMP(-2)	-0.372	0.227	-1.639	0.117
UNEMP(-3)	-0.378	0.252	-1.498	0.150
UNEMP(-4)	0.426**	0.174	2.445	**0.024**
LMS	-0.293	0.353	-0.829	0.417
LMS(-1)	-1.380*	0.391	-3.526	**0.002**
C	17.848*	3.872	4.609	**0.001**
Descriptive Statistics				
Test		**Calculated Statistics**		**Prob.**
Breusch-Godfrey Autocorrelation		0.659		0.719
Breusch-Pagan-Godfrey Test		4165		0.654
Jargue-Bera Test of Normality		0.171		0.917
Ramsey RESET Test		0.286		0.777

* Expresses significance according to 5% level of significance.

Table 3 shows that there is no autocorrelation and heteroscedasticity problems in the ARDL (4,1) model, the error term has a normal distribution, and there is no distress in the

functional form of the model.

The analysis of whether the coefficients obtained by the ARDL(4,1) model are stable during the examined period has been investigated by using CUSUM and CUSUMQ analysis.

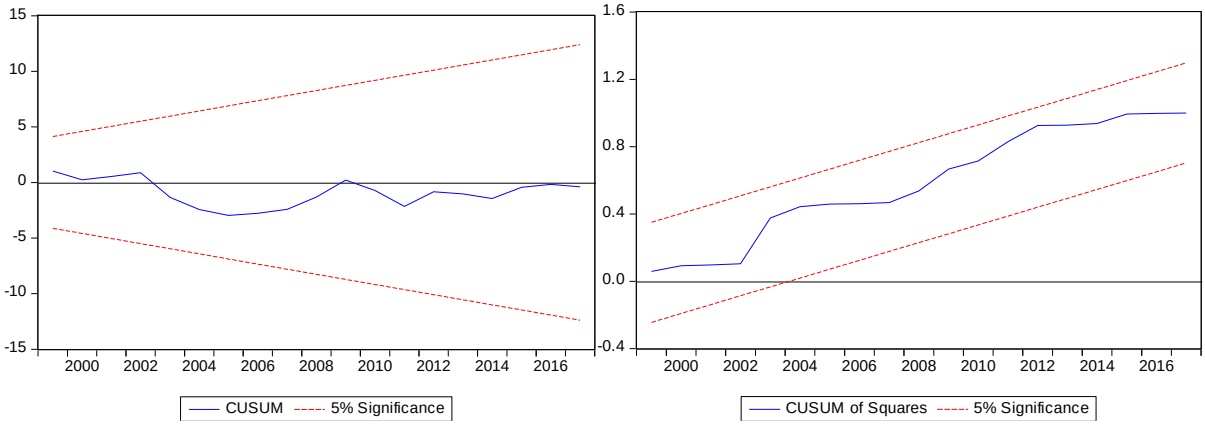

Figure 2. CUSUM and CUSUMQ Results

When we look at Figure 2, it is seen that the coefficients obtained in the period analysed for the ARDL(4,1) model are stable. This is because CUSUM and CUSUMQs obtained are within 5% confidence interval.

After determining the ARDL model, the equation to be used in the bounds testing has been formed. Equation 3 shows the equation used in the bounds testing. By using this equation, long-term relationships between variables were tested.

$$\Delta UNEMP_t = \theta_0 + \sum_{i=1}^{m} \theta_{1i} \Delta UNEMP_{t-i} + \sum_{i=0}^{n} \theta_{2i} \Delta LMS_{t-i} + \theta_3 UNEMP_{t-i} + \theta_4 LMS_{t-i} + e_{1t} \quad (3)$$

To test the long-term relationships between variables, the following hypotheses have been established for the ARDL bounds testing:

$$H_0 : \theta_3 = \theta_4 = 0 \text{ (no cointegration)},$$

$$H_1 : \theta_3 \neq 0 \text{ or } \theta_4 \neq 0 \text{ (cointegration)}.$$

The hypotheses have been tested using Wald F statistics. In other words, a Wald F test has been used to test whether $\theta_3 = \theta_4 = 0$. This statistical value obtained to decide on hypotheses has been compared with the lower limit I(0) and upper limit I(1) values, obtained from the study by Pesaran et al. (2001:300). If the calculated statistical value is higher than the critical value I(1), then H0 is not rejected, leading to a conclusion that there is a long-term relationship between the variables.

Table 4. ARDL Bounds Testing Results

K	F-Statistic	1% Critical Values	
		I(0)	I(1)
1	**7.29***	4.94	5.58

Table 4 shows the ARDL bounds testing results. According to these results, the H_0 hypothesis is rejected because the F statistic value (7.29) obtained is higher than the critical value I(1) (5.58). This means that the LMS variable affects the UNEMP variable in the long term. Taking into consideration these finding, it can be said that military spending has an effect on the unemployment rate in the long term. After this stage, it should be determined whether the error correction mechanism works, as well as determining the extent and direction of the effect of independent variables on the dependent variables in the long and short term. Also, it should be tested whether the independent variables have a statistically significant effect on the dependent variable. The error correction mechanism is tested employing the model 4.

$$\Delta UNEMP_t = \theta_0 + \sum_{i=1}^{m} \theta_{1i} \Delta UNEMP_{t-i} + \sum_{i=0}^{n} \theta_{2i} \Delta LMS_{t-i} + \theta_3 ECM_{t-1} + e_{2t} \qquad (4)$$

A statistically significant ECM(-1) coefficient in model 4 in the range of 0 to -1 indicates that the imbalances between the variables are improved in the short term. Table 5 shows the error correction model results. Besides, short-term and long-term coefficients can also be found in this table. According to these results, ECM(-1) coefficient is between 0 and -1, and it is statistically significant. This shows that the short-term deviations in the model have reached an equilibrium in the long term.

Table 5. Short-Term and Long-Term Coefficients

Short-Term Coefficients and Error Correction Model				
Variable	**Coefficient**	**Standard Error**	**t-Statistics**	**Prob.**
ΔUEMP(–1)	**0.324****	**0.145**	**2.227**	**0.038**
ΔUEMP (–2)	-0.048	0.146	-0.327	0.746
ΔUEMP (–3)	**-0.426**	**0.152**	**-2.808**	**0.011**
ΔLMS	-0.293	0.319	-0.916	0.371
ECM(-1)	**-0.701***	**0.142**	**-4.917**	**0.001**
Long-Term Coefficients				
Variable	**Coefficient**	**Standard Error**	**t-Statistics**	**Prob.**
LMS	**-2.386***	**0.547**	**-4.357**	**0.001**
C	**25.450***	**3.788**	**6.717**	**0.001**

* Expresses significance according to 5% level of significance.

If we look at Table 5, there is no statistically significant relationship between LMS and UNEMP in the short term. However, it has a statistically significant effect on the UNEMP variable in the long term. A 1% increase in the LMS variable in the long term increases the UNEMP variable by approximately 2.386%. This means that changes in military spending have a significant impact on the unemployment rate in the long run.

Also, according to present results, ECM(-1) coefficient is between 0 and -1 and is statistically significant. The significance of this coefficient indicates that the error correction mechanism works in the model; that is, the short-term deviations in the model reach an equilibrium in the long-term.

6. Conclusions

This study, which investigates the impact of Turkey's military spending on the unemployment rate for the period 1988-2017, suggests that military spending does not have any impact on the unemployment rate in the short-term. However, military spending in the long-term decreases the unemployment rate. In other words, military spending in Turkey has resulted in reduced unemployment in the long run. Findings of this study resulted in similar to the studies Paul (1996), Baran, Paul and Sweezy (1966), Huang and Kao (2005) and Azam et al. (2015). This finding, in particular, coincides with the results of Üçler (2017) which carrying out paper for Turkey.

The unemployment problem is one of the most critical problems for policymakers of Turkey, which has an unemployment rate of around 14.7% as of 2019. As an alternative way to resolve this issue, it may be suggested to compensate the arms imports with the domestic defence industry, which is a particularly important item in military spending.

The positive movement between Turkey's remarkable investments in the defence industry and its macroeconomic performances in the last 15 years cannot be coincidental. Looking at the most massive arms exporting countries, it is evident that their industries are developed, and they do not suffer from an unemployment problem. Turkey's efforts to develop the domestic defence products and to become less dependent on export will also reduce unemployment. At this point, it is considered that Turkey's investments and activities in the defence industry may be the solution to the unemployment problem in the long-term.

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