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Defence Expenditures and Economic Growth Nexus: A Panel Data Analysis

Fatih Mangır, Esra Kabaklarlı

Selçuk University, Faculty of Economics and Administrative, Department of Economics, Konya,Turkey
e-mail: fmangir@selcuk.edu.tr, etalasli@selcuk.edu.tr

Abstract

This paper has tried to analyse the nexus between defence expenditures and economic growth using panel data from sixteen countries spanning from 1991 to 2013. A panel fixed effect model has been estimated for the all countries and the results show a negative effect on economic growth due to military expenditures, but this negative effect is negligible due to the statistically *insignificant value of the coefficients. Thus, the effect of military expenditure on economic growth is very low compared to the effect of expenditures on the other undependable variables, the human capital, the fertility rate and life expectancy coefficients. The present study supports the Barro-growth model by stating that defence expenditures are neither effective nor an efficient way of achieving higher growth in the economy.*

Keywords: *Economic Growth; Defence Expenditure; Fixed Effect Model; Barro-growth model*

JEL Classification: *O47; H53; C23; O40*

Introduction

Public expenditures are one of the most important determinants of economic and social development and also play a significant role for the sustainable growth of economies. Defence budgets cover critical parts of fiscal policies in developing and developed countries to manage a given country's level of security against political and economic risks. As in any other parts of the public sector, military budgets should be critically administered by a country's government. Evaluating the effect of military spending on growth has been a vital political and economic responsibility, especially since the recent financial crisis and the Arab Spring.

There are two main approaches to the impact on defence spending on economic growth. These are the military Keynesian approach and the neo-classical theoretical approach. A basic Keynesian perspective would see military spending as simply one component of government spending, with effective demand/multiplier effects (Dunne, 2011, p.2). Military Keynesianism believes that defence expenditures and the weapons industry have stimulated the economy by creating multiplier accelerator growth and more employment. Military spending can affect the economy through boosting the utilization of capital stock and higher employment (Larusso, 2010, p. 5).

Classical and neoclassical economists attach importance to the laissez-faire doctrine and international division of labour in order to ensure national welfare and security (Karaçay, 2009:6). Neoclassical models are generally supply side with a focus on trade-off between mentioned "guns and butter" (Danek, 2013, p.20). For this reason, neo-classical growth model have claimed that the effects of defence expenditures on growth are negative and these expenditures have also crowded out public and private investments.

Data from Stockholm International Peace Research Institute (SIPRI) shows that developing countries share approximately 46% of the world military expenditures and the rest of the world shares the rest. So do defence expenditures spurring economic growth depend on a country being developed or just developed features of a country?

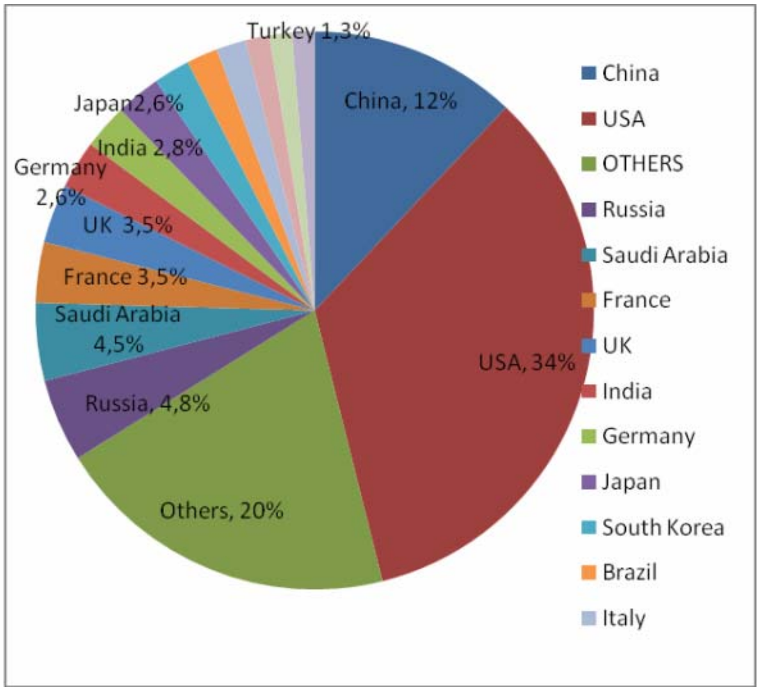

Fig.1. The share of world military expenditures of 15 states (highest expenditures in 2014)

Source: SIPRI, Military Expenditure Database

This study examines the likely importance of defence expenditures on growth, using the Barro type growth model for a panel of 8 developed and 8 developing countries from 1991-2013. The next section provides a brief review of the literature on the effects of defence expenditure on growth. Section 3 then defines data and the empirical models, and Section 4 summarizes empirical results and conclusions.

A Brief Review of the Literature

The conclusions of empirical studies about the defence and growth topic have been classified into three sub-groups. Benoit (1973, 1978); Weede (1983); Biswas (1993); Cohen et al., (1996); Yakovlev (2007) found positive impacts of military spending on economic growth. On the other hand, Deger and Smith (1983); Faini et al. (1984); Deger (1986); Mintz and Huang (1990, 1991); Heo (1999); Ward and Davis (1992); Pieroni (2009) are the second category whose studies found the negative relations between defence spending and growth. Biswas and Ram (1986); Alexander (1990); Xuan (2011) found no long or short run relation between the two variables. Table 1 provides a brief summary of empirical studying from the title of defence and growth with panel data.

Table 1. Review of the empirical literature

Study (ies)	Independent Variable	Regions of focus	Method	Main Findings
Şimşek (1993)	Defence expenditure/ GDP, official exchange rate, per capita, inflation	Developing Countries	Cross-sectional Analysis	Negative effects of defence expenditures on growth
Candar (2003)	Savings, balance of payments, labour	Turkey	Co integration	Positive short and long run positive impact
Gökbunar, Yanıkkaya(2004)	Military expenditures, military import and soldier numbers	Developed and developing countries	Panel regressions	Positive relation on growth through investment in developing but no significant relation in developing countries
Sümer (2005)	Military expenditure, number of military personnel public expenditures per capita	Developed and developing countries	Panel Regression analysis	Positive relation on economic growth in military export countries but negative in military import countries except Germany
Görkem, Işık(2008)	Nominal military expenditures, GDP deflator	Turkey	VAR model, Granger causality	No causality relation.
Yurttançıkmaz ve Emsen(2012)	Capital accumulation, average labour and military expenditures average education expenditures and average terms of trade	İran	ARDL	Positive relation on economic growth and trade openness
Başar, Künü(2012)	populations, export, imports, investments	36 countries	Panel regression	Negative relations
Duyar, Koçoğlu(2014)	Defence expenditures, gross fixed investment, labour	6 African countries	Panel Regression	Positive relations

Source: The authors' own elaboration based on Literature about defence and economic growth.

Data and Method

In this article, we have examined the relationship between military expenditures, the number of military personnel and economic growth determinants in selected developed and developing countries. The developing countries are: Argentina, Brazil, Indonesia, Malaysia, South Africa, Turkey, China and India. The four countries called BRICS (Brazil, Russia, India and China, South Africa) have been mentioned for the first time as an acronym by the Goldman Sachs Report in 2001. These countries have seen differences in terms of their economic, social and political effects and economists have projected that in 40-50 years, these economies could catch up to the high-income OECD countries (O'Neill, 2001). We could not get data for the economy of Russia in this analysis because of missing data for the years between 1991-2013. Also, we included developing countries such as Turkey, Indonesia, Malaysia and Argentina by performing the panel data analysis. We have chosen the developing countries in terms of population and GDP size. The data series are annual ranging from 1991 to 2013 over a period of 23 years.

Table 2. Descriptive statistics for developing countries

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
GDP per capita	3883	4654	8719	3983	2303	184
Government Exp.%	13.55	12.96	20.25	2.97	3.80	184
Investment %	25.40	22.38	47.67	11.36	8.79	184
Fertility	2.51	2.50	3.95	1.51	0.53	184
Armed Forces %	0.98	0.58	4.03	0.32	0.89	184
% Military Exp of GDP	1.91	1.80	4.13	0.57	0.84	184
Life Expectancy	68.36	70.09	75.98	51.55	6.14	184

The dependent variable of the growth model in this article is determined in logarithmic form of real GDP per-capita (constant 2005 US$). The explanatory variables of this model are adapted from the Barro growth model (Barro, 1991). Data on defence spending (as a percent of GDP, the armed forces (as a percent of the population), life expectancy, fertility rate, government expenditures and gross capital formation are taken from the World Bank Databank. The variables that we consider are the logarithm of the level data. The logarithmic form of the fertility rate and life expectancy are included as a proxy for the human capital. Because of the over-population pressures, we expect the coefficients of fertility rates and life expectancy to be negative (Barro,1991). The logarithmic form of gross capital formation is included as a proxy measure for the physical capital. According to the Keynesian approach, we anticipate physical capital formation and government expenditures lead to higher economic activity and economic growth (Backhouse and Bateman, 2011, p.7). We expect positive coefficients for investments and government expenditure. Considering the relationship between the military size and economic growth, there are two different views in the literature. However, one group of academicians explain that the net effect of defence expenditure and military size on economic growth is positive since military resources could stimulate economic activity; whereas others find that the military burden is a reason for reduced savings and investment, which leads to low economic growth rate.

Analysed developed and developing countries are classified on the basis of the World Bank income criteria. We had two different regressions for the panel data analysis. In the first regression, 8 developed countries: France, Germany, Italy, Japan, Spain, UK, USA and Australia are analysed between the years 1991-2013 and 8 developing countries are analysed in the second regression. We have selected the developed countries with the highest military expenditure in 2014.

Table 3. Short description of variables

Variables	Description
LARMFORCES (independent variable)	Armed forces personnel (% of total labour force)
LGDP(dependent variable)	Real GDP per capita (constant 2005 US$)
LINVEST (independent variable)	Gross capital formation (% of GDP)
LLIFE (independent variable)	Life expectancy at birth, total (years)
LFERTILITY (independent variable)	Fertility rate, total (births per woman)
LMILEXP (independent variable)	Military expenditure (% of GDP)

Table 3 (cont.)

LGOVERNMENT (independent variable)	General government final consumption expenditure (% of GDP)
LMILEXPSQ (independent variable)	Squared Value of Military expenditure (% of GDP)
LARMFCSQ (independent variable)	Squared Value of Armed forces personnel (% of total labour force)

Source: The authors' own elaboration based on World Bank Databank

Table 4. Descriptive statistics for developed countries

	Mean	Median	Maximum	Minimum	Std. Dev.	Observations
Armed Forces %	1.011	0.949	2.570	0.350	0.535	184
Fertility	1.604	1.580	2.120	1.160	0.292	184
GDP per capita	32957	33298	45660	19447	5604	184
Government Exp.%	18.51	18.33	24.00	13.39	2.332	184
Investment %	22.36	21.90	32.21	15.28	3.356	184
Life Expectancy	79.25	79.12	83.33	75.31	1.98	184
% Military Exp of GDP	2.041	1.897	4.666	0.809	0.920	184

Model Specification

The panel data regression, which follows a given set of individuals over time and includes individuals' characteristics are called the unobservable individual effect. (Hsiao, 2003:1)
The basic unobserved effects model can be written as (1)

$$y_{it} = \alpha + \chi_{it}{}' \beta + u_{it} \qquad i = 1,........., N \qquad t = 1,.........., T \quad (1)$$

$$u_{it} = \mu_i + \lambda_t + \nu_{it} \quad (2)$$

Where y is the dependent variable and x is the independent variables. The panel data consists of *N*-units and *T*-time periods, and therefore we have *N(16)* times *T(23)* observations. μ_i is called as "individual effect" and i: which represents number of countries, λ_t denotes the unobservable time effect, and v_{it} is the remainder stochastic disturbance term (Baltaci, 2005).
If the individual effects are considered fixed and may change across individuals, because of the multicollinearity problem, we prefer to use the fixed effect method (Balestra and Krishnakumar, 2008:23). The fixed effects model treats ui as a fixed but unknown constant differing across individuals. The alternative specification for the panel data model is known as the random effects. Differently from the fixed effect model not treating, u_i as a fixed constant, a principal assumption in the random effects model is that the random effects are uncorrelated with the explanatory variables $X_{it.}$ Random effects specifications assume that μ_i is drawn from an idd (independent and identically distributed), $N(0,\sigma^2)$ distribution, is uncorrelated both with the ε_{it} and with the X_{it}. (Hausman, 1978: 1261). Where sit: ε_{it} is error term, η_{it} is total of individual effect and the error term.

$$y_{it} = \chi_{it}{}' \beta + \eta_{it} \qquad i = 1,........., N \qquad t = 1,.........., T \quad (3)$$

$$\eta_{it} = \mu_i + \varepsilon_{it} \quad (4)$$

Table 5. Models Estimations for the developed countries*

Explanatory variables	Fixed Effect			Random Effect		
	Coef.		Prob.	Coef.		Prob.
LGOVERNMENT	0.199		0.004	-0.264		0.005
LINVEST	0.443		0.000	-0.215		0.011
LLIFE	4.441		0.000	3.326		0.000
LFERTILITY	-0.507		0.000	-0.084		0.522
LMILEXP	-0.031		0.587	0.311		0.000
LMILEXPSQ	-0.018		0.758	0.083		0.413
LARMFCSQ	0.219		0.000	0.094		0.215
LARMFORCES	-0.098		0.001	-0.188		0.000
_cons	-4.677		0.000	-1.273		0.223
Adjusted R^2	within %89	between %25	overall %2,1	within %48	between %70	overall %62
F statistics	F(7168)=237.73 prob=0.000			Wald $chi^2(8)$= 296.97 Prob > chi^2 = 0.000		

*One way Error Component Regression Model, Stata is used in data processing

According to F test Statistics for random and fixed effect regressions we had $F_{developed}$=237.73 prob=0.000, $F_{developing}$= 203.05 , prob=0.000 and Wald $chi^2(8)$= 296.97 Prob > chi^2 = 0.000, Wald $chi^2(8)$= 423.39, Prob > chi^2 = 0.000, respectively for developed and developing countries. According to the F test statistics, we reject the H_0 hypotesis, which tells that all of the individual effects are zero (H_0: μ_i=0). The classical linear regression model is not convenient because of the "individual effect" for both of them.

Table 6. Maximum likelihood estimation

Developed countries	LR test of sigma_u=0: chibar2(01) = 370.77 , Prob >= chibar2 = 0.000
Developing countries	LR test of sigma_u=0: chibar2(01) = 185.11 , Prob >= chibar2 = 0.000

The Presence of the individual effect is guaranteed with another test, the Maximum likelihood ratio, which calculates the indivual effects consistancy, is applied for both type of countries. H_0 hypotesis, which tells the individual effects standards errors are zero. According to Maximum Likelihood –ratio test result, we must accept the presence of the individual effect for both type of countries.

Table 7. Models Estimations for the developing Countries

	Fixed Effect		Random Effect	
	Coef.	Prob.	Coef.	Prob.
LGOVERNMENT	-0.073	0.330	1.167	0.000
LINVEST	0.423	0.000	-0.702	0.000
LLIFE	3.981	0.000	3.210	0.000
LFERTILITY	-1.018	0.000	0.545	0.044
LMILEXP	-0.056	0.482	-0.099	0.554
LMILEXPSQ	-0.035	0.828	-2.241	0.000
LARMFCSQ	0.697	0.000	1.458	0.000

Table 7 (cont.)

<table>
<tr><td>LARMFORCES</td><td colspan="2">-0.102</td><td>0.101</td><td>0.801</td><td colspan="2">0.000</td></tr>
<tr><td>_cons</td><td colspan="2">-4.004</td><td>0.000</td><td>-2.764</td><td colspan="2">0.042</td></tr>
<tr><td>Adjusted R^2</td><td>within %69</td><td>between %0.5</td><td>overall %0.2</td><td>within %21</td><td>between %91</td><td>overall %70</td></tr>
<tr><td>F statistics</td><td colspan="3">F(7,168)=203.05 prob:=0.000</td><td colspan="3">Wald $chi^2(8)$= 423.39
Prob > chi^2 = 0.000</td></tr>
</table>

*One way Error Component Regression Model

Hausman Specification Test Fixed Vs. Random Effects Model

For the presence of the individual effects, the next step is choosing model to calculate panel data regression. If an analysis involves hundreds of individuals, which are taken randomly from the large population, the estimation method of random effect is appropriate, although if the analysis involves fewer individuals, then the individuals effect would be fixed rather than random (Hsiao at all, 2002:43).

$$y_{it} = \chi_{it}'\beta + \eta_{it} \qquad i = 1,\ldots\ldots\ldots,N \qquad t = 1,\ldots\ldots\ldots\ldots,T \tag{3}$$

$$\eta_{it} = \mu_i + \varepsilon_{it} \tag{4}$$

The null and alternative hypotheses of Hausman test are as follows:

H_0: $\acute{\eta}_{i,}$ is not correlated with explanatory variables
H_1: $\acute{\eta}_i$ is correlated with explanatory variables

The Hausman test statistic follows Chi-square distribution with *k* degrees of freedom, where *k* is the number of slope parameters in this model. If the p-value of Chi^2 statistics is more than 0.05, then we reject the null hypotheses and conclude that $\acute{\eta}_i$ is correlated with the explanatory variable, then appropriate model is determined as fixed effect model for panel data regression. (Shahid and Saba, 2015:61).

As shown in Table 8, the probability of Chi-square statistics for developed and developing countries is more than 0.05 (Prob>chi2: 0.000), so we reject unit (i), which is correlated with explanatory η. As a result, the fixed effects model is the appropriate choice for panel estimations of developed and developing countries.

Table 8. Hausman Specification Test Fixed Vs. Random Effects Model

Country Groups	**H_0:** difference in coefficients not systematic	
	$Chi^2(6)$ Values	**Prob>chi2**
Developed Countries	84.83	0.000
Developing Countries	156.50	0.000

Source: Authors' calculation

Diagnostic Tests for Autocorrelation and Heteroskedastıcıty

The standard two ways error component model given by equations (5) and (6) assumes that the regression disturbances are homoskedastic with the same variance across time and individuals. This may be a restrictive assumption for panels, where the cross-sectional units may be of varying size and as a result may exhibit different variation (Baltagi, 2005:79).

$$y_{it} = \alpha + \chi_{it}{'}\beta + u_{it} \quad (5)$$

$$u_{it} = \mu_i + \lambda_t + \nu_{it} \quad (6)$$

We apply the Wald test for heteroskedasticity in fixed effect regression model. According to the results, we reject the null hypothesis of ($\sigma_i^2 = \sigma^2$), chi2 $_{developed}$ = 207.22 and chi2 $_{developing}$ = 889.93, in all developed and developing countries respectively. According to Wald test results, both error components are heteroskedastic.

Table 9. Heteroskedasticity Test

Country Groups	**H$_0$:** sigma(i)^2 = sigma^2 for all i	
Developed Countries	chi2 (8) = 207.22	Prob>chi2= 0.0000
Developing Countries	chi2 (8) = 889.93	Prob>chi2= 0.0000

Source: Authors' calculation

It has been observed in literature that the problem of serial correlation in panel-data models leads to biased standard errors and makes the results to be inefficient (Baltagi, 2005:84). Baltagi and Wu (1999) provide a locally best invariant (LBI) test for zero first-order serial correlation against positive or negative serial correlation in case of unequally spaced panel data. So, LBI test for autocorrelation in panel data for fixed effect model has been employed in this paper. This test results are presented in table 10. According to the results, we reject the null hypothesis of no first order autocorrelation in all developing and developed countries.

Table 10. Autocorrelation Test Results

Country Groups	**H$_0$:** no first order autocorrelation	
Developed Countries	Baltagi Wu LBI = 0.492	Durbin-Watson = 0.389
	F test that all u_i = 0: F(7,160) = 11.86	Prob>F = 0.00
Developing Countries	Baltagi Wu LBI = 0.447	Durbin-Watson = 0.275
	F test that all u_i = 0: F(7,160) = 10.39	Prob>F=0.00

Source: Authors' calculation

Panel Cross-Section Dependence Test

It is commonly assumed that error term in panel data models are cross-sectional independent, ignoring cross-sectional dependence in estimation can have serious consequences like inconsistent coefficients and invalid test statistics (Chudik and Paseran, 2013:2). There is a variety of tests for cross-section dependence in the literature:

- Frees Cross-section Dependence test;
- Friedman Cross-section Dependence test;
- Pesaran (2004) CD test.

Pesaran (2004), addresses the size distortion of Breusch-Pagan LM and an alternative statistic based on the average of the pair wise correlation coefficients ρ_{ij}.

$$CD = \sqrt{\frac{2T}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \rho ij \quad (7)$$

Pesaran (2004) points out the CD test is likely to have good properties for both N and small T_{ij}. In this paper, we have applied the cross-section dependence test, which is reported in the table 11.

Table 11. Cross-section Dependence statistics results

Developed Countries		
Frees Test	**Pesaran CD**	**Friedman Test**
Frees test of cross sectional independence= 1.255 Critical values, Frees' Q distribution Alpha=0.10: 0.1124 Alpha =0.05 :0.1470 Alpha =0.01 :0.2129 $1,255 \geq 0,1470$*	Pesaran test of cross sectional independence = 1.772, Prob= 0.0765	Friedman test of cross sectional independence =30.918,Prob = 0.0001
Developing Countries		
Frees Test	**Pesaran CD**	**Friedman Test**
Frees test of cross sectional independence= 0.716 Critical values, Frees' Q distribution Alpha=0.10: 0.1124 Alpha =0.05 :0.1470 Alpha =0.01 :0.2129 $0.716 \geq 0,1470$*	Pesaran test of cross sectional independence = 0.933 Prob= 0.3508	Friedman test of cross sectional independence = 28.429,Prob = 0.0002

Source: Authors' calculation,*The statistics are acceptable in the level of %5

According to the Pesaran CD test (cross section dependence test) result, we cannot reject the null hypothesis prob=0.076, prob=0,3508 for developed and developing countries respectively. The results of the Pesaran CD test, do not show cross section dependence. However, the Frees test and Friedman test show cross section dependence.

Driscoll–Kraay standard errors are adjusted when cross-sectional dependence, autocorrelation and Heteroskedasticity is present. After applying this method we find robust standard errors for panel data regressions with cross-sectional dependence, autocorrelation and Heteroskedasticity (Hoechle,2007)

Empirical Results

After the diagnostic tests for both type of countries we detected autocorrelation and heteroskedasticity problem. Our panel data model is based on the Driscoll–Kraay Regression estimators. These estimators are consistent and valid with the autocorrelation and heteroskedasticity problem (Hoechle, 2007). The results are shown in equation and suggest fixed effect regression model. The estimated model of developed countries is as follows:

$$\log GDP_{it} = -4.6 + \log 0.19\, gov_{it} + \log 0.44\, invest_{it} + \log 4.44\, life_{it} - \log 0.50\, fertility_{it}$$

$$-\log 0.03\, mil\exp_{it} - \log 0.01\, mil\exp^{2}_{it} + \log 0.2\, armforc^{2}_{it} - \log 0.09\, armforc_{it} + u_{it} \quad (8)$$

All the variables in the model have been transformed to logarithmic form to provide appropriate estimated coefficients.

Table 12. Regression results for developed countries

Developed Countries	Regression with Driscoll-Kraay standard errors			
	Method: Fixed-effects regression			
	F(8,7) =454.28, Prob>F= 0.000			
Variables	Within R-squared =0.8993			
LGDP	Coef.	Drisc/Kraay Std.Err	t	prob
LGOVERNMENT	0.199	0.058	3.39	0.012
LINVEST	0.443	0.033	13.41	0.000
LLIFE	4.441	0.210	21.10	0.000
LFERTILITY	-0.507	0.054	-9.35	0.000
LMILEXP	-0.031	0.049	-0.63	0.551
LMILEXPSQ	-0.018	0.071	-0.26	0.803
LARMFCSQ	0.219	0.048	4.49	0.003
LARMFORCES	-0.098	0.036	-2.72	0.030
_cons	-4.677	0.381	-12.27	0.000

Source: Authors' calculation

The Regression with Driscoll-Kraay standard errors estimates (developed countries) suggest a negative but insignificant impact of military expenditure and square of military expenditure emerges on per capita growth rate. One-percentage increase in the arm forces ratio to population will lead to decreased economic growth 0.09%. However the positive and significant of LARMFCSQ (Squared Value of Armed forces personnel, % of total labour force) show that more arm forces ratio (quadratic form) will lead positive effect on economic activity. 1% change of the government expenditures determines an increase of per capita growth rate 0.1%. Investment has a positive impact on economic growth, 1% change of the investments leads to 0.4% increases on economic growth. The coefficients for investment and government expenditure meet literature expectations in Keynesian approach and Wagner law. The coefficient of life expectancy is positive and significant so that a change of 1% in the life expectancy determines an increase of the economic growth of the 4.4%. The fertility rate instead has a negative and significant effect on the economic growth.

Table 13. Regression results for developing countries

Developing Countries	Regression with Driscoll-Kraay standard errors			
	Method: Fixed-effects regression			
	F(8,7) =255.21, Prob>F= 0.000			
Variables	Within R-squared =0.6909			
LGDP	Coef.	Drisc/Kraay Std.Err	T	prob
LGOVERNMENT	-0.0738265	.0417491	-1.77	0.120
LINVEST	0.4232002	.0497647	8.50	0.000
LLIFE	3.981.926	.8722253	4.57	0.003
LFERTILITY	-1.018.754	.2901064	-3.51	0.010
LMILEXP	-.0569619	.0631546	-0.90	0.397
LMILEXPSQ	-0.0351129	.1572868	-0.22	0.830
LARMFCSQ	0.6977344	.2051663	3.40	0.011
LARMFORCES	-0.102244	.0524914	-1.95	0.092
_cons	-4.004.591	1.695.728	-2.36	0.050

Source: Authors' calculation

The Regression with Driscoll-Kraay standard errors estimates (developing countries) suggest a negative but not significant impact of military expenditure and square of military expenditure emerges on per capita growth rate. A one-percentage increase in the number of military personnel will lead to decrease economic growth 1%. However, LARMFCSQ (Squared Value of military personnel, % of total labour force) shows that more arm forces ratio (quadratic form) will lead to positive but not significant effect on economic activity. 1% change of the government expenditures determines a decrease of per capita growth rate 0.07%. Investment has a positive and significant impact on economic growth, 1% change of the investments leads to a 0.4% increase in economic growth. The coefficients for investment meet literature expectations in the Keynesian approach. The coefficient of life expectancy is positive and significant so that a change of 1% in the life expectancy determines an increase of the economic growth of the 3.9%. The fertility rate instead has a negative and significant effect on the economic growth.

Conclusions

According to the empirical results of this study, the per capita income of defence spending and the number of military staff effects growth negatively in both developed and developing countries. The effect of investment on growth is significantly positive, which supports the Keynesian theory of investment. The contribution of the increase in public spending to growth support the law of Wagner in developing countries however in developed countries it is found negative and statistically insignificant. The life expectancy and fertility rates represent the human capital indicators in the model. The improvement in life expectancy leads to growth positively but high fertility rate impacts growth negatively.

The results of this study indicate a negative but not significant effect of military expenditure on economic growth of selected developed and developing countries. This study raises an important argument about the opportunity cost of military expenditures. The empirical findings demonstrate that military size has a negative impact on economic growth. The present study concludes that upgraded defence spending may constrain economic growth. The coefficients for investment in both type of regressions meet literature expectations in the Keynesian approach, which defends the notion that capital formation (investment) increases nations' productive capacity. As a proxy measure for the human capital, the fertility rate and life expectancy coefficients meet the Barro growth model expectations. The control variable of life expectancy has a positive influence and the fertility rate has a significant negative effect on the economic growth.

In conclusion, the negative but statistically insignificant effect of defence expenditures and the numbers of military personnel can be interpreted that economic resources should be channelled into efficient investments in the long run in accordance with the Barro growth theory.

The importance of this article's empirical result for the following studies is that economies should support peaceful policies, cut their military expenditures and raise their economic resources to other areas which will lead to the economic growth.

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