The Impact of Military Expenditure on External Debt: The Case of 35 Arms Importing Countries

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ABSTRACT
This study aims to empirically test the effects of military expenditure on external debt of 35 arms importing countries by using the annual panel data from the year 1995 to 2016. The panel was divided into two income classes (upper-middle and lower-middle), and the basic sample was also divided into five different regions (Middle-East and North Africa, South and East Asia, Latin America, Europe and Central Asia, and Sub-Saharan Africa) to achieve further robustness in the study. The empirical results of pooled mean group estimators suggest that military expenditure generally increases the external debt burden in the studied countries. More specifically, it was noted that military expenditure decreases external debt in Europe and Central Asia. Moreover, it was found that the interaction term of military expenditure and growth rate is positive and significant in all of the sub-samples, except upper-middle class, the Middle East and North Africa, and Latin American regions. Thus, it may be concluded that military expenditure often increases external debt burden in countries where the debt management system is weak. Countries with weaker debt management systems need to devise economic policies that curtail their military expenditure, reduce their external debt and improve their economic condition.

Introduction
According to the Stockholm International Peace Research Institute (SIPRI), $1.7 trillion was estimated to be the world military expenditure for the year 2017 (SIPRI Yearbook 2018). It was also reported that the world military expenditure consecutively rose from the year 1999 to 2011, but remained relatively stagnant from 2012 till 2016. However, there was a rise in the expenditure again in 2017, and it currently stands at 2.2% of global Gross Domestic Product (GDP) (SIPRI Yearbook, 2018; SIPRI Fact Sheet, 2018). The resurgence in militarization could be attributed to the rise of military expenditure in the countries of Asia and the Middle East, such as Saudi Arabia and India, depicting a global shift in military expenditure away from the Euro-Atlantic Region (SIPRI Yearbook 2018).

The significance of military expenditure in debt accumulation was first highlighted by Brzoska (1983). He asserted that during 1979, 20–30% of the debt burden in the developing countries was due to the armament expenditures. Military expenditure can translate into external debt mainly through two channels. Firstly, military expenditures are financed either through public debt or taxes. Therefore, if domestic avenues fall short in providing sufficient funding for military expenditures, the alternative for developing countries is to seek foreign loans. Secondly, arms imports which are a major part of the military expenditure require foreign reserves. Insufficient foreign reserves may also compel developing countries to resort to external debt to finance their military expenditures.
Over the long run, the economic growth of a country is negatively influenced by increased military expenditure (Dunne and Tian 2013). It was observed that during the industrial revolution in England, the capital formation was 5% slower because the debt crowded out savings accumulation (Williamson 1984). Similarly, after the first and the second world war, the accumulated stock of debt became a burden on economic growth (Caruso and Di Domizio 2016), a stance shared by numerous scholars (Antonakis 1997; DeRouen 2000).

Therefore, it is pertinent to examine the nexus of external debt and military expenditure. Although external debt may not have harmful effects over-reliance on foreign loans may lead to an excessive debt balance which may, in turn, cause currency devaluation, negative trade balance and slower economic growth (Smyth and Narayan 2009). The ‘guns-butter trade-off’ asserts that foreign reserves are scarce. Therefore, if they are used to purchase arms, it will divert money away from capital and investment goods that are necessary for sustainable economic growth (Looney and Frederiksen 1986).

Although there is ample work done to investigate the effects of military expenditure as well as external debt on economic growth, less focus has been given to the association between external debt and military expenditure (Azam and Feng 2017). However, the recent war on terror has revived the interest of scholars in this area, and several studies have been conducted to investigate the nexus between public debt and military expenditure recently (Caruso and Di Domizio 2016). This paper also intends to contribute to the scant literature on the relationship between the military expenditure and external debt by focusing on 35 arms-importing and developing countries.

Seminal work in this field was of Looney (1989), in which they grouped 61 developing countries into unconstrained and constrained groups using factor analysis. The constrained group consisted of the countries which have scarce financial resources, whereas the unconstrained group contained the countries which have an abundance of financial resources. The categorization was based on trade patterns, governmental debt, and capital flows. They used two-stage least square estimates and reported that for the constrained group, arms imports led to debt accumulation, whereas the unconstrained group was able to finance the armament imports without increasing its debt. Later on, Looney (1998) found that in the case of Pakistan, increased military expenditures negatively affect its external debt capability. Dunne et al. (2004a) found the same result by using a sample of 11 industrialized countries and applying fixed effects, random effect and the Arellano–Bond GMM models. Wolde-Rufael (2009) also studied this relationship in Ethiopia using Granger causality tests and concluded that although defense spending increases foreign debt, servicing of the debt is easier when incomes rise.

Furthermore, some earlier work provides both long-run and short-run perspective. For example, Narayan and Narayan (2008) revealed that expenditure on defense has a positive effect on external debt, however high growth decreases the effects on external debt. Moreover, Zaman et al. (2013) conducted a study on Middle Eastern countries and found that the relationship of military expenditure with external debt is inelastic in the short-run and elastic in the long-run.

Conversely, some prior literature has found that military expenditure has no effect on debt or even in some instances, it decreases debt. For instance, Dunne et al. (2004b) reported no relation between external debt and military expenditure in the case of Argentina and Brazil. Similarly, Feridun (2005) did not find any causality between external debt and military expenditure for Argentina. Moreover, Sezgin (2004) found that military expenditure reduces external debt and the import of armaments increases external debt in the case of Turkey. Kollias, Manolas, and Paleologouc (2004) also studied this relationship in Greece and concluded that military expenditure reduces the external debt burden. Thus, although the majority of the literature supports the stance that military expenditure increases debt, there are some deviations which create ambiguity about the relationship. Therefore, more research in the area is warranted.

The developing countries simultaneously need to develop their economy and deal with their security issues. Due to the towering expenditures for security and militarization, many developing countries face rising fiscal deficits and have to take foreign loans to deal with the fiscal deficit.
Initially, the influx of foreign loans may alleviate the economic problems, but over a period of time, it becomes a burden on the country’s economy (Shabbir 2013). In developing countries, external debt may result in worsening of social, economic and political conditions. Moreover, the servicing of the loan deters economic growth and private investment while increasing inflation (Azam and Feng 2017).

Furthermore, although the effects of military expenditure on external debt have been previously studied in the context of developing countries (Brzoska 1983; Looney 1989), this study provides three contributions to the existing literature. Firstly, it uses the developing countries as the target population that import arms. Arms imports is a major component of military expenditure that specifically requires foreign reserves. Therefore, due to the foreign reserve scarcity, the country will have to resort to external debt raising its external debt balance (Dunne et al., 2004b; Mansour, 2013).

Secondly, the study divides the countries into two income levels, upper- and lower-middle-income countries, for an indepth comparative analysis and enhanced understanding of the relationship. Earlier work on the relationship between economic growth and militarization has shown that it is possible to identify variations in government spending patterns in one group of developing countries based on their resource scarcity (Looney 1989). As Looney (1987) elaborated, it may be difficult for lower-income countries to simultaneously finance for both capital investment and defense programs, whereas a higher income country can afford to increase its defense expenditures without compromising on the needed capital for economic growth.

Thirdly, the study groups the countries by regions. Smith (1980) pioneered the demand model for military expenditure. According to the model, a country’s military expenditure is a result of a country’s output and the ‘strategic environment’ in which it exists. The strategic environment is a representation of other countries’ military expenditures (Caruso and Di Domizio 2016). Moreover, Murdoch and Sandler (1984) and Dunne and Perlo-Freeman (2003) confirmed that there is an interdependence between the militarization of countries with an alliance at the regional level. Therefore, the data is divided into five regions of Middle East and North Africa, South and East Asia, Latin America, Europe and Central Asia, and Sub-Saharan Africa in the current study to understand the relationship at the regional level. The selection of 35 countries is based on the availability of external debt data and other variables for panel construction. The list of the 35 arms importing countries (arranged income-wise and region-wise) is attached in appendix 1.

Methodology
To conduct the current study, the data of 35 countries were extracted from the World Bank database from the year 1995 to 2016. Existing literature provides no firm guidelines about the control variables that should be included along with military expenditure in a model (Smyth and Narayan 2009). According to Dunne et al. (2004a), when forming a model of militarization and external debt, the objective is not to discern all the variables that are a function of borrowing, but to examine the relationship given the objective is not to discern all the variables that are a function of borrowing, but to examine the relationship given the financial capacity of the country. Therefore, most scholars have used variables that highlight the country’s capacity to use alternative financing options (Smyth and Narayan 2009). Therefore, the model for the current study incorporated variables that are the source of finance as in:

\[ ED_{it} = \alpha_i + \beta_1(MilExp)_{it} + \beta_2(GR)_{it} + \beta_3(FDI)_{it} + \beta_4(lnFR)_{it} + \beta_5(TR)_{it} + \beta_6(MilExp*GR)_{it} + \epsilon_{it} \]  

(1)

where \( ED \) stands for external debt stock as a percentage of GNI, \( MilExp \) is military expenditure as a percentage of GDP, \( GR \) is GDP Growth rate, \( FDI \) is foreign direct investments as a percentage of GDP, \( TR \) is trade as a percentage of GDP, and \( lnFR \) stands for natural logarithm of foreign reserves. The data for FR were not available, therefore the total reserves less gold (US$) was used as a proxy. Besides, \( MilExp*GR \) denotes an interaction term used to measure the effects of military expenditure on external debt in the presence of economic growth. Lastly, \( \alpha \) is the constant, \( \beta \) is the coefficient of the variables, subscripts \( i \) and \( t \) denote number of cross-sections and time, and \( \epsilon \) is the error term.
This paper uses a panel estimation technique because it allows for more variability and degrees of freedom. Moreover, as it involves the pooling of observation on cross-section over time, it allows for individual heterogeneity of the countries to be controlled for, thereby leading to better estimation in comparison to pure cross-sectional and time-series models (Smyth and Narayan 2009). More specifically, the pooled mean group estimator was used as proposed by Pesaran, Shin, and Smith (1999) which has added several advantages. It allows heterogeneity in short-run coefficients and variances according to the groups but constrains long-run coefficients to be homogeneous along with providing short-run and long-run estimations. Past studies have found that a long-run relationship could only exist in the variables when they have the same order of integration (Johansen 1995; Philipps and Bruce 1990). However, Pesaran, Shin, and Smith (1999) contend that PMG can also be used with the variables having mixed order of integration, since PMG estimator simultaneously corrects the serial correlation and endogeneity problem by choosing appropriate lags for both dependent and independent variables (Pesaran, Shin, and Smith 1999).

**Analytical Framework**

The relationship between military expenditure (MilExp) and external debt (ED) is likely to be positive since the former is a budget item that needs funding. Therefore, it will either be financed through taxes or loans, in case the taxes are not sufficient (Caruso and Di Domizio 2016). Consequently, if the domestic borrowing avenues are insufficient, the alternative is to opt for external loans especially in the context of developing countries (Looney 1989; Dunne et al., 2004a). We also hypothesize the same to be true for the two income classes and the five regions, but the magnitude of impact may be different in each group.

The second variable is GDP growth rate and we postulate that an increase in GDP growth rate should decrease external debt. Fast-growing economies have a tendency to reduce their debts and the future need for borrowing (Azam and Feng 2017). Moreover, Dunne, Perlo-Freeman, and Soydan (2004b) reported a negative and statistically significant effect of GDP growth rate on external debt. Thirdly, arms imports is a major component of military expenditure that specifically requires foreign reserves. Therefore, if a country has insufficient reserves, it will have to resort to external debt (Dunne et al., 2004a). For this reason, foreign reserves are incorporated as a control variable in the current study and it is postulated that the higher the reserves, the lesser will be the country’s need to seek loans.

The fourth variable, trade, is incorporated in the framework because increased imports imply the need for the imports to be financed translating into higher demand for external debt (Looney 1989). Conversely, an increase in exports implies an influx of money which will help a country reduce the burden of external debt. It is, thus, hypothesized that the higher the trade balance, the lesser will be the need to resort to external debt. Finally, FDI may be another important factor that affects a country’s external debt because it impacts the host country’s economy in many ways. It influences employment, development, income and general welfare of the people (Azeez, Oladapo, and Aluko 2015). Therefore, FDI brings money into the country and it is hypothesized that the increased FDI will have a negative impact on external debt.

In addition to the above control variables, taxes and monetization are two important sources of funding for the government. Through tax accumulation and monetization, the government can finance its expenditures, such as military needs, and reduce the need for external debt. Kugler and Tammen (2012) indicated that high tax revenue and printing money alleviate the need for external debt. Keeping the significance of monetization and taxes, these variables should also have been added to the model, but they could not be added due to the unavailability of data.

Furthermore, the interaction term was added in the econometric model to empirically test the simultaneous effects of military expenditure and economic growth on the external debt. The coefficient of interaction term can be interpreted by identifying the threshold of growth rate beyond which the effects of military expenditures and external debt vary. Following the methodology of
Munemo (2017), the threshold level of growth rate was calculated beyond which military expenditure does not add to external debt. If $\beta_1$ (coefficient of MilExp) is positive and $\beta_6$ (coefficient of interaction term, i.e. Growth Rate*MilExp) is negative and vice-versa, then the threshold value of growth rate will begin to have a negative impact on external debt. The breakeven point is written as follows:

$$\text{Growth Rate} \geq \frac{\beta_1}{\beta_6}$$  \hspace{1cm} (2)

On the other hand, if the $\beta_1$ and $\beta_6$ are both positive or negative, it implies that military expenditure has an unambiguously positive or negative effect on external debt.

**Findings and Discussion**

**Summary Statistics**

*Table 1* shows the summary statistics of the variables. The mean of external debt as a percentage of GNI is 46.65% and the mean for Military expenditure as a percentage of GDP is 1.81%. The remaining control variables of GDP Growth Rate, Foreign Direct Investment, Foreign Reserves and Trade have a mean of 4.38%, 3.06%, $7.14$ Billion and 66.35%, respectively. Moreover, external debt has a standard deviation of 28.69 and military expenditure has a standard deviation of 1.13.

**Cross-section Dependence and CIPS Unit Root Tests**

Firstly, Pesaran CD test was applied to ensure the homogeneity of the panel. *Table 2* reports the results of CD test and shows that all the variables have cross-sectional dependence in the panel. In addition, CIPS test was also applied to ascertain the stationarity status of the variables. *Table 2* illustrates the results of CIPS test that show that external debt, military expenditure, foreign reserves, GDP growth and trade are non-stationary at level and stationary at first difference, i.e. $I(1)$, whereas foreign direct investment is stationary at level, i.e. $I(0)$. Hence, it is concluded that variables have a mixed order of integration, therefore Pooled Mean Group Estimation (PMG) can be applied to estimate the models.

| Table 1. Descriptive statistics of variables (1995–2016). |
|----------------------------------------------------------|
| **ED % of GNI** | **Milexp % of GDP** | **GR** | **FDI% of GDP** | **InFR (US $ Billion)** | **TR % of GDP** |
| Mean | 46.65 | 1.81 | 4.38 | 3.06 | 71.4 | 66.35 |
| Std. Dev. | 28.69 | 1.13 | 3.36 | 2.92 | 343 | 31.30 |
| Maximum | 280.94 | 9.46 | 33.74 | 31.24 | 3860 | 220.41 |
| Minimum | 2.56 | 0.37 | –13.13 | –5 | 0.116 | 15.64 |

*Source: Author’s Estimation.*

| Table 2. Test for cross-sectional dependence, panel unit root results. |
|----------------------------------------------------------|
| **Panel A:** Variables |
| **Pesaran CD Test** | 14.17 | 22.9 | 110.39 | 13.92 | 88.85 | 19.12 |
| **P-Value** | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Panel B:** |
| **CIPS (Level)** | –2.075 | –1.979 | –1.018 | –2.926*** | –1.772 | –1.773 |
| **CIPS (1st Difference)** | –4.019*** | –3.978*** | –2.76*** | –5.217*** | –3.604*** | –4.19*** |

*Source: Author’s estimation.*

*** denotes as 1% significance level.
Panel Cointegration Test

After ensuring the stationarity, as mentioned in the above status of the data series, the long-run relationship was assessed between variables. Pedroni panel cointegration test was run on different panels as per the income classification. The results are displayed in Table 3. It is revealed by the results that variables have a long-run relationship because at least four out of seven statistics reject the null hypothesis of no cointegration.

Pooled Mean Group Estimation

In order to estimate the econometric models, pooled mean group estimator was used. Table 4 reports the long-run and short-run estimations of overall, upper-middle, and lower-middle income panels. The results suggest that military expenditure has a positive and statistically significant impact on external debt in all of the given panels, indicating that an increase in the proportion of military budget increases the external debt. It possibly occurs when a country finances its military budget through external resources due to the lack of domestic resources and foreign reserves, which ultimately increases external debt. These findings are consistent with the results of the past studies (Looney 1998; Wolde-Rufael 2009; Ahmed 2012).

In addition, the control variables indicated that greater economic growth reduces external debt. These findings are also corroborated by the findings of Wolde-Rufael (2009), Ahmed (2012) and Smyth and Narayan (2009). They argued that the larger economy has larger tax bases and more extensive domestic leverages to finance its government debt, thereby reducing the pressure of

| Table 3. Panel cointegration for. | Overall | Upper-Middle Income | Lower-Middle Income |
|----------------------------------|---------|---------------------|---------------------|
|                                  | Statistics | Statistics | Statistics |
| Panel v-Statistic                | −0.609   | 0.086              | −0.347              |
| Panel rho-Statistic              | 3.79     | 2.064              | 1.931              |
| Panel PP-Statistic               | −6.524***| −2.051***          | −7.514***          |
| Panel ADF-Statistic              | −8.098***| −2.99***           | −9.099***          |
| Group rho-Statistic              | 7.493    | 4.392              | 5.092              |
| Group PP-Statistic               | −2.455***| −2.987***          | −1.988***          |
| Group ADF-Statistic              | −2.955***| −2.313***          | −2.3***            |

The level of significance is as follows: ***<0.01

| Table 4. Pooled mean group estimations by income classification. | Overall | Upper-Middle Income | Lower-Middle Income |
|-------------------------------------------------------------|---------|---------------------|---------------------|
| Long-run coefficients                                       |         |                     |                     |
| MilExp                                                      | 11.208***| 37.464***          | 5.358***          |
| GR                                                         | −5.844***| −7.977***          | −14.754***        |
| FDI                                                        | 1.557***| 7.774***           | 0.917             |
| lnFR                                                       | 1.063    | 33.594***          | 2.569             |
| TR                                                         | −0.414***| −0.124             | 0.006             |
| MilExp*GR                                                   | 0.512*   | −2.949             | 2.619***          |
| Short-run coefficients                                      |         |                     |                     |
| ECT                                                        | −0.159***| −0.074***          | −0.162***         |
| D1(MilExp)                                                 | −1.399   | −6.181*            | 1.443             |
| D1(GR)                                                     | 0.091    | 0.094              | 1.044             |
| D1(FDI)                                                    | −0.596*  | −0.247             | −0.636            |
| D1(lnFR)                                                   | −1.708   | 0.023              | −5.199***         |
| D1(TR)                                                     | 0.193*** | 0.342***           | 0.016             |
| D1(MilExp*GR)                                              | −0.855   | −0.515             | −1.232            |
| Constant                                                   | 7.996*** | −55.234***         | 4.026*            |
| Observations                                               | 770      | 374                | 396               |

The level of significance is as follows: ***<0.01, **<0.05, *<0.1.
external debt. This implies that richer countries have a better capacity to make their debt repayments. Similarly, the relationship between trade and external debt was found to be negative in the upper-middle countries. It means if an economy is open for trade, it will have reduced external debt. However, the open economy of the lower-middle countries significantly increases the external debt. On the other hand, foreign reserves significantly increase the external debt of the upper-middle countries; however, the relationship becomes insignificant in the case of lower-middle economies. The flow of foreign direct investment increases external debt in all of the three panels.

Interestingly on the other hand, the interaction term between military expenditure and growth rate of overall and lower-middle income panels was found to be statistically positive and significant, whereas the interaction term of upper-middle-income countries was found to be statistically negative and significant. This implies that the positive and negative effect of military expenditure on external debt varies depending on the level of growth rate. The threshold level of growth rate for each of the panel was estimated by the proposed methodology. It was concluded that military expenditure has an unambiguously positive and significant effect on external debt in overall and lower-middle income regions. However, for the upper-middle-income countries, the estimated threshold level of growth rate is 12.7% - (37.464/-2.949). In other words, when the growth level of upper-countries is at par with or greater than 12.7%, military expenditure will have a negative effect on external debt.

**Robustness Check**

For the robustness check, Arellano and Bond’s (1991) GMM technique was applied only on the overall sample. Table 5 reports the GMM estimations for the overall sample and indicates that the results are robust with the PMG estimation. The same technique could not be applied to the sub-samples. According to Samargandi et al. (2015), GMM estimator produces spurious results when N is small and T is large. Pesaran (1999; 1995) stated that GMM technique only captures short-run dynamics of panel data and the assumption of homogeneity of lagged dependent variables leads to biased results. Within the case of large time span, the required number of instruments becomes larger and the validity of Sargan test of over-identification becomes doubtful.

In this case, the sub-samples have small N (for upper-middle = 17; lower-middle = 18) and large T (t = 22 years). Therefore, the GMM technique might have led to biased results for the sub-samples. In order to assess the robustness of the sub-samples, the composition of the basic sample was changed into different regions and PMG was applied. The regions included Middle and North Africa (i = 4, t = 22), South and East Asia (i = 8, t = 22), Latin America (i = 12, t = 22), Europe and Central Asia (i = 5, t = 22), and Sub-Saharan Africa (i = 6, t = 22). According to Gaies, Goutte and Guesmi (2019), robustness of the results can be checked through several ways: by inserting alternate variables, including new control variables, using different time periods and changing the composition of the basic sample.

Table 6 reports the long-run and short-run PMG estimations of all of the above five regions. It is shown that military expenditure increases the external debt of all the regions except in Europe and Central Asia, and Sub-Saharan Africa. As it is noted in the panel of Europe and Central Asia, the countries selected in this specific region (The list is attached in appendix.) are both arms importers.

#### Table 5. GMM for the overall panel.

| External Debt | Coef. | t-stats | Prob. |
|---------------|-------|---------|-------|
| ED.1          | **0.847** | 129.210 | **0.000** |
| MilExp        | 0.490 | 1.210 | 0.226 |
| GR            | −1.827 | −24.840 | **0.000** |
| FDI           | 0.396 | 7.150 | **0.000** |
| InFR          | −0.313 | −5.420 | **0.000** |
| TR            | 0.242 | 13.880 | **0.000** |
| MilExp*GR.    | 0.076 | 1.920 | 0.054 |

The bold values mentioned in the Table are the lag values of the dependent variable.
and exporters. These countries are usually involved in the imports of weapons’ raw materials. Thus, these findings can be justified as the spending on arms raw material, in turn, increases the manufacturing of weapons and hence, decreases the external debt of the country.

However, mixed results were found between growth rate and external debt. In Middle-East Asia and Latin America, the high growth rate increases the external debt, whereas in South-East Asia, Europe, and Sub-Saharan Africa, higher growth rate reduces the external debt of the regions. Additionally, it was found that the flow of foreign investments is positively related to external debt, however the inverse relationship was found in Latin America and Sub-Saharan Africa. In a similar way, open economy for trade reduces the debt burden of Middle-East Asia, South-East Asia and Latin America. However, a positive relationship was found between trade and external debt in Europe and Sub-Saharan Africa.

Importantly, a mixed relationship was also found between the interaction term and external debt. The coefficient of interaction term is positive and significant in Europe and Central Asia and Sub-Saharan Africa, but statistically negative and significant in Middle-East and North-Africa and Latin America. This implies that the effect of military expenditure on external debt becomes negative in Middle-East and North-Africa, when the growth rate of the region reaches 7.13% (33.825/-4.739). It is noticed the effect of military expenditure on external debt turns negative in Latin America, when the minimum growth rate of the region is 6.73% (148.436/-22.080). However, an unambiguous positive effect of military expenditure was found on external debt in South and East Asia. Surprisingly, it was found that the effect of military expenditure on external debt becomes positive when the growth rate level of Europe and Central Asia is 8.34% (−13.246/1.588). It means high growth rate in this specific region increases the debt burden with respect to military expenditure. Similarly, it was noted that military expenditure increases external debt of Sub-Saharan Africa when the growth level reaches 2.568% (−45.849/17.851) indicating that low growth rate increases debt burden on the African economies.

**Conclusion**

This study has investigated the impact of military expenditure on external debt in 35 arms importing and developing countries. We divided the data into two income classes and five regions in order to gain a deeper understanding of the relationship and more robustness in

| Table 6. Pooled mean group estimations by region-wise. |
|-----------------------------------------------|
| **External Debt** | **Middle East and North Africa** | **South and East Asia** | **Latin America** | **Europe and Central Asia** | **Sub-Saharan Africa** |
| MilExp coefficients | 33.825*** | 11.372*** | 148.436*** | −13.246** | −45.849 |
| GR | 10.561* | −3.961*** | 10.896*** | −13.359*** | −38.205** |
| FDI | 0.928 | 2.753*** | −1.845 | 7.155*** | −1.980 |
| lnFR | 0.582 | −0.548 | 13.216*** | −3.384 | 21.558 |
| TR | −0.790*** | −0.393*** | −0.416* | 0.854* | 0.103 |
| MilExp*GR | −4.739*** | 0.069 | −22.080*** | 1.588* | 17.851* |
| Short-run coefficients | 0.582 | −0.548 | 13.216*** | −3.384 | 21.558 |
|ECT | −0.126 | −0.249*** | −0.111** | −0.122*** | −0.127** |
| D1(MilExp) | 0.886 | −9.933 | −6.412 | −0.137 | −0.474 |
| D1(GR) | 1.168 | −0.588 | 0.940 | −0.122 | 1.091 |
| D1(lnFR) | −0.115 | −1.201** | −0.304 | 0.666 | −1.368 |
| D1(TR) | −3.440 | 0.573 | 1.670 | −3.628 | −14.219*** |
| D1(MilExp*GR) | −0.071 | 0.234*** | 0.262 | 0.106 | 0.142 |
| Constant | −4.632 | 17.366*** | −31.558*** | 13.944*** | −35.463*** |
| Observations | 88 | 176 | 264 | 110 | 110 |

The level of significance is as follows: ***<0.01, **<0.05, *<0.1.
the findings of our study. The results of the complete sample show that military expenditure increases external debt. In the analysis of sub-samples, the results show that this is the case for lower-middle-income countries as well as for upper-middle-income countries. The region-wise results show that military expenditure has a positive and significant impact on the regions of the Middle East and North Africa, South and East Asia, and Latin America. However, it has a negative and insignificant effect in the regions of Sub-Saharan Africa, and Europe and Central Asia.

Based on the results, it can be concluded that the relationship between military expenditure and external debt varies depending upon the countries’ income level and region. Therefore, policies about military expenditure in a country should be tailored accordingly. If a country is from an income class or a region where military expenditure is causing an increase in external debt, it needs to curb military expenditure to reduce external debt. Increasing debt accumulation causes increased interest payment, and as a result, high growth developmental and investment programs have to be sacrificed to service the debt (Looney 1989; Azam and Feng 2017; Alami, 2002). Therefore, if the debt is not managed, the country will be locked into a self-contained trap with increasing military expenditure and poverty levels (Azam and Feng 2017). It could be more disastrous for lower-income countries with limited resources to manage the debt.

Therefore, the study advocates reduction in military expenditure as it will allow the reallocation of resources into productive sectors, thus improving economic development opportunities. However, based on a country’s political and security situation, it may not be possible to directly reduce military expenditure without further aggravating the conflict. Therefore, a country might have to look for ways to reduce external debt without reducing military expenditure. Since the results show that GDP growth rate and trade decreases external debt, it is recommended to devise and implement policies that promote economic growth and trade in countries facing increasing external debt.

Several directions for further research are suggested. Firstly, the biggest caveat to the present study was the unavailability of data; therefore, as more data become available in future, more comprehensive research can be conducted into how military expenditure translates into external debt. Future researchers may also focus on exploring different aspects and impacts of military expenditure on developing and developed countries by using comparative research designs. Moreover, as our results revealed that the impact of control variables on external debt changes by region, further research can be carried out to identify the causes of this phenomenon. Finally, the econometric model used in the current study can also be expanded in future research by adding several other directly or indirectly related control variables, such as tax revenues, monetization and political stability, to more comprehensively study the effects of external debt in different countries and regions of the world.

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Appendix-1: List of Countries Used as per Income Classification and Region

Table A1. Countries as per Income Classification.

| Upper-Middle Income | Lower-Middle Income |
|---------------------|---------------------|
| Algeria             | Bangladesh          |
| Brazil              | Bolivia             |
| Bulgaria            | Egypt               |
| Colombia            | El Salvador         |
| Dominican Republic  | Georgia             |
| Ecuador             | Ghana               |
| Guatemala           | India               |
| Jamaica             | Indonesia           |
| Kazakhstan          | Kenya               |
| Malaysia            | Morocco             |
| Mexico              | Nicaragua           |
| Paraguay            | Nigeria             |
| Peru                | Pakistan            |
| Romania             | Philippines         |
| South Africa        | Sir Lanka           |
| Thailand            | Tunisia             |
| Turkey              | Tanzania*           |
|                    | Uganda*             |

Groupings are made according to World Bank Classifications. *Tanzania and Uganda are low-income countries and instead of creating a panel of just two countries, we have merged them in lower-middle-income countries.

Table A2. List of Countries as per Region.

| Middle East & N. Africa | South & East Asia | Latin America | Europe & Central Asia | Sub-Saharan Africa |
|-------------------------|-------------------|---------------|-----------------------|--------------------|
| Algeria                 | Bangladesh        | Bolivia       | Bulgaria              | Kenya              |
| Egypt                   | India             | Brazil        | Georgia               | Nigeria            |
| Morocco                 | Indonesia         | Colombia      | Kazakhstan            | Tanzania           |
| Tunisia                 | Malaysia          | Dominican Republic | Romania | Uganda              |
|                         | Pakistan          | Ecuador       | Mexico                | South Africa       |
|                         | Phillipines       | El Salvador   | Nicaragua             | Ghana              |
|                         | Sir Lanka         | Guatemala     | Jamaica               |                    |
|                         | Thailand          | Mexico        | Perú                  |                    |