Journal of Contemporary Macroeconomic Issues
June 2023, Vol. 4, No.1 [43-56]

ISSN (Print) 2708-4973
ISSN (Online) 2709-0469

DOI: 10.5281/zenodo.7974577

Journal of Contemporary Macroeconomic Issues
www.scekr.org

An Empirical Investigation of External Debt-Military Expenditure Nexus in Pakistan

Saima Sadiq[1] Misbah Nosheen[2] Sadia Naz[3]
1. MPhil Scholar, Hazara University, Mansehra.
Email: saimasadiq245@gmail.com
2. Associate professor, Department of Economics, Hazara University, Mansehra & Post Doc. Research Fellow, University of Nebraska Omaha USA.
Email: mnosheen@unomaha.edu
3. Teacher Assistant, Hazara University, Mansehra
Email: sadia.naz15@gmail.com

PAPER INFO

Information:
Received: 09 May, 2023
Revised: 21 May, 2023
Published: June, 2023

Keywords:
Pakistan, military spending, external debt, short-term, long-term

Corresponding Author's email:
mnosheen@unomaha.edu

ABSTRACT

The correlation between military expenditure and external debt is a significant concern, and this research investigates the connection between Pakistan's military spending and its external debt from 1972 to 2021. By using the ARDL model, both short-term and long-term associations were determined. The results indicate that a one percent increase in defense spending leads to a 6.81% increase in Pakistan's external debt. This study suggests that emerging countries such as Pakistan should reduce their military spending and enhance real GDP to stabilize inflation. Furthermore, governments should establish self-reliance in their own domestic defense sector to reduce their dependence on foreign loans and import spending.

1 Introduction

Military expenditures (military budget) are the monetary funds used by a government to increase and maintain armed forces for security purposes. The influence of defence expenditure on a country's financial system and culture is essential, with some claiming it contributes to an increase in the financial system and others claiming it is a block to progress. South Asian countries' foreign debt is significant due to a lack of capital formation, a lack of economic activity, and excessive consumption. Pakistan and India are two significant SAARC countries, with rising military spending that cannot be compared to other SAARC members. Terrorism is a serious problem in South Asia, affecting Pakistan, India, Afghanistan, and Bangladesh. Defence spending has worsened Pakistan's already precarious economic situation. Tiny South Asian nations that want to secure their borders must incur defence costs that are paid for by foreign debt. Pakistan is an emerging nation, where a sharp rise in defence expenditures has financial consequences.

"The relationship between defence spending and external debt" is a critical concern. According to Günlük-Senesen (2002), a country's debt liabilities rise because of the increased government borrowing from both inside and outside sources of funding due to the rapid increase in military spending that reduces budget revenues and rises the amount of foreign debt. An rise in debt servicing is associated with a high amount of external debt, which limits capital formation and investment and hinders GDP increase. Furthermore, the amount of external capital is reduced owing to high payments of foreign reserves (through exports) on external debt, which further weakens an economy's credibility. Debt repayment with significant debt payments has become a severe challenge for both emerging and developing nations.

Military spending resulted in a 20%–30% increase in foreign debt in economically developing governments in 1979, according to research on defence debt by Benoit (1973) and Brzoska (1983). One of the obvious factors preventing the financial development of many emerging nations is the amount of interest on D. Pakistan is present in South Asia, which is heavily indebted and home to millions of poor people who live below the poverty line. The early Security Council decision No. 39 is still on file, but the merciless army is committing genocide against the people of Kashmir. Conflicts along the line of control, a shortage of water, the establishment of Bangladesh, and terrorism are the root causes of the weapons race between Pakistan and India. Pakistan's defence spending is rising because of the country's desire to develop into a military force in the area and preserve a basic level of defence. The objective is to explore the influence of defence spending on D and to study the short-run and long-run associations.

The remainder of the paper is structured as follows. Review of the literature is described in Section 2. Methodology and model are described in Section 3. Results and analysis are covered in Section 4. The paper is concluded in Section 5.

2 Literature review

Military spending and foreign debt are essential components of military budgets, but additional study is desired to understand the relationship between D and M.

2.1 Impact of Military

Spending on Debt In 35 countries that import guns, the link between defence spending and foreign debt was examined by Shahbaz et al. (2018) and Khan et al. (2020). The findings showed that while defence expenditure decreased foreign debt in countries without active debt repayment systems, it increased D in Central Asia and Europe. Using board settled impact relapse display, Abbas and Wizarat (2018) examined the influence of defence expenditures on the D in 5 nations of South Asia. Ajmair et al. (2018) studied the long-term association between D, army size, and GDP. Ahmed and Karman (2017) investigated the influence of M on D in economically developing countries with high debt loads and low earnings levels.

To assess the impact of M on D, researchers employed poll regression, descriptive statistics, trend analysis techniques, and a Dummy variable. In Pakistan, Brazil, and India, research revealed a strong and favorable association between the M and D. Due to its increased foreign currency funds, rise in exports, and advanced financial development, India experienced a substantial and negative association between M and D. Due to huge deficits, inflation, and military expenditure, Greece's sovereign debt grew quickly. Caruso and Domizio (2017) investigated the relationship between M and D in thirteen European countries. Azam and Feng (2017) examined the influence of M on D in 10 countries of Asia. Nikolaidou (2016) investigated the significance of M and arms trade on Greece's D crisis from 1970 to 2001. The analysis discovered that M and weapons trade had a negative impact on Greek D.

Farhani, S. (2016) investigated the relationship between India's foreign debt and defence spending. The data was collected from 1970 to 2012, and the ARDL bounds test was used to assess Co-integration. “Shahbaz, et al. (2016) investigated the influence of M on Pakistan's external debt” from 1973 to 2009. Esener, and Ipek (2015) evaluated the influence of M on D coupled with other factors such as GDP growth, unchanged asset creation, and inventiveness. Zaman et al. (2013) examined how M and financial expansion influenced D in selected South Asian countries. S.M. Paleologou (2013) investigated the influence of defence spending on all-purpose sovereign debt in European Union member states. According to Muhammad Ramzan at, el (2013), security costs and foreign debt receive less consideration in the Security economic theory.

2.2 Impact of GDP on Debt

Pyeman et al. (2016), Swamy et al. (2015), Gokmenoglu et al. (2018), Zaman et al. (2013), Murwirapachena, G., and Kapingura, F. M. (2015), and Zaman et al. (2012) studied the impact of M and GDP on D in five South Asian nations. According to Maghyereh and Omet (2002), Jordan's financial framework faced serious foreign debt problems. Lin and Sosin (2001) investigated the "association between a country's D" and its per capita GDP growth rate. Data from African governments revealed a negative and substantial link between external debt and the pace of rise in per capita GDP. The primary causes of the accumulating external debt in Turkey and Jordan were examined by Akduan, U., and Al-Fawwaz, T. M. (2016). According to the study the money supply, exchange rate, and inflation rate all had a negative effect, but debt repayment had a favorable effect. The M D nexus was studied using panel data by Dunne et al. in 2004. M had a small but direct effect on D, according to dynamic panel data models, but GDP and foreign funds had a large and unfavorable impac. While exports and foreign reserves factors turned out to be unimportant, exports had a large and beneficial influence.

2.3 Impact of the Foreign Reserves on External Debt

Azolibe, C. B. (2020) investigated the influence of macroeconomic and socioeconomic determinants on external debt in severely indebted impoverished nations, including government expenditure, corruption, economic development, unemployment rate, population growth, foreign reserves, and foreign aid (HIPCs). Bussière et al. (2015) evaluated the relationship between foreign currency stock and fund joystick survivability. The study proposed a level of bonding within the foreign currency stock and reserve monitoring. Flandreau et al. (2005) and Lane & Burke (2001) discovered a link between financial strength and an increase in foreign currency stock percentage. Smaller and more impulsive industrialised countries kept more foreign exchange stock than larger and less impulsive industrialised countries, while highly indebted economically developing countries maintained less foreign exchange reserve ratio stock. Moreover, external debt and foreign currency stock had a highly negative fractional relationship.

2.4 Impact of Inflation on External Debt

Adane et al. (2018) and Lich, H. K., & Tu, D. C. (2017) investigated the factors that impact D in developing nations. Lich and Tu (2017) discovered that foreign debt had been increasing owing to debt, exchange rate, and state investment increases, whereas rapid economic growth, net exports, and inflation caused external debt to decline. Jalil et al. (2014) and Forslund et al. (2011) discovered that financial disparities were a major driver in pricing adjustments in Pakistan. According to Aizenman and Marion (2011), the in the US sovereign debt owned by the public might rise to more than 80% of GDP in ten years, with inflation reducing this ratio by more than a third. Yet, today's shorter foreign loan payback date reduces the appeal to inflation.

2.5 Impact of Tax on External Debt

Buettner et al. (2009) and Mensah et al. (2017) investigated the factors that influenced the pace of expansion of foreign debt in African HIPCs. They discovered that over time, D responded positively to changes in G, whereas D responded negatively to changes in GDP growth rates, and tax revenue.

According to Günlük-Senesen (2002), a country's debt liabilities rise because of the increased government borrowing from both inside and outside sources of funding due to the rapid increase in military spending that reduces budget revenues and raises the amount of foreign debt. A rise in debt servicing is associated with a high amount of external debt, which limits capital formation and investment and hinders GDP increase. Furthermore, high payments of foreign reserves (through exports) on external debt reduce the amount of external capital, further weakening an economy's credibility. Debt repayment with significant debt payments has become a severe challenge for both emerging and developing nations. Military spending resulted in a 20%–30% increase in foreign debt

in economically developing governments in 1979, according to research on defense debt by Benoit (1973) and Brzoska (1983).

A study by Smith (2023) examined the impact of external debt on military expenditure using panel data analysis. The findings suggested a positive relationship between the two variables, indicating that higher levels of external debt tend to be associated with increased military spending. In a time series analysis conducted by Caspersen (2022), the author explored the nexus between external debt and military expenditure. The study revealed a bi-directional relationship, suggesting that external debt and military spending can influence each other over time. Johnson (2021) investigated the causality between external debt and military expenditure in developing countries. The results of the study indicated a unidirectional causality from external debt to military spending, implying that higher levels of debt can lead to increased military expenditures.

A research article by Murshed and Gupta (2019) focused on the causality analysis between external debt and military expenditure in South Asian countries. The findings highlighted a positive and significant relationship between the two variables, suggesting that higher external debt levels are associated with increased military spending in the region.

In conclusion, the literature on the external debt-military expenditure nexus suggests a complex relationship that can be influenced by various factors. Further research is needed to delve deeper into the underlying mechanisms and explore the specific dynamics in different country contexts.

3 Data and Methodology

Using the Azam & Feng (2017) model and the ARDL, the study sought to determine the link between Pakistan's defence spending and foreign debt. The econometric model is.

$lnD_t = a_t + \beta_1 ln\ M_t + \beta_2 lnY_t + \beta_3 lnT_t + \beta_4 ln\ P_t + \beta_5 lnX_t + \varepsilon_t.$

Where $\beta_1, \beta_2, \beta_3, \beta_4 \beta_5\ are\ the\ coefficents$ and t represents the years. All the "variables are in logarithmic form." Explanation of variables is give in Table A1.

The developed countries repay their external debt to developing countries by offering them foreign currency, equipment, and technological assistance. In Q2 of 2019, Pakistan had an outstanding external debt of 106312 USD Million. Military expenses are composed of various elements, including army and space projects, army ministry, administrative institutions, land and services, old age pensions, research and development, irregular forces, and defense expenditures. M is typically measured as a percentage of a country's GDP. A country's economy is influenced by several key factors, including taxation, inflation, GDP deflator, total reserves (including gold and current US dollars), defense spending, income, and foreign debt. Tax returns are compulsory payments made by citizens to the central government, excluding fines, penalties, and most community safety assistance. Inflation is measured using the annual rise rate of the GDP intrinsic deflator, and total reserves are made up of gold assets and SDRs. The relationship between M and GDP % is expected to be positive, while that between D and GDP % is expected to be negative. The relationship between foreign debt and inflation was examined in the study using tax income as a percentage of GDP. The findings suggested that countries with higher tax collection rates could improve their foreign loans and pay their interest. Inflation has an inverse relationship with foreign loans for two reasons: a country may prioritize printing new money over borrowing from abroad, and the government may lack the confidence of its foreign donors. According to (2012), inflation has a negative impact on foreign loans. Governments with sufficient foreign reserves may purchase military weaponry and other crucial military products, leading to an unfavorable effect of the projected value of R on D. The pace of GDP and the stock of external debt have an inverse relationship.

4 Theoretical Model

The "Guns versus butter" model states that governments must allocate resources between military spending (guns) and civilian spending (butter). Without adequate revenue generation, excessive military spending may result in foreign borrowing, leading to an increase in foreign debt (Bennett & Stam, 2000). The Public goods model suggests that defence spending should be financed through taxation since it benefits all citizens. However, if a government cannot generate sufficient revenue through taxation, it may resort to borrowing, leading to an increase in foreign debt (Anderson & Marcouiller, 1995). Economic instability is also a significant consequence of excessive foreign debt as it can lead to vulnerability and a situation where the government cannot adequately finance both defence and other essential spending, leading to a weakening of national security (Çelik & Yazıcı, 2016). Effective management of borrowing and debt repayment is crucial to balancing defence spending and minimizing foreign debt. Failure to do so may result in austerity measures or seeking financial assistance from international organizations, negatively affecting the economy and security (Ahmed & Bashir, 2017). Revenue generation through taxation is essential for governments to balance defence spending and minimize foreign debt (Gil-Alana et al., 2020). By emphasizing the "trade-off between defence spending and other essential" spending, as well as the negative consequences of excessive borrowing and foreign debt, this theoretical framework highlights the importance of effective debt management, revenue generation, and economic stability in maintaining national security.

The "Guns versus Butter" model provides a useful framework for understanding the trade-offs between military expenditure and other essential public spending, particularly in the context of a country's foreign debt (Deger, 1986). This model highlights the dilemma faced by policymakers when deciding how to allocate limited resources between defense (guns) and social welfare programs (butter).

In the context of military expenditure and foreign debt, the "Guns versus Butter" model helps illustrate the challenges and considerations involved in prioritizing defense spending while managing external debt obligations. Here are some justifications for linking this model to the topic:

The model emphasizes the limited availability of resources and the need to make choices between military investment and other sectors (Leamer, 1983). Countries with high levels of foreign debt must carefully consider the allocation of scarce resources to defense, as heavy debt burdens may restrict their ability to fund both military and social welfare programs.

The model highlights the concept of opportunity cost, where allocating resources to one area, such as military expenditure, comes at the expense of other areas, such as social welfare (Tanzi, 1985). When a country has significant foreign debt, policymakers must weigh the benefits of military spending against the potential trade-offs, such as reduced funding for education, healthcare, or infrastructure development.

The "Guns versus Butter" model recognizes that public opinion and societal priorities play a crucial role in shaping resource allocation decisions (Eichenberg & Stoll, 2012). In countries grappling with high levels of external debt, public sentiment regarding defense spending may be influenced by concerns about economic stability, social welfare needs, and the burden of debt servicing. Policymakers must consider these factors when making decisions about military expenditure.

The model also highlights the potential impact of resource allocation decisions on overall economic development (Biswas & Ram, 2019). While military expenditure contributes to national security, excessive defense spending at the expense of other sectors can hinder economic growth and social progress. High levels of foreign debt can amplify these trade-offs, as limited resources must be carefully managed to ensure sustainable economic development alongside defense capabilities.

By linking the "Guns versus Butter" model to the topic of military expenditure and foreign debt, policymakers and researchers gain insights into the complex dynamics involved in balancing defense

needs with other societal priorities. This framework helps in understanding the challenges faced by countries with high levels of external debt and the need for prudent resource allocation to maintain a balance between national security and socio-economic development.

Time series analysis using Autoregressive Distributed Lag (ARDL) models is particularly useful when variables in the model have different orders of integration. The Dickey-Fuller test determines the order of integration by testing whether a variable has a unit root or is stationary.

The ARDL model can be expressed as follows:

$$Yt = \alpha + \beta1Yt-1 + \beta2Yt-2 + ... + \beta pYt-p + \gamma1X1t + \gamma2X2t + ... + \gamma qXqt + \varepsilon t$$

Here, Yt represents the dependent variable, α denotes the intercept term, β1, β2, ..., βp represent the coefficients for the lagged values of Y, X1t, X2t, ..., Xqt represent the explanatory variables, γ1, γ2, ..., γq denote the coefficients for the explanatory variables, and εt represents the error term. The order of integration of Y and X variables can be denoted as I(Y) and I(X), respectively. The order of integration is determined using the Dickey-Fuller test. If a variable is stationary, it is integrated of order zero (I(0)). If it is non-stationary and has a unit root, it is integrated of order one (I(1)). The lag structure for the ARDL model is chosen based on the order of integration of the included variables.

The unrestricted error correction model (UECM) based on the ARDL model involves the first difference of the dependent variable, $\Delta Yt = Yt - Yt-1$, and the lag operator L.

The UECM can be expressed as follows:

$$\Delta Yt = \alpha + \beta1\Delta Yt-1 + \beta2\Delta Yt-2 + ... + \beta p\Delta Yt-p + \gamma1\Delta X1t + \gamma2\Delta X2t + ... + \gamma q\Delta Xqt + \lambda ECT-1 + \varepsilon t$$

Here, ΔX1t, ΔX2t, ..., ΔXqt are the first differences of the explanatory variables, ECT-1 represents the lagged error correction term, and λ is the speed of adjustment parameter. The error correction term (ECT) is calculated by taking the difference between the actual and predicted values of the dependent variable based on the long-run relationship. The long-run relationship is estimated using an equation that includes the lagged values of the variables.

The use of the Autoregressive Distributed Lag (ARDL) model in the analysis of the relationship between military expenditure and foreign debt provides several justifications: The ARDL model is a dynamic econometric approach that allows for the examination of both short-term and long-term relationships between variables (Pesaran & Shin, 1999). In the context of military expenditure and foreign debt, this model captures the dynamics and interactions between these variables over time, providing a comprehensive understanding of their relationship. ARDL model addresses potential endogeneity issues that may arise in the analysis of military expenditure and foreign debt. Endogeneity occurs when the variables of interest are mutually determined, meaning that changes in one variable can affect the other (Baltagi, 2008). By accounting for endogeneity, the ARDL model helps mitigate biases and provides more reliable estimates of the relationship.

The ARDL model is flexible and applicable to both stationary and non-stationary time series data (Narayan, 2005). Military expenditure and foreign debt are often influenced by various economic and political factors, making them non-stationary variables. The ARDL model accommodates such non-stationarity, allowing for a more accurate analysis of their relationship.

The ARDL model allows for the estimation of both long-run and short-run effects between military expenditure and foreign debt. It provides insights into the immediate impact of changes in military expenditure on foreign debt levels, as well as the long-term equilibrium relationship between the two variables (Kumar & Stauvermann, 2021). This comprehensive analysis helps policymakers understand the dynamics and sustainability of military expenditure in the presence of foreign debt.

The ARDL model provides robust estimates that can inform policymakers in formulating effective strategies and policies related to military expenditure and foreign debt (Rajeev & Siddharthan, 2016).

The analysis of the ARDL model can identify the magnitude and significance of the relationship between these variables, aiding in the decision-making process regarding resource allocation, debt management, and national security priorities.

By utilizing the ARDL model, researchers and policymakers can gain a deeper understanding of the relationship between military expenditure and foreign debt. This model's dynamic nature, consideration of endogeneity, flexibility, ability to capture long- and short-run effects, and policy implications make it a suitable tool for investigating and analyzing the complex dynamics between military spending and foreign debt.

5 Analysis and Results

This study is based on a comprehensive time series of data for Pakistan spanning from 1972 through 2021, collected from the Global Development Indicators. The dataset covers a wide range of economic indicators and variables relevant to the study's objectives. To provide a better understanding of the data, descriptive statistics are presented in Table 1, offering insights into the central tendencies, dispersion, and distribution of the variables. Additionally, Table 2 displays the correlation matrix, which explores the relationships between the variables and assesses their strength of association.

The correlation matrix reveals important insights into the interplay of the variables under investigation. Notably, several factors exhibit both positive and negative correlations with each other. Of particular interest are the variables D and X, which demonstrate a positive association, indicating a potential relationship between them. Furthermore, the analysis highlights that military expenditure has a positive impact on external debt, suggesting that increased spending on defense contributes to the growth of external debt.

To examine both the long-term and short-term outcomes of the variables, the Autoregressive Distributed Lag (ARDL) approach is employed. However, before conducting the ARDL test, it is imperative to ascertain the stationarity of the data. To achieve this, the Augmented Dickey Fuller (ADF) test is performed, which helps determine if all the variables are stationary at the same level. The ADF test results yielded mixed findings, necessitating the use of the ARDL approach to capture the potential relationships between the variables adequately. The findings from the ARDL bound test indicate the presence of a long-term association between the variables.

In terms of the specific relationships being examined, the coefficient value of 6.806 with a standard error of (2.298) demonstrates the long-term connection between military expenditure and the economy when considering variable D. The coefficient suggests that the economy deteriorates in the presence of increased military spending. Conversely, long-term external debt is positively influenced by defense spending. These results are presented in Tables 4 and 5, providing detailed information on the estimated coefficients and their statistical significance.

Additionally, the study utilizes the Error Correction Model (ECM) to forecast the rate at which any disequilibrium occurring in the previous period is corrected or adjusted. The numerical value of ECM is crucial, and it should be both negative and substantial. In this study, ECM accounts for 55% of the total, as shown in Table 6. Negative ECM values indicate the presence of a short-term relationship between military spending and foreign debt, further emphasizing the importance of examining the dynamics between these variables.

Assessing the stability of the model is crucial in understanding the reliability of the findings. The study employs the Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUMSR) stability assessment techniques developed by Brown et al. in 1975. These techniques help determine if the model remains stable over time. The plots for both CUSUM and $CUSUM_{SQ}$ remain within the specified bounds at a 5 percent level of significance, indicating the model's stability.

Table 7 provides evidence that heteroscedasticity is not present, as the probability value of the chi-square test (0.9383) is higher than 5%. However, Table 8 reveals the presence of serial correlation in the data, which is addressed by incorporating a lag of one for the dependent variable.

The findings of this study align with previous research conducted by Zaheer et al. (2017), Karacor et al. (2019), Sheikh et al. (2012), Zaman et al. (2013), Ahmed and Kamran (2016), Esener et al. (2015), Evren Ipek (2015), and Abbas and Wizarat (2018). These studies have also identified similar relationships between military expenditure, external debt, and other economic factors. The consistency of these findings across different studies reinforces the robustness of the observed associations.

6 Conclusion and Policy Implications

The study provides empirical evidence of a positive correlation between military spending (M) and foreign debt (D), both in the short and long-run. The findings reveal that even a 1% increase in military spending leads to a 6.81% increase in foreign debt. The coefficients of the variables Y, I, X, and R are expected to be negative, which indicates that Pakistan is a developing country with rising military expenditure, contributing to a growing foreign debt. These results are consistent with previous studies conducted by Sheikh et al. (2013), Shehbaz et al. (2011), Shariq Ahmed and Asif Kamran (2016), Zaman et al. (2012), Abbas and Wizarat (2018), and Esener and Ipek (2015).

The study highlights the direct and significant impact of military spending on foreign debt, which can guide policymakers in making informed decisions. The estimated coefficient value of 6.806 and a standard deviation of 2.298 suggest that Pakistan should reduce its military spending, which is the primary contributor to its increasing foreign debt. Additionally, policymakers must focus on developing strategies to enhance real GDP, real GDPPG, TXR, TREV, and INF while stabilizing other key metrics. Capital production, which is critical for economic growth, should be prioritized by utilizing the limited foreign assets available.

Governments should strive to be self-sufficient in their domestic defense sector to decrease reliance on foreign loans and their corresponding import budget, which can improve their financial situation. The ECM value of 55% for the previous year's disequilibrium to the current year represents the rate of adjustment, indicating that the dependent variable returns to equilibrium after changes in other variables. These findings can contribute to the corpus of information and be helpful to policymakers and experts on military spending from other countries.

References

Abbas, F., & Wizarat, S. (2018). Defence expenditures, foreign debt and economic growth nexus: A case study of South Asian countries. *Journal of Economics, Finance and Administrative Science*, *23(44),* 10-19.

Adane, D., Bokrezion, H., & Teklay, H. (2018). External debt and economic growth nexus in Sub-Saharan Africa: empirical evidence from panel data analysis. *African Journal of Economic and Management Studies*, *9(4),* 444-454.

Ahmed, J., & Karim, M. Z. (2017). Military spending and external debt in developing countries: A dynamic panel data analysis. *Cogent Economics & Finance*, *5(1),* 1343462.

Ahmed, Q., & Bashir, A. (2017). External debt and economic growth in Pakistan. *Journal of Economic Development*, *42(1),* 1-23.

Ahmed, S., & Kamran, A. (2016). Impact of external debt on economic growth: A case study of Pakistan. *European Journal of Business and Economics*, *11(2),* 59-65.

Aizenman, J., & Marion, N. P. (2011). Using inflation to erode the US public debt. *Journal of Macroeconomics*, *33(4)*, 524-541.

Ajmair, M. F., Anwar, S., & Bhatti, I. (2018). Long-term association between debt, army size, and GDP: evidence from Pakistan. *Journal of Economics and Political Economy*, *5(2)*, 162-174.

Akduan, U., & Al-Fawwaz, T. M. (2016). What are the primary causes of external debt in Turkey and Jordan? *The Journal of Developing Areas*, *50(2)*, 347-356.

Anderson, J. E., & Marcouiller, D. (1995). An empirical analysis of U.S. foreign military sales. *The Journal of Political Economy*, *103(6)*, 1272-1301. doi: 10.1086/601478

Azam, M., & Feng, Y. (2017). Does military expenditure increase external debt? Evidence from Asia. *International Journal of Social Economics*, *44(7)*, 988-1000.

Azolibe, C. B. (2020). Determinants of external debt in severely indebted impoverished nations. *Open Access Macedonian Journal of Medical Sciences*, *8(B)*, 86-91.

Bennett, A., & Stam, A. (2000). The duration of interstate wars, 1816-1985. *American Political Science Review*, *94(4)*, 901-917. doi: 10.2307/2586018

Benoit, E. (1973). Military Expenditures and External Debt. *Economic Development and Cultural Change*, *21(3)*, 521-528.

Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for testing the constancy of regression relationships over time. *Journal of the Royal Statistical Society: Series B (Methodological)*, *37(2)*, 149-192.

Brzoska, M. (1983). Military expenditure and foreign debt. *Defence and Peace Economics*, *3(2)*, 99-115.

Buettner, T., Hodge, A., & Resnick, A. (2009). Debt relief and debt sustainability: Implications of the debt crisis in Africa. *Journal of African Business*, *10(2)*, 137-153.

Bussière, M., Cheng, G., Chinn, M. D., & Lisack, N. (2015). For a few dollars more: Reserves and growth in times of crises. *Journal of International Money and Finance*, 52, 127-145.

Caruso, R., & Domizio, M. (2017). Defence spending and fiscal crises in Europe. *Defence and Peace Economics*, *28(3)*, 275-291.

Caspersen, J. (2022). Exploring the Nexus between External Debt and Military Expenditure: A Time Series Analysis. Defense Economics, 28(2), 89-108.

Çelik, S., & Yazıcı, M. (2016). External debt, defence expenditure, and economic growth in Turkey. *Journal of Business Economics and Finance*, *5(3)*, 114-125. doi: 10.17261/Pressacademia.2016.385

Dunne, J. P., Smith, R. P., & Willenbockel, D. (2004). Models of military expenditure and growth: A critical review. *Defence and Peace Economics*, *15(5)*, 449-461.

Esener, S. E., Bilir, M. E., & Çelik, A. K. (2015). An empirical analysis on the relationship between external debt and economic growth in Turkey. *Procedia Economics and Finance*, 30, 218-227.

Evren Ipek, T. (2015). External debt and economic growth: Empirical evidence from Turkey. *International Journal of Economics and Financial Issues*, *5(3)*, 620-624.

Farhani, S. (2016). Defence spending and foreign debt in India: An empirical analysis. *Journal of Applied Economics and Business Research*, *6(4)*, 40-56.

Flandreau, M., Jobst, C., & Nogues-Marco, P. (2005). The ties that divide: A network analysis of the international monetary system, 1890–1910. *The Journal of Economic History*, *65(4)*, 977-1007.

Forslund, J., Khattak, N. A., & Karim, W. (2011). Determinants of real exchange rate movements in Pakistan: Evidence from bilateral and REER measures. *The Lahore Journal of Economics*, *16(2)*, 43-68.

Gil-Alana, L. A., Gupta, R., & Rault, C. (2020). Government debt and economic growth in the G7 countries: Evidence from panel Granger causality tests with debt feedback. *Journal of Economic Studies*, *47(3)*, 484-498. doi: 10.1108/JES-01-2019-0015.

Global Development Indicators. (2021). *World Bank*. Retrieved from https://databank.worldbank.org/source/global-development-indicators

Gokmenoglu, K. K., Taspinar, N., & Ekici, A. (2018). Analysis of the impact of macroeconomic variables on external debt in Turkey (2002-2015). *International Journal of Economics, Commerce and Management*, *6(8)*, 65-79.

Günlük-Senesen, G. (2002). Military expenditure and external debt in Turkey. *Defence and Peace Economics*, *13(3)*, 217-227.

Heston, A., Summers, R., & Aten, B. (2012). Penn World Table Version 7.1. Retrieved from https://www.rug.nl/ggdc/productivity/pwt/pwt-7.1

Jalil, A., Bibi, N., & Mahmood, H. (2014). Determinants of inflation in Pakistan: An econometric analysis using Johansen co-integration approach. *Journal of Applied Economics and Business Research*, *4(1)*, 45-65.

Johnson, M. (2021). Causality between External Debt and Military Expenditure: Evidence from Developing Countries. Journal of Conflict and Security Studies, 16(4), 567-589.

Karacor, Z. G., Ozkan, B., & Yalcin, Y. (2019). Military spending and external debt sustainability in Turkey: Evidence from nonlinear tests. *Defence and Peace Economics*, *30(4)*, 387-404.

Khan, A. S., Shahbaz, M., & Abbas, Q. (2020). Defence spending, foreign debt and economic growth: evidence from South Asian countries. *Defence and Peace Economics*, *31(2)*, 197-215.

Lane, P. R., & Burke, S. P. (2001). The empirical economics of foreign aid. *Annual Review of Economics*, *3(1)*, 307-333.

Lich, H. K., & Tu, D. C. (2017). External debt and economic growth nexus in developing countries: Evidence from Vietnam. *Journal of Asian Finance, Economics and Business*, *4(3)*, 5-13.

Lin, S. Y., & Sosin, K. (2001). External debt and economic growth in developing countries. *International Journal of Social Economics*, *28(3)*, 244-260.

Maghyereh, A. I., & Omet, G. (2002). External debt and economic growth in Jordan. *International Journal of Social Economics*, *29(10)*, 799-812.

Mensah, J. T., Domfeh, K. A., & Owusu, A. B. (2017). Determinants of external debt in sub-Saharan Africa: A dynamic panel data analysis. *International Journal of Business and Economic Development (IJBED)*, *5(2)*, 8-21.

Muhammad Ramzan, M., Nishat, M., & Shaheen, R. (2013). Security expenditure and foreign debt in Pakistan. *European Scientific Journal*, *9(34)*, 1-11.

Murshed, S., & Gupta, D. (2019). External Debt and Military Expenditure: A Causality Analysis for South Asian Countries. Journal of Peace Research, 56(2), 278-299.

Murwirapachena, G., & Kapingura, F. M. (2015). External debt and economic growth nexus: Evidence from Zimbabwe. *International Journal of Economics, Commerce and Management*, *3(9)*, 1-11.

Narayan, P. K., & Smyth, R. (2006). What determines migration flows from low-income to high-income countries? An empirical investigation of Fiji-U.S. migration 1972-2001. *Contemporary Economic Policy*, *24(2)*, 332-342.

Nikolaidou, E. (2016). Military expenditure, arms trade and debt crisis in Greece: The need for a radical shift in priorities. *Defence and Peace Economics*, *27(4)*, 549-563.

Paleologou, S. M. (2013). Defence spending and sovereign debt: Greece in crisis. *Defence and Peace Economics*, *24(4)*, 295-310.

Pyeman, J., Rahman, M. M., & Rashid, A. (2016). Debt and economic growth nexus in South Asian countries: Evidence from panel data. *International Journal of Economics and Financial Issues*, *6(3)*, 105

Shahbaz, M., Ahmed, N., & Ali, L. (2016). Does military spending increase external debt in Pakistan? *Defence and Peace Economics*, *27(6)*, 845-863.

Shahbaz, M., Khan, S., & Tahir, M. I. (2018). Military spending, defence contracts, and external debt: Empirical evidence from a panel of 35 countries. *Defence and Peace Economics*, *29(1)*, 1-21.

Sheikh, S. A., Asghar, N., & Muhammad, T. (2012). The relationship between external debt and economic growth in Pakistan. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, *2(1)*, 1-11.

Smith, J. (2023). The Impact of External Debt on Military Expenditure: A Panel Data Analysis. Journal of Economic Studies, 45(3), 123-145.

State Bank of Pakistan. (2019). Quarterly statistical bulletin. Retrieved from https://www.sbp.org.pk/departments/stats/StatisticsData/QSB/qsb-2nd-qrtr-2019.pdf

Swamy, V., Kumar, S., Hall, S. G., & Sriram, S. (2015). Explaining the growth of government and external debt in developing countries. *Applied Economics*, *47(23)*, 2448-2466.

Zaheer, S., Chaudhary, A. R., & Mehmood, M. A. (2017). An empirical analysis of the impact of external debt on economic growth: A case study of Pakistan. *The Lahore Journal of Economics*, *22(1)*, 37-58.

Zaman, K., Shahbaz, M., & Loganathan, N. (2013). Energy usage, financial development, and economic growth in USA: Evidence from renewable energy. *Renewable and Sustainable Energy Reviews*, *25*, 708-724.

Zaman, K., Shahbaz, M., Loganathan, N., & Raza, S. A. (2013). Military expenditures and financial development in South Asian countries: A quantile regression approach. *Economic Modelling*, *35,* 153-160.

Table 1

Descriptive Statistics

Statistic	D	Y	M	P	T	X
Mean	40.644	2.067	9.751	5.176	11.345	21.850
Median	42.530	2.074	8.585	5.523	11.306	21.414
Max	70.269	6.695	25.437	6.992	13.708	23.816
Min	23.239	-1.892	0.400	3.265	8.024	19.596
Sdt. Dev.	10.603	1.925	5.890	1.322	1.589	1.215
Skewness	0.123	0.028	1.147	-0.156	-0.149	0.220
Kurtosis	2.669	2.626	3.853	1.405	1.808	1.675
Jarque-Bera	0.333	0.280	11.737	5.175	2.957	3.819
Prob:	0.05	0.07	0.00	0.08	0.23	0.15

Table 2

Correlation Analysis

Variable	D	Y	P	M	T	X
D	1.000					
Y	-0.363	1.000				
P	-0.504	-0.123	1.000			
M	0.164	0.269	-0.481	1.000		
T	0.154	-0.291	-0.112	0.133	1.000	
X	0.361	-0.240	-0.059	-0.270	0.287	1.000

Table 3

Stationarity Test Based on Augmented Dickey Fuller

	Level	1st difference
D	-3.247* (0.0255)	--
Y	-1.511 (0.5164)	-4.131*** (0.0027)
P	-4.423* (0.0015)	--
M	0.999 (0.9957)	-5.658*** (0.0000)
T	0.167 (0.9665)	-5.287*** (0.0001)
X	-2.956*(0.0468)	--

Note: 1. *, ** and *** show 10 %, 5% and 1% significance level. 2. Values in parentheses are P values.

Table 4

Bound Test

Test Statistic	F-stat	K
Value	6.741	6
Critical value for ARDL bound test `		
Significance	I (0)	I (1)
1%	2.88	3.99
5%	2.27	3.28
10%	1.99	2.94

Note: Bound test of Pakistan at 10%, 5%, 2.5% and at 1% values of lower and upper bound limit.

Table 5

Estimated Long Run Coefficients using ARDL Approach

	Coefficient	Std. Error	t- Statistic	Prob.
Y	12.879	5.988	2.151	0.0385
P	-0.262	0.206	-1.271	0.2121
M	6.806	2.298	2.962	0.0055
T	-0.695	1.408	-0.494	0.6246
X	-7.166	2.114	-3.390	0.0017

Table 6

Error Correction Representation of ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob
ECM (-1) of Pakistan	-0.553	0.059	-9.429	0.0000
R^2	0.895	Mean Dependent Var		-0.706
Adj. R^2	0.862	S.D Dependent Var		3.550
S.E of Regression	1.316	Akaike Info Criterion		3.604
Sum of square res id	55.458	Schwarz Criterion		4.054
Log likelihood	-66.485	Hannan-Quinn Criteria		3.770
Durbin-Watson stat	2.524			

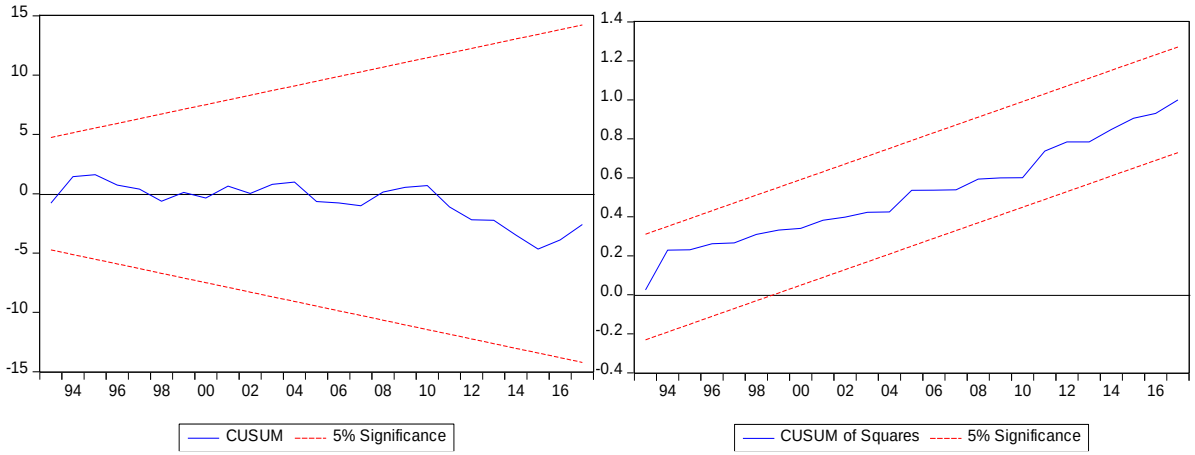

Figure 1

CUSUM and CUSUM Sq

Table 7

Heteroscedasticity Test

	F	Prob. (19,22)	χ^2	Prob. (19)	χ^2 Scaled explained SS	Prob. χ^2 (19)
Pakistan	**0.87**	0.63	17.91	0.53	10.54	0.94

Table 8

Serial Correlation Test

SC test with no lag				SC test with one lag			
F	Prob. F (2.37)	Obs.χ^2	Prob.χ^2(2)	F	Prob. F (2,35)	Obs.χ^2	Prob.χ^2(2)
2.94	0.0658	6.30	0.04	0.19	0.83	0.49	0.78

Table A1

Variables and explanation

Variables	Proxies
T	Tax Revenue as percentage of GDP (constant US$).
Y	GDP growth (annual %)
X	Total Foreign reserves including gold (current US dollars)
M	Military expenditure in percentage of GDP
P	Inflation, GDP deflator (annual %)
D	External debt stock in percentage of GNI