The Impact of Military Spending on The Economic Growth of Arab Spring Countries

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Abstract
The present research explores dynamics of expenses on military and economic growth in four major Arab spring countries by using data from a balanced panel in a period from 2000 to 2014. Results of Kao cointegration report on the existence of long-run equilibrium in the relationship between economic growth and spending on military in all the countries. The FMOLS reports revealed a significant positive effect of military expenditure on economic growth of all four north Arab African countries (Libya, Egypt, Tunisia, Yemen and Iraq). For long-term Granger causality, this study adopted the panel vector error correction mechanism (P-VECM). Results indicated that in the long-term, not all countries have had Granger causality running from economic growth to military expenditure or vice-versa. The present research concludes that spending in the military division in the respective countries is in long-term not essential for the economic growth. While growth of GDP resulted in military expenditure in the short run, military expenditure does not show any short-term effect on the growth of GDP.
Keywords: Military Expenditure, Economic Growth (GDP), Arab Spring Countries, FMOLS, P-VECM

Introduction
Provide its security against internal and external threats. Defense spending are composed of production (or import from other countries) of tools and vehicles used in defense, repair and maintenance costs for the tools and vehicles, expenditures for R&D activities and the military and civilian staff employed in defense field. Governments arrange the share they separate for defense spending by taking the welfare of their country into consideration. If they feel a threat, they decrease the investments which will increase the welfare of the country and increase defense spending. The effect of defense spending on the economy is one of the most discussed subjects today. Many countries separate more share to defense spending compared to education, health and infrastructure expenditures. In scope of international relations and from the point of view of European Union and France, Mediterranean region

has a strategic importance. Due to the instability after Arab spring, especially Maghreb region has a specific importance. Security gap in many Arab countries constitutes a threat for all Mediterranean and Southern Europe. Therefore it is important to examine the defense spending of Mediterranean countries and the effects of these expenditures on their economies.

The international environment, especially towards the end of the Cold War, has been characterized by a growing tendency to reduce military spending and to allocate it to development spending in general. However, it is noted that military expenditures continue to increase in many countries. Weaponry issued by some international institutes specialized in this field contributes to the increasing global trend of spending on the military sector. This, in turn, indicates that the high rates of increase in these expenditures is not limited only to the developed countries, but belong to many developing countries in Asia, Latin America, and the Middle East. These countries spend much of their wealth on their national army. These countries purchase weapons to increase their national security and protection themselves against external as well as internal actual and potential threats.

The issues of military spending in developing countries are major problems, as the facts and the available resources indicate that in recent decades these countries have wasted vast resources on armaments that could have been directed to address poverty and underdevelopment and to achieve the sustainable development.

It is also empirically evident by a latest study Odhiambo (2015),conducted in South Africa, which reveals that in a short-run economic growth and government expenditure are interrelated whereas in the long-run government expenditure is affected by economic growth of a country. Different kinds of government expenditures have different effects on the growth of an economy. For example, the expenditure on health, education and public infrastructure are considered to be productive and has a positive effect on economic growth. While government expenditure on non-productive spending are subject to a reduction in income growth and hence a negative effect on economic growth. According to Shahbaz et al. (2013), military expenditure has negative impact over economic growth of a country while non-military spending have positive impacts. Although, these theories show the positive relationship of productive government expenditures with economic growth and negative relationship of non-productive spending on economic growth, empirical evidences do not always support it. Military expenditure is considered to be non-productive government expenditure and hence it should have a negative impact on economic growth because it crowds out the investment from productive spending's like health, education and infrastructure hence retarding the economic growth. Hou and Chen (2013) provide experiential evidence to support this hypothesis so that the results can be generalizable to a number of other countries. They conducted study on 35 developing countries and they used the data over the period of 1975 to 2009. They concluded that military expenditures have negative and significant impacts on economic growth of a country. According to the latest study, which includes 106 countries and in which data used for analysis from 1988 to 2010, the results show the strong evidences supporting the negative relationship between the military expenditure and economic growth Dunne and Tian (2015). They also found that in some countries military spending has no any effect on economic growth. While Keynesian type aggregate demand effects suggest that military expenditure may enhance economic growth. This theory suggests that any type of government expenditure has a positive effect on economic growth. Hassan, Waheeduzzaman, and Rahman (2003) and Yildirim, Sezgin, and

Öcal (2005) also support their hypothesis of the positive relationship between military expenditure and economic growth. Hence, there are no clear-cut conclusions that can define the effect of military expenditure on economic growth. The latest study by Pan, Chang, and Wolde-Rufael (2015) also concludes the inconsistency of results. The results of the study reveal that there are no such findings which can be generalized about the relation of military expenditure and economic growth. Deger (1986)argues that there are simultaneous changes and counter effects are present that makes the final causality quite difficult. Since of irregularity in the comes about of thinks about on this point, it is imperative to observationally examine the relationship between military spending and GDP. This paper points to analyze the impacts of military consumptions on GDP of the Arab spring countries the period of 2000-2014 by utilizing a panel data investigation. The reason for this investigation is to look at the relationship between the military spending and GDP of the five countries the period of 2000-2014 by Applying panel data approach. The study does not only contribute to the literature on military expenditure and economic growth in the context of a developing economy, but it has implications for military and economic policymaking.

The Importance of Studying

The scientific importance of the study lies in its monitoring of the subject of military spending, which is currently a fundamental issue in many countries, especially those that seek to maintain their security in the face of security threats. However, they are required to develop economically and meet the needs of society, Economic, and social. The importance of this study is that it examines the controversial relationship between military spending and economic growth by analyzing the positive and negative effects of military spending on economic growth.

The Study Problem

What are the limits of the impact of military spending on growth in Arab spring countries? The following sub-questions fall under this problem:

    I.   What is military spending and growth?
    II.   What are the factors and reasons that lead to increased military spending?

Objectives of the Study

I.   To examine the impact of military government expenditure on economic growth in Arab countries
II.   To empirically investigate the short run and long-run relationships between the components of military government expenditure and economic growth.

Military Expenditure and North African Countries' Growth

North African countries are among those countries that have not been at the focus in the literature on government expenditure and economic growth. These countries are characterized by large economic imbalances due to high expenses, and the vulnerability of government incomes to external shocks.

In addition, as the result of the 7 years-standing Arab spring conflicts until now including North African countries except Algeria, the military burden as the result of spending for military expenditures, is very high by international standards. Nearly all of these countries have carry out some economic adjustments—mainly through reducing expenses. However, with the rapid growth of population and the vulnerability of incomes to external shocks,

persistent per capita economic growth is still a main challenge. policymakers are increasingly conscious about the need to improve a macroeconomic environment that would be encouraging to private investment and help economic growth. Given the principal role of the public divisions in North African economies, particularly in terms of a) the resources they control, b) their contribution to output, and c) their impact on economic incentives. Also public investment reform and moving expenditures to productive capacities are important elements for coping with this challenge. Thus it is important to determine which government functions are creative and which are not. While there have been many attempts to examine the relationship between military expenditures, and economic growth for Mid-East countries Askari and Corbo (1974). To the best of our knowledge, there have been no studies on the causal relationship between the different types of government expenditure, separated into productive and nonproductive spending, with economic growth.

 Leibovik & Ishaq (1987), that high military burdens stifled economic growth in the Middle East in (1973-1982). If the annual economic growth rate in that period was 0.6%, the average annual military expenditure increased by 0.13%. It is also shown that oil exporters have increased their military spending because of the economic growth they have achieved from rising oil prices.

In a study of military spending in Arab countries and its impact on economic growth, Al-Faris (2002) found that in most Arab countries, "analysis shows that there is an inverse association between the military burden and economic growth rates. , Such as Saudi Arabia and Tunisia, and to a lesser extent in the UAE and Morocco, and in other middle countries such as Egypt, Syria, and North Yemen. In contrast, countries that did not show this negative relationship between the two variables (Kuwait, Oman, although positive, but weak, and in most cases not significant "He said. He said that the biggest burden of the expansion of the military sector in the years of financial prosperity in the Arab countries ... has occurred on development spending. He pointed out that military spending constitutes a net economic cost for the Arab countries, despite the positive aspects that contribute to it.

During the 1970's and 1980's, the growth rate of military expenditure in the Arab world was higher than that of GDP and fixed gross capital formation. As a result, more scarce resources have been diverted from productive sectors (or from the civilian sector) to the military sector. The fact that Arab countries were able to overcome this problem in the early 1970s with the help of soaring oil prices and other raw material prices, as well as foreign economic and military aid, the 1970s and 1980s brought with it many developments, exacerbating the problem of defense financing. The most significant of these developments was the decline in the prices of raw materials in basic and real values, the drop in oil prices beginning in 1982, the reduction of foreign aid from major countries, the volume of assistance from the Arab Gulf countries due to their departure for the Iraq-Iran war, Imported military. At the end of his study, economic models that were estimated by statistical means showed that military spending had direct and strong negative effects on economic growth, investment and employment rates. This spending has obvious inflationary effects, particularly in non-oil countries. Arab countries and geographical neighbors, characterized by high rates of military spending, have, on the other hand, achieved modest rates of economic growth. Defense spending was also a strong contender for social spending, particularly capital formation. Political decision makers seem to recognize that reducing social spending, especially education and health spending, to finance the military establishment may lead to destabilizing the very foundations of national peace or creating strong opposition. Therefore, the main victim of military spending was development allocations. As the latter is mainly

directed towards future investments, the bulk of the defense burden is borne by the fact that future generations will be in the form of lower investment rates and higher inflation. In this context, Al-Faris (2002)pointed out that governments, in order to win popular support and support in the present, may shift the cost of opportunity to future generations. This is done by maintaining positive growth rates for public spending and increasing allocations for defense spending without harming social or development spending. This funding is financed not by taxes borne by the current generation, and not by the deficit of the budget, the bulk of which is now borne by the current generation in the form of high inflation rates, but by financing through internal and external debt. Debt includes costs for future generations, as the tax rates they pay must be increased or some of the privileges they receive to meet the debt service must be sacrificed.

Literature Review

Military spending and economic growth are disputable cases because military spending seizes the big amount of budget as well as it is trades off between productive and nonproductive spendings of a state. The research of case was coined by Benoit (1973) he wrote about 44 less developed countries (LDCs). This noted the positive effect of military expenditure on economic growth.

Ever since then many investigators have attempted to discuss this issue in different contexts with different methodological models. According to government spending and economic growth are linked to together Chude and Chude (2013).

Benoit (1978) conducted by research on military expenditure and economic growth in developing countries which detected the positive relationship between military expenditure and economic growth. He discussed that economic growth can be increased by growing aggregate demand over more expenditure on the military, particularly in developing countries because they have the generally underutilized resource which can be utilized to generate more jobs and in turn, economic growth will raise. According to Keynesian demand theory (1930), military spending raises the aggregate demand which in turn leads to economic growth. Hassan et al. (2003) studied the impact of military spending on economic growth of 5 out of 7 SAARC countries by utilizing panel data of the time of 1980 - 1999. They discover the positive correlation between the military spending and economic growth in SAARC countries. It finished that military spending can bring positive effect on economic growth. Dimitraki and Menla Ali (2015) also discover the similar outcome. Furthermore, examine of Yildirim et al. (2005) on Middle Eastern countries finished the appropriate relationship between defense spending and economic growth. Deger (1986) also talk that economic growth and military spending are linked. It is considered that military spending takes away the resources from the investment and failure to mobilize and make an extra investment, therefore, it is the obstacle for economic growth (Deger (1986)He also examined 44 less developed countries same as (Benoit (1978) Empirical analysis drawn the negative relationship between military spending and economic growth. The outcome is in disparity with (Benoit, 1973; Benoit, 1978) who finished the positive relationship between military spending and economic growth. He furthermore proposed that military spending can boost up economic execution over investment on social and physical infrastructure such roads and ports, and training and research, so the society will be improved which will lead to higher economic performance.

The economic growth is negatively impacted in these countries by military expenditure because of more funds used in military spending the less available for investment Hou and Chen (2013).

They empirically clear this event, they examined military spending and economic growth of thirty five developing countries from 1965 - 2010. The outcome of their research display that there is the important and negative effect of military expenditure on economic growth. Shahbaz et al. (2013) also argue that military expenditure have negative impact on economic growth.

Chang, Lee, Hung, and Lee (2014) conducted the examination in China and G7 countries on the relation between military spending and economic growth from 1988- 2010. The result was different among countries, concluding that these results cannot be generalized to other countries. On the other hand, Grobar and Porter (1989) saying there is no relationship between military spending and economic growth.

Defense spending and economic growth have causality relationship Kollias, Manolas, and Paleologou (2004). They studied the fifteen EU countries and finished the result was mixed in term of causal direction. According to Kollias et al. (2004), the majority of the EU countries displayed unidirectional causality from the economic growth to defense spending. On the other hand, the results for 5 countries out of fifteen displayed no casualty between variables. Yildirim et al. (2005) also support this opinion and the outcome proposed that military spending is exogenous variable and it may impact economic activities of the countries. They concluded that the relationship between military spending and economic growth by analyzing the data of 10 Middle East countries from 1988 to 2010. The outcome also detects that there is a contradiction of results about the relation among military spending and economic growth.

In a study prepared by Al-Yousif (2002), the causal relationship between military expenditure and economic growth in six countries of the Arabian Gulf region - Saudi Arabia, Iran, Kuwait, UAE, Oman and Bahrain - That the relationship between military expenditure and economic growth is uneven in the countries of the Gulf region. In Saudi Arabia, causation is positive and extends from military spending to economic growth; however, this does not happen in the short term. Spending on defence takes a long time to boost economic growth. It also shows that government spending and liberalization of foreign trade do not appear to be important determinants of the impact of defence spending on economic growth. In Kuwait, however, military spending reduces economic growth in the short and long term. However, in Saudi Arabia, military spending and economic growth are not affected by government spending or the degree of liberalization of foreign trade. However, the results indicate that military spending in Bahrain leads to economic growth in the short and long term. Both government spending and trade liberalization tend to promote economic growth in the short term, while trade liberalization alone leads to more military spending. In the United Arab Emirates, there is a causality between military expenditure and economic growth. While military spending leads to short- and long-term economic growth, economic growth leads to increased expenditure on defense in the short term only. Here, too, as in Bahrain, both government spending and trade liberalization have a positive impact on economic growth. But unlike Bahrain, it is trade liberalization that encourages military spending rather than government spending in the UAE. He concluded that the relationship between military expenditure and economic growth could not be generalized in all countries.

a study carried out by Abu-Bader and Abu-Qarn (2003) aimed to find out whether there is any relationship between government expenditure (civilian and military) - and economic growth in three countries of the Middle East and North Africa (Egypt, Israel and Syria).

According to that research, governments play a noticeable role in economies, and a large amount of expenditure goes to the military sector. The study started from the idea that government expenditure is behind macroeconomic instability and low growth rates in these countries, over the past three decades. that research also studied the effect of reducing and shifting government expenditures, to see if this would lead to higher rates of economic growth. The study was based on the idea that the economies of these countries have the highest rates of military burdens, and that these countries will gain the benefits of peace by reducing military budget. results indicated that if total government expenditure is considered, there is a two-way relationship between government expenditure and economic growth. however, this relationship has been negative in the long-term in the case of Israel and Syria. that in the case of Egypt, the study also revealed causality towards a unilateral and negative trend in the short term from economic growth to government expenditure. Additional investigations have revealed that military budgets may be behind these findings. In order to test this hypothesis, the total government expenditures and military expenses were dismantled to civilian to test the causal relationship between three variables. The results revealed that in all cases, the military budget adversely affected economic growth. The impact of government civilian expenditure in Israel and Egypt resulted in positive economic growth, while it negatively impacted Syria's long-term economic growth. It was also found that military expenditure was external and did not originate from civilian government expenditure or economic growth. Findings of the present research is in the seme line with the previous studies, which concluded that. in the Middle East, the military budget is not determined by economic elements, but by the geopolitical situation of the region.

Data and Methodology
This paper applied to panel data of Military expenditure and GDP of five Arab spring countries over the 2000 to 2014 years. One panel includes Arab economies: Libya, Yemen, Egypt, Iraq and Tunisia. The annual data of Military expenditure and GDP. Military expenditure measured as the ratio of military expenditure to GDP, and GDP measured in constant 2010 dollars.
The data of military expenditure and GDP are taken from: Ministry Planning of Libya, Ministry of Finance Libya, and Central Bank of Libya (CBL), WORLD BANK and Arab monetary fund which was in constant US dollar.
The data series are annually ranging from 2000 to 2014.

Estimation Results
Descriptive Statistics (DS)
Table (1) presents the results of the descriptive statistics. The rows show the variables of GDP, and GEM, in this order. Column two and column three show the measures of central tendency used – the mean and the median. These are the representative values of the variables used. column four depicts the dispersion of the variables from their mean values (central tendency). The dispersion is measured by standard deviations. columns five and six show the nature of statistical distributions that are contained in the data applied. The nature of data used was measured using the departure from symmetry (skewness) and the peaks of the distributions (kurtosis). columns seven and eight, measure the statistical significance of the results of the descriptive statistics, using the Jacque-Bera statistics and the probability thereof. All values, except skewness and kurtosis, are stated in billions of US dollars at their 2010 constant prices. The mean values of GDP and GEM are also stated in billions of US dollars at their 2010 constant. In the beginning, a series of statistical tests should be carried out on the variables

represented in the study model and for a sample consisting of five Arab spring countries, this is illustrated in the table 1 below:

Table 1. Descriptive Statistics (DS) all of North African Countries

Variables	Mean	Median	Std.Dv	Skewness	kurtosis	J.Bera St	Probability
GDP dep	96.33388	67.69200	73.68491	1.245269	3.575205	16.33409	0.000284
GEM indp	2.643490	2.715000	2.171396	1.040803	3.878497	12.76210	0.001693

Table 1 shows that the mean values of GDP and GEM are 96.33388 and 2.643490 respectively. Their median values are 67.69200 and 2.715000, respectively. Since the mean values of the variables are greater than their median values for all variables, the distributions of all the variables are negatively skewed, showing that the distribution of the variables studied is not normally distributed. The majority of the countries have lower mean distributed values than the overall mean values for all the countries studied. The standard deviations of the variables are 73.68491 and 2.171396 representing GDP, and GEM respectively. These results show that for all variables, the standard deviations are lower than the mean and median. This clearly shows that there are no significant variations in the value of the variables used in the empirical work of this paper. The values of skewness of GDP and GEM are 1.245269 and 1.040803 respectively. This means that none of the variables used in this paper presents skewness that is equal to the skewness of a normal distribution of zero (0.0). The variables used in this study are, therefore, skewed and are not symmetric but asymmetric. A further analysis of the data contained in Table1 shows that the Kurtosis of the variables used in this paper is higher than the normal Kurtosis values of 3.0. The Kurtosis of the variables is 3.575205 and 3.878497 for GDP and GEM respectively. This clearly demonstrates that the peak of the statistical distributions of the variables is higher than a normal distribution. This type of distribution is called leptokurti. The measures of the statistical significance of the distributions based on the Jacque-Bera statistic are 16.33409 and 12.76210, standing for GDP and GEM respectively. The associated probability values are all less than 0.05 as shown in Table 1. These clearly show that the above descriptive statistics are significant and that they are not normally distributed Thus, the variables used in the empirical analysis in this thesis are not normally distributed for several reasons, which are: (i) the mean and the median are significantly different. (ii) the values of skewness of the variables used in the study are higher than zero, (iii) the Kurtosis of the majority variables are more than 3.0 and (iv) the Jacque-Bera Statistics are significant. The implication is that the data used in the analyses of this paper are not normally distributed.

Panel Unit Root Test Results
in any empirical research, when the data series is non-stationary, there is a risk of spurious results in time series as well as panel data. therefore, in the present research, the stationary properties of panel data were also examined to identify and transform non-stationary series into stationary. First, the data on the gross domestic product (GDP), and military expenditure (GEM) were transformed by taking natural logarithmic values to control heterogeneity bias, and then transformed series were tested for stationery through LLC test, Breitung t-stat, IPS test, ADF test, PP test and Hadri. table 3 below presents the results. The results suggest that GDP, and GEM   have a unit root in the first stationary series. While unit root test results

further reveal that not all series contains unit root in Level, the data is non-stationary at levels but stationary at first differences.

Table 2. Panel Unit Root test (GDP is the dependent variable)

Variables	Type of test	At level I(1)	At 1st difference1(0)
GDP	LLC	-1.77362 (0.0381)	-3.62469 (0.0001)
	Breitung	0.56580 (0.7142)	-2.06201 (0.0196)
	IPS	-0.97954 (0.1637)	-1.75892 (0.0393)
	ADF	11.8545 (0.1578)	20.7951 (0.0077)
	PP-Fisher	17.5974 (0.0245)	33.6189 (0.000)
	Hadri	4.19616 (0.0000)	-
GEM	LLC	0.91911 (0.975)	-3.78 (0.0001)
	Breitung	4.84366 (1.0000)	-1.64 (0.0496)
	IPS	3.161 (0.999)	-2.64040 (0.0041)
	ADF	1.46092 (0.999)	23.20 (0.0100)
	PP- Fisher	1.403 (0.9992)	31.97 (0.0004)
	Hadri	4.721 (0.000)	-

*Note: ** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. IPS Test assumes asymptotic normality.*

Three of the unit root tests used in this thesis assumed that there is a common unit root process across the countries. These tests are the LLC, Breitung and Hadri. The null hypothesis of the LLC and Breitung tests state that the panel data exhibits a common unit root process. Hadri's null hypothesis states that the cross-sectional units have no common unit root. As opposed to common unit root processes, which assume that there is a persistent unit root (Pi) common across all cross-sections, IPS, ADF-Fisher and PP-Fisher tests assume that individual cross-sectional units have separate unit root processes so that Pi is not common.

These tests are featured by combining individual unit roots to estimate the panel unit root. The IPS, Fisher-ADF and Fisher-PP tests state in their null hypothesis that the individual cross-sectional units do not have a unitary root against the alternative hypothesis that they do have unit root in their panel data.

Based on the above, the six methods of testing the unit root were applied to evaluate the time-series properties of data in Arab spring countries. The null hypothesis of LLC is that all of the variables used do not contain unitary roots and that the unit root is common across the countries. A careful examination of the unit root test statistics in Table 2 reveals that all five variables estimated, using the LLC method, had unit root at the level, that is, without differencing. This means that the null hypothesis that all the variables are stationary cannot be accepted. However, when the data are differenced once, there are no unit roots in the differenced data.

Breitung (2001) also assumed a common unit root process across the panel units. The null hypothesis of this unit root process is that the variables involved do not have a common unit root in all the panel data. A careful perusal of the data in table 2 shows that all the variables in the table have a common unit root. Thus, the null hypothesis that there are unit roots in the data cannot be rejected. When the variables are differenced once, the result shows that there is no unit root in the data. Therefore, all the variables are integrated of order one.

The IPS test assumes that the data applied to the analysis of this thesis do not have unit roots. This null hypothesis is rejected in all the variables. However, all the variables are first difference stationary. The same remarks apply in the case of ADF-Fisher and PP-Fisher tests. Not all the variables were stationary at a level. All the other variables were stationary after the first differencing.

Hadri (2000) presents a unique situation in this study; its null hypothesis is that the panel data variable contains no unit root that is common to the entire panel and therefore, the data used in the analysis are stationary. Because the hypothesis placed emphasis on its null hypothesis by allocating the null hypothesis a 95% chance of being true, it could not reject the hypothesis that any of the variables are stationary. Hence, it accepts the hypothesis that the variables contain no unit roots that are common among the panel units.

In summary, table 2 show that all the variables are integrated of order one. This shows that if the variables comprise a pure time series, the application of OLS regression in estimating the long-run relationship between the variables would have given a super consistent estimate of their parameters. The reason is that a combination of co-integrated variables in OLS regression yields super consistent estimates of parameters (Greene, 2012). However, (Baltagi, 2014) argued that in OLS panel data settings, co-integrating variables do not yield super consistent estimated variables.(Baltagi, 2014) stated that in panel co-integrated regression models, the asymptotic properties of estimators of regression coefficients and associated statistical tests are different from those of time series co-integrating regression models.

Panel Co-integration Test Results
This current study tested for the existence of co-integrating relationships among the variables with two-panel co-integrating testing methods. These tests are (Kao & Chihwa, 1999) co-integration test. The data on which co-integrating relationships were examined are the figures of GDP, GEM.

Table 3. Kao Test

ADF	-2.091589(0.0182**)
Residual variance	215.0353
HAC variance	325.0156

As all variables were I (1), to examine the null hypothesis of no cointegrating relationship the Kao test was employed. The alternative hypothesis to the null hypothesis was the existence of a cointegrating relationship. Results of Kao test for the cointegration revealed a significant correlation at 5% level.   Therefore, the Kao test results support a significant panel cointegration between the GDP and expenditure on the military at 0.05 level**.**
  The Kao statics are statistically significant at 0.05 level, approving overwhelming support for panel cointegration.

Fully Modified Least Square
Since the cointegrating relationship does not account for the long/short-run dynamics of the variables, for to find out long-term elasticities, the Fully Modified Least Square (FMOLS) was employed. Table 4 below, presents the result of estimation and inference in the panel data cointegration regression models. The methods applied follow that of (Kao & Chihwa, 1999), (Phillips & Moon, 1999) and(Pedroni, 2001),(Krenz, 2012) , (Jun, 2012). These researchers recommended the application of co-integrating regression methods like VEC, DOLS and FMOLS, canonical cointegration regressions (CCR) and pooled mean group (PMG) in estimating panel data cointegrating data. This current paper, therefore, applied FMOLS in this case.
Table 4 indicates the long-run elasticities examined through FMOLS. The study examined long-run elasticities for all the 5 countries along with the panel group. Table 4 reports the results of individual and panel cointegrated cases. Results indicated a positive relationship between expenditure on military and GDP. The individual FMOLS results show a positive impact of expenditure on GDP due to expenditure on the military. In the case of Libya, a slight increase in military expenditure has resulted in a significant increase (27.5%) in the growth rate. It is also true in the case of Egypt, which reveals a significant positive relationship between military budget and economic growth. For Egypt, 1% change in overall expenditure on military results in 47.4% change in economic growth. Among the four countries, the highest impact of military expenditure on economic growth is seen in Tunisia. It is evident from the results of FMOLS that 1 % increase in military expenditure increases economic growth by 68.4%, Yemen shows a positive relationship between economic growth and expenditure on military. In Yemen, a 1% increase in expenditure on military increases the economic growth to 25.6%, finally Iraq shows a positive relationship between economic growth and expenditure on military. In Iraq, a 1% increase in expenditure on military increases the economic growth to 35.6% in the long run.

Table 4. Long-run Elasticity coefficient of FMOLS (the dependent variable is GDP)

Country	GEM	t-statistic	Prob
Libya	27.52135	3.592825	0.0033
Egypt	47.41024	10.12606	0.0000
Tunisia	68.46940	24.20342	0.0000
Yemen	25.69556	16.01647	0.0000
Iraq	35.65490	14.06541	0.0000
Panel Group	34.41291	12.47111	0.0000

*The null hypothesis for the t-ratio is $H0 = \beta i = 0$; ** denotes 5% level of significance*
All the Arab spring countries experience positive influence of military expenditure on economic growth in long-run. The panel group FMOLS also showed significant positive influence on economic growth. A 1% increase in military expenditure increases 34.41 % in improving economic growth in the long run.

Panel Granger Causality (VECM)
The model of Engle and Granger (1987) employed in this study suggests a two-step process to investigate the short run and long run dynamic relationships between the military budget and the economic growth. In the first step, the long-term model was estimated and in the next step, the lagged residuals obtained as the error correction term (ECT) were determined. The estimation of dynamic Vector Error Correction Model (VECM) is as follows:

$$\begin{pmatrix} \Delta GDP_{i,t} \\ \Delta GEM_{i,t} \end{pmatrix} = \begin{pmatrix} \phi_{i,1} \\ \phi_{i,2} \end{pmatrix} + \sum_{I=1}^{m} \begin{pmatrix} \theta_{1,2,K} \\ \theta_{2,1,K} \end{pmatrix} \begin{pmatrix} \Delta GDP_{i,t} \\ \Delta GEM_{i,t} \end{pmatrix} + \begin{pmatrix} \lambda_1 \\ \lambda_2 \end{pmatrix} ECT_{i,t-1} \begin{pmatrix} \psi_{1,i,t} \\ \psi_{2,i,t} \end{pmatrix}$$

In this model, the term Δ presents first differences, $\phi_{i,j}$(j, k = 1, 2) presents the fixed country effect; I (I=1,....m) presents the lag length determined by the Schwarz information Criterion (SIC), and ECT_{t-1} presents the estimated lagged error correction term (ECT) resulting from the long run cointegrating relationship. The term λ_i presents the adjustment coefficient, and $\psi_{1,i,t}$ presents the disorder term, which is expected to have zero mean.

Table 5. Panel Granger Causality Test result based on PVECM

Short run			Long run
	$\Delta LGDP$	$\Delta LGEM$	ECT
$\Delta LGDP$	………….	8.706422(0.0129)	0.041910^a 2.384455^b $(0.0194)^c$
$\Delta LGEM$	5.827293(0.0543)	……………	0.102889^a 3.342587^b $(0.0012)^c$

Notes: 1): ^{a,b,c} *denote the sum of coefficients, statistics value, and p-value, respectively. 2) Chi-square statistics testing for short run causality through the joint significance of Wald test, and t-statistics testing for long run causality through the error-correction adjustment coefficient. 3) ** Statistical significant at 0.05 level*
Table 5 demonstrates the dynamics of spending on military and economic growth in five Arab countries (Arab spring countries) both in the short run and long run. The panel, vector error correction, does not support the long-term Granger causation between military expenses and economic growth, results also indicate a short-run Granger causation witnessed

from military budget to economic growth. Consequently, results confirm that expenditure on the military can cause economic growth in the short run as well as in the the long-term.

Conclusion

The military expenditure impact on economic growth by Arab governments remain a big question that is yet to be answered in the empirical literature. Therefore, in this paper we contribute to the empirical literature by examining the relationship between military expenditure and economic growth by using a Fully Modified Least Square (FMOLS) and panel Granger causality model approaches. used a balanced panel of 5 Arab spring countries spanning 2000 to 2014. The estimation techniques used for this study include: cointegrating regression tests (FMOLS a long-run elasticities); Granger causality test. The results from the FMOLS long-run elasticities reveals that military expenditure have a negative long-run impact on growth that mean is no long-run relationship between military expenses and economic growth selected countries .From the panel Granger causality test, the overall results of the panel model show that there is a bidirectional causality between military expenditure and economic growth in Arab spring countries.

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