

DOES MILITARY EXPENDITURE AFFECT ECONOMIC GROWTH IN THE DEVELOPING COUNTRIES?

هل الانفاق العسكري يؤثر في النمو الاقتصادي للبلدان النامية؟

تأيا خهرجى سهربازى كاريگهري ههيه

له گهشه کردنى ئابوورى له ولاتانى تازه پيشكهوتودا؟

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Abstract

Over the last 50 years, there has been an impressive amount of empirical study on the impact of military expenditure on economic growth in the developing countries, by using different methodologies, econometric techniques and models. Despite numerous empirical investigations utilizing diverse methodologies over the past four decades, a conclusive consensus remains elusive. To fill in the gap in the literature, this paper employs It is necessary to indicate the type of model used to provide empirical evidence on the economic impacts of military expenditure in the 64 developing countries over the period 2017-2022. The findings obtained through panel data techniques consistently indicate a positive correlation between military expenditure and economic growth within the sampled countries.

Keywords: Military expenditure; Economic growth; Developing countries; and Panel Estimation.

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خلال الخمسين عامًا الماضية ، كان هناك كم هائل من الدراسات التجريبية حول تأثير الإنفاق العسكري على النمو الاقتصادي في البلدان النامية ، باستخدام منهجيات وتقنيات ونماذج اقتصادية مختلفة. وعلى الرغم من ان العديد من هذه الدراسات التجريبية تستخدم منهجيات متنوعة خلال العقود الأربعة الماضية ، إلا أنها لا تقدم إجماعًا حاسمًا . لسد الفجوة في الأدبيات ولفحص الآثار الاقتصادية للإنفاق العسكري في ٦٤ بلدًا ناميًا في الفترة من ٢٠١٧ إلى ٢٠٢٢ ، تستخدم هذه الورقة نموذجًا محددًا وتقدم أدلة تجريبية تستند إليه. وذلك باستخدام تقنيات بيانات اللوحة ، تظهر النتائج بشكل متسق أن هناك علاقة إيجابية بين النمو الاقتصادي والإنفاق العسكري في البلدان النامية في العينة

به كورتی

له ماوهی چوار دهیهی رابردودا لیکۆئینهوهی ئەزموونی زۆر له سهر کاریگه رپی خه رجییه سهر بازیه کان له سهر گه شهی ئابووری له ولاتانی تازه پیگه یشتودا ئەنجام دراوه. میتۆدۆلۆژیا و ته کنیک و مۆدێلی ئابووری پێوانی جوړاوجوړ به کاره یئران، که له رینگه ی توێژینه وه و پانیل داتا کانی نیوان ولاتانه وه گرنگی به ٦٤ ولاتی تازه پیشکه وتوو دراوه. سهره پای زۆری و فره چه شنی ئەم توێژینه وه، به لگه کان له سهر بوونی په یوه ندی نیوان (خه رچی سهر بازی - گه شهی ئابووری) هیشتا بێ ئەنجامن. ئەوهی جینگه ی تیرامانه، ته نیا ژماره یه کی سنووردار له لیکۆئینه وه کان ئەم په یوه ندییه یان له ناو بواری فراوانی ولاتانی تازه پیگه یشتودا لیکۆئینه وه. بۆ چاره سهر کردنی ئەم بۆشاییه، ئەم توێژینه وه یه مۆدێلیکی داتا کانی پانیل به کار ده هینیت بۆ پیشکه شکردنی تیروانینیکی ئەزموونی سهر بارت به کاریگه ریه ی ئابووریه یه کان خه رجییه سهر بازیه کان له سهر انسه ری ٦٤ تازه پیشکه وتو له ماوه ی ٢٠١٧-٢٠٢٢. به گشتی ئەو ئەنجامانه ی که به به کاره یئانی شیوازه کانی توێژینه وه ی داتا کانی پانیل به ده ست هاتوون ئاماژه به وه ده که ن که خه رجییه سهر بازیه کان به شدارن له پیشخستنی گه شهی ئابووری له ولاتانه ی که له نمونه که دا هاتووه

1. Introduction

The 2008 global financial. Crisis triggered by the downfall of the Lehman Brothers. led to what is more popularly known. as the worst financial crisis since the Great Depression. Following the crisis, most central governments worldwide have been concerned. with providing fiscal stimulus packages as a means of promoting economic growth in face of the after-effects. of the Global recession period of 2009. For the specific case of several development. countries, much debate has centered on the role of non-military government expenditure as a fiscal tool towards promoting economic growth. In this regard, a number of scholars have argued that cuts in the military budget of the development countries could avail more funds. for fiscal authorities to direct towards more productive usage on non-military items (Dunne and Vougas. (1999); Dunne, Nikolaidou, and. Roux (2000); Birdi and Dunne (2002). It is particularly argued that the end of the cold war and the Apartheid regime. as well as others participation in conflicts in neighboring countries. have lessened the need for high levels of military spending in the light of the resulting. absence of domestic and external threats to the economy. This argument. for the decrease. of military spending is reminiscent. of the peace dividend hypothesis which. Speculates. that the transfer of. resources from civilian to the military.

hamper's economic growth through a crowding out effect of consumption and investment. However, these arguments have not gone uncontested. There also exists a separate group of scholars who contend that high levels of military spending in the development countries fosters economic growth through spillover effects of new technology to the private sector, provision of public infrastructure and protection against domestic and external threats, as well as increases in aggregate demand and employment through Keynesian-type multiplier effects?

Inclusive of this list of studies arguing for a positive military–growth relationship in the development countries are the works of Batchelor, Dunne, and Saal (2000); Mosikari and Matlwa (2014) Lobont, O. R., et al. (2019) Wang, X., et al. (2022), Geng, L., Abban, et al. (2023), Negri, C., & Dincă, G. (2023). Of recent, the empirical literature has tried to reach some sort of consensus on these contradicting views by speculating that the relationship between military spending and economic growth may be negative until some threshold level, after which it turns positive afterwards. This strand of literature argues that the marginal effect of a change in military burden is not constant across different levels of the variable (Cuaresma and Reitschuler 2004). Nonetheless, this literature is primarily limited towards developed countries, and in particular the US economy (Cuaresma and Reitschuler (2004); d'Agostino, Dunne, and Pieroni (2011)). For developing countries, and in particular our sample countries, the available literature can be narrowed down to the panel data studies of Aizenman and Glick (2006); Cuaresma and Reitschuler (2006); Pieroni (2009). And even so, these panel studies have been criticized on the basis of generalizing their empirical findings across various panels with differing country-specific characteristics and steady-state levels of income. Moreover, there is, to the best of our knowledge, no existing research which investigates possible military–growth relationship for such a group of developing countries besides the aforementioned panel data studies. In identifying this hiatus in the literature, we make a contribution by investigating the panel data in the military–growth relationship for the development countries economy which boasts one of the most sophisticated military sectors on the sample countries. In our study, we use a panel data econometric model to estimate an endogenous growth model developed by Pieroni (2009).

What distinguishes the panel data econometric model from other competing econometric models is that the regime switching mechanism is conducted in a smooth manner as opposed to being abrupt and this is consistent with the stylized fact that economic entities who influence the variables do not behave simultaneously or in the same direction (Phiri 2015).

The rest of this paper is organized as follows. The following section is dedicated to the review of the theoretical and empirical literature, and Section 3 presents the data and methodology. Finally, the findings of this empirical study are summarized in Section 4.

2. REVIEW OF THE THEORETICAL AND EMPIRICAL LITERATURE

Military spending constitutes a significant share of national and international resources but despite its significant size, its economic effect has only recently been an issue of investigation in economic theory. The theoretical examination of military spending becomes very difficult as it is not a purely economic issue but rather a mixture of economic, political, psychological, strategic, cultural and even moral aspects. Although most economic theory does not have an explicit role for military expenditure as a separate economic activity, there are four basic theoretical approaches (the Keynesian, the Neoclassical, the Liberal and the Marxist) that explain military spending from different points of view. In the Keynesian framework, the state appears as proactive and interventionist, using military spending to increase output through multiplier effects when aggregate demand is ineffective (Dunne, 1996). Faini et al. (1984) found that if aggregate demand is low than potential supply, increases in military expenditure can lead to increased capacity utilization, increased profits and hence, increased investment which is lead to economic growth. In the recent literature, Keynesian demand-side theory is mainly used to explain the relationship between military spending and economic growth. Empirical study within this demand-concentrated framework tends to find a negative correlation between defense expenditure and economic growth (through the crowding out of savings or investment). The main disadvantage of this theory is that it concentrates on demand-side rather than supply-side such as (technology spin-offs and externalities). Smith and Smith (1980) explained the production functions in order to overcome this problem of concentrating on the demand side only. A linked institutional approach regards the Military Industrial Complex (MIC) as the central point in explaining defense expenditure. The MIC is a powerful interest group that benefits from defense expenditure and thus has an incentive to exaggerate international conflicts and to hinder attempts to settle disputes by non-military sector (Dunne, 1990). Marxists consider that military expenditure as a social phenomenon with a historical aspect and they concentrate on the socio-political and strategic aspects of military spending and not so much on the economic ones. They argued that military spending enhances economic growth by preventing crises (Dunne, 1990). Within this school of thought, there is one theoretical perspective that has a fundamental role for military spending. The under consumptions approach developed by Baran and Sweezy (1966), and they claimed that as a capitalist economy grows better, the available surplus grows beyond that absolutely necessary for investment and consumption. So, within the under consumptions framework, military spending will be beneficial to growth when the economy is in disequilibrium. In contrast, Neoclassicals see military spending as a pure public good

supplied by the state, which recognizes some well-defined national interest that it seeks to protect. So, the state can appear as a rational actor that tries to maximize national interest by balancing opportunity costs and security benefits of military spending. In the new empirical study, supply-side models of the military expenditure–economic growth relationship within the Neoclassical framework derives from the aggregate production function. Commonly used supply-side model is developed by Feder (1982) and further elaborated by Ram (1986) and Biswas and Ram (1986) who considered military spending as an exogenous variable and estimated its dynamic real impacts on output. On the other hand, a recent critique done by Dunne et al. (2005) and Khalid, et al. (2014), makes the Feder-type model looks very problematic both in terms of theoretical and econometric issues. Furthermore, other growth models that have been applied in the defense economics literature are the Barro (1990) model (applied by Aizenman and Glick, 2003; (Khalid, M. A., & Altaee, H. H. A. (2015)., Mylonidis, 2008; Pieroni, 2009& Khalid, M. A., & Noor, Z. M. (2015) and the augmented Solow growth model (introduced by Mankiw et al. (1992) and adopted by Knight et al. (1996). In addition, Halicioglu (2004) following Atesoglu (2002) applied the new macroeconomic model of Romer (2000) and Taylor (2000) that replaces the standard IS-LM and AD-AS models and provides a more detailed account of fiscal and monetary policies on the national income. Most of the recent studies avoid a reliance on ad hoc specifications and tend to be based on well-specified theoretical frameworks – usually the Keynesian or the neoclassical frameworks – which allow the development of consistent formal models. All in all, while the empirical results offer no consensus on the economic impacts of defense spending, the most common finding is that military spending has either no significant effect, or a negative effect on economic growth for developing countries.

Moreover, there are three studies that concentrate on the EU15 to estimate the defense–growth nexus, namely, Kollias et al. (2004, 2007) and Mylonidis (2008). The first study investigated the relationship between growth and military expenditure over the period 1961–2000 by panel data methods and they found evidence of positive bidirectional causality in the long run and a positive impact from defense spending to economic growth in the short run. Given these results, the authors argued that increases in military expenditure led to promote growth in this region. However, this study has been criticized by Hatzinikolaou (2007) for the econometric analysis employed. Furthermore, the empirical findings of Kollias et al. (2007) study are in contrast to an earlier causality study by Kollias et al. (2004) for the EU15 over the same period of time where the authors provided country by country analysis and they found that growth positively affects defense spending. It seems that the results of these studies differ although the analysis in both studies is for the same set of countries and over the same period; the only difference is the estimation methods (time series approach for the 2004 study while panel data approach for the 2007 study). Finally, the third

study investigated by Mylonidis (2008) and he focused on the EU143 employs a Barro-type model to analyze the economic impacts of defense spending by using cross-section and panel data methods. The empirical evidence indicates a strong negative effect of military expenditure on economic growth. The present study contributes to the existing literature by providing empirical evidence for the 64 developing countries with more recent data and using the model and estimation methods outlined below.

3.DATA AND METHODOLOGY

3.1 The Data

In order to examine the military-growth relationship in the 64 developing countries over the period 2017-2022 and a balanced panel implies that $n=64$ and $t=5$, whereas in this study. Therefore, this situation can be referred to as an imbalanced panel was constructed. The data are taken from the SIPRI Yearbooks for military expenditure (Stockholm International Peace Research Institute, various years) and the data on GDP and population are drawn from the World Development Indicator (WDI).

Table I variables descriptions: Annual data: (2017-2022; N=64)

Variable	Description	Source
ME	Military expenditure	SIPRI (2023)
RGDPC	Real Gross domestic product per Capita	WDI (2023)
POP	Population	WDI (2023)

Albania, Algeria, Argentina, Bolivia, Botswana, Burkina Faso, Cambodia, Cameroon, Central African, Chad, Chile, China, Colombia, Congo, Cuba, Dominican, Ecuador, El Salvador, Guinea, Ethiopia, Fiji, Gabon, Gambia, Guatemala, Haiti, India, Indonesia, Iran, Iraq, Jordan, Kenya, Laos, Lebanon, Madagascar, Malawi, Malaysia, Mali, Malta, Mongolia, Morocco, Mozambique, Nepal, Niger, Nigeria, Pakistan, Panama, Papua Guinea, Paraguay, Peru, Rwanda, Saudi Arabia, Senegal, Sierra Leone, South Africa, Sri Lanka, Sudan, Syria, Tanzania, Thailand, Togo, Tunisia, Uganda, Viet Nam, Zambia.

3.2 ECONOMETRIC METHODOLOGY

In investigating the military expenditure growth nexus we use three panel regression models. In doing so we follow Samreen, I., Majeed, M.T. (2022) study since he use the forth mentioned model with a sample simillare to the sample used in this study.

3.2.1 Fixed Effect versus Random Effect Models

In our Panel data models we have examined and concentrated on fixed and random effects model. The core difference between fixed and random effect models lies in the role of dummy variables. If dummies are considered as a part of the intercept, this is a fixed effect model. In addition, in a random effect model, the dummies act as an error term.

Furthermore, a fixed group effect model examines group differences in intercepts, assuming the same slopes and constant variance across entities or subjects. Since a group (individual specific) effect is time invariant and considered a part of the intercept, u_i is allowed to be correlated to other regressors. Fixed effect models use least squares dummy variable (LSDV) and within effect estimation methods. Ordinary least squares (OLS) regressions with dummies, in fact, are fixed effect models.

Table 1.1 Fixed Effect and Random Effects Models

	Fixed Effect Model	Random Effects Model
Functional form	$Y_{it} = (\alpha + U_i) + X_{it}\beta + V_{it}$	$Y_{it} = \alpha + X_{it}\beta + (U_i + V_{it})$
Intercepts.	Varying across groups and times	Constant.
Error variance	Constant.	Varying across groups and times.
Slopes.	Constant	Constant
Estimation.	LSDV, within effect method	GLS, FGLS.
Hypothesis test.	Internal F test.	Breusch-Pagan LM test.

A random effect model, by contrast, estimates variance components for groups (or times) and error, assuming the same intercepts and slopes. u_i is a part of the errors and thus should not be correlated to any regressor; otherwise, a core OLS assumption is violated. The difference among groups (or time periods) lies in their variance of the error term, not in their intercepts. Moreover, a random effect model is estimated by generalized least squares (GLS) when the matrix, a variance structure among groups, is known. The feasible generalized least squares (FGLS) method is used to estimate the variance structure when is not known. A typical example is the group wise heteroscedastic regression model (Greene 2003). There are various estimation methods for FGLS including the maximum likelihood method and simulation (Baltagi and Cheng 1994).

3.3 Model Selection

To determine whether POLS or FEM is a better fit for the military expenditure model, the author utilizes the Likelihood Ratio Test. The hypotheses for the test are as follows:

Null Hypothesis (H0): The POLS and FEM models have equal explanatory power for the military expenditure data.

Alternative Hypothesis (H1): Either the POLS or FEM model has superior explanatory power for the military expenditure data."H0: POLS is more favorable.

Ha: FEM is more favorable.

Decision Rule: H0 is rejected when p-value is less than α . Otherwise, H0 will not be rejected.

3.5.3 Hausman Test

In this study the Hausman Test also will be used to test whether the FEM or REM is more appropriate and fits the model well.

H0: REM is more favorable.

H1: FEM is more favorable.

Decision Rule: H0 is rejected Ho when p-value is less than 0.5%. Otherwise, H0 will not be rejected.

4 The Empirical Result

Our sample countries include 64 less developed nations for which data are available for over period 2017–2022. We have reported the estimated results of REM and FEM and POLS model are reported in Table III and Table IV.

In order to specify whether a fixed and random effects model is appropriate for our study we performed the Hausman test which is distributed as χ^2 , where the degrees of freedom are equal to the number of regressors. The results illustrate that the fixed effects model is rejected, and this finding is consistent with Murdoch et al. (1997) since random effect models are considered more appropriate than fixed effect models. Thus, the fixed effects model is not necessary in our case. Parameter estimates from the random effect and fixed effect are presented in Table II and Table III for the 60 less developed countries. The results obtained, similar to Smith and Dunne (2001); who found a positive and significant correlation between economic growth and military expenditure.

Furthermore, we have employed Pooled Regression Model based on balanced data-set, to investigate the correlation between military expenditure and economic growth in the context of different political and welfare less developed nations.

The panel regression model estimation results of this study, presented in Table IV, and it illustrates that there is a positive relationship between military expenditure, economic growth and population for the rest of the sample countries, and it's statistically significant, it means that, when economic growth, it motivates military sector to spend more on it, and also population is directly related to economic growth, meaning that when population increase, it rises military expenditure in the developing countries . All diagnostics for the models in each table is satisfactory. Generally, GDP and population are positively related with military spending in this study, and all variables are statistically significant at 1%, level. The results illustrate that as economic growth (GDP) and population are increase military expenditures as a percentage of government expenditures are increased as well. Furthermore, this finding suggests that military spending plays a significant role in the less developed nations despite of many problems such as civil war, conflicts and border tensions, and this result supported by earlier works done by Benoit (1973&1978) for 44 developing nations. Moreover, our findings are also confirmed and supported by Ali's (2007) findings in the developing countries. Moreover, these net positive relationships support the belief that military spending and economic growth are related through an expansion of aggregate demand in less developed countries. Furthermore, investment in infrastructure and human capital development in LDC economies operating below full employment thus, it has positive Benoit-type spillover impacts from military expenditures. There is less evidence to suggest that military spending in developing nations negatively related to economic growth. The positive impacts that arise when relationship runs from economic growth to military spending imply that many LDCs are still at a stage where military expenditures are constrained by low income and will grow along with the economy. They are not yet in a position to have defense expenditures grow less than proportionally with economic growth.

Table II. Random Effects Results: Dependent variable is RGDP.

Variable	Coefficient	T ratio
Constant	-1698.766	0.000*
Ln ME	.7368974	0.000*
Ln POP	1.283371	0.000*
Hausman Random effect (ME)	.7814164	-
Hausman Random effect (POP)	.0000437	
N	540	
Countries	64	
Min obs	6	
Max obs	6	
Av obs	6.0	
R-sq within	0.1397	
R-sq between	0.7903	
R-sq overall	0.6722	

* denote significance at 1%, level. Values in parentheses are heteroscedasticity consistent *t*-statistics and values in brackets are *p*-values.

Table III. Fixed Effects Results Dependent variable is RGDP.

Variable	Coefficient	T ratio
Constant	-25720.29	0.000*
Ln ME	.5635426	0.000*
Ln POP	.0004134	0.000*
Hausman fixed (ME)	.5635426	
Hausman fixed (POP)	.0004134	
N	540	-
Countries	64	-
Min obs	6	
Max obs	6	
Av obs	6.0	
R-sq within group	0.3793	
R-sq between group	0.7417	
R-sq overall group	0.6234	

* 1%, level. Values in parentheses are heteroscedasticity consistent *t*-statistics and values in brackets are *p*-values.

Table IV Results of Pooled Regression Models: Dependent variable is RGDP. (Sample period: 2017 -2022)

Variable	Coefficient	Std. Err	T ratio	Conf. Interval
CONSTANT	-1698.766	360.1701	0.000*	-991.2514
Ln MEit-1	.7368974	.0764001	0.000*	.8869771
Ln POP1t	.00004	1.23e-06	0.000*	.0000424
N	64			
T	6			
The variables are defined as follows: ME = Military expenditure; RGDP = real GDP per capita (in US dollars; POP = Population. Figures in the parentheses are t-statistics. (*) indicate significance at 1%. Time dummies were jointly significant and are not reported here to save space.				

4. Conclusions remarks

The defense–growth relationship has been an issue of keen concern in defense economics and there is a huge amount of the literature investigating the military-growth relationship in less developed nations. However, the existing literature is inconclusive as to the military-growth relationship due to applying different theoretical models, different empirical techniques and different samples. This paper examines the relationship between defense expenditure and economic growth in 64 developing countries. Our panel regressions present reasonable and robust results by applying three panel data models (POLS, FEM, and REM).

The empirical panel results show that defense spending has a significant and positive relationship with economic growth in our sample developing countries. Thus, the empirical estimations support the positive relationship between defense spending and economic growth, and they are consensus of Kollias (1997) and Ali (2012). Furthermore, proper regression model and more advanced econometric methodologies do improve empirical results in this article which could make contributions to the defense economics literature.

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