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Public Spending and Economic Growth: A Case Study of Developed Nations

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ABSTRACT

In this paper, the spending patterns of developed countries of the world are studied along with the identification of the effect of public spending components on economic growth of these developed economies. Public spending on health, education, and defense are predictors and GDP growth rate is the outcome variable in this research. Data from 41 developed countries, from 2000 to 2015 is taken and after necessary diagnostic tests. Least Square Regression is applied. Cluster Regression Model (CRM) is also used for empirical analysis of the data. Results of this study indicate that defense expenditures do not have a significant effect on economic growth, whereas education spending has a significant inverse effect on economic growth. Public spending on health is found insignificant to predict economic growth. It is concluded that spending on education is the only variable, which affects economic growth but its impact is also negative. This finding is contrary to the general acceptance that spending on education results in economic growth.

Keywords: Public Spending on Health, Public Spending on Education, Public Spending on Defense, Economic Growth, Panel Least Square

INTRODUCTION

The world spent USD 1,676 billion on military in 2015, which is almost 2.3 percent of the world's Gross Domestic Product (GDP); people consider it as a burden on mankind and take it as a huge waste of resources (Media Breakgrounder, 2016). On the other hand analysis of data between 1995 and 2009 showed that health and education have a greater part in GDP spending as compared to defense, moreover health expenditure witnessed a rise and defense expenditure a fall in the last decade (Freeman, 2011).

In a study, Idrees and Siddiqi (2013) argued that there is a strong positive relationship between economic growth and spending on education. Developed nations are far ahead from developing nations due to their high consideration of education; education brings innovation in working procedures and improves technology. Investment in education if different in various developed countries and the impact of this investment on economic growth is also different. Indeed, most scholars agreed on the argument that there are some situations in which low level of public spending can enlarge economic growth and in some other situations higher level of spending may be ineffective (Gisore, Kiprop, Kalio, Ochieng, & Kibet, 2014). It is seen that developed countries invest most of their funds in maintaining health care system they have developed (Gupta, et al., 2016). Surprisingly, military expenditure has a positive effect on economic growth in 44 less developed countries, but it is important to consider that there is no theory supporting these results (Pradhan, Arvin, Norman, & Bhinder, 2013). Another study explored similar results and started the debate about the non-existence of any theoretical model regarding defense spending and economic growth (Dunne & Tian, 2015). Since the last decade, considerations are high for the military spending and it is now a debate not only among policymakers but also academicians (Ali & Dimitraki, 2014). Interestingly, empirical evidence also shows defense spending is correlated with fraud and dishonesty, and economic meltdown (Gupta, Verhoeven, & Tiongson, 2002).

This confusion of studies leads toward a need for a comprehensive investigation relating to health, education, and defense spending while taking into consideration the income level of the countries. Spending on every segment is at the cost of some other segment. Expenditure on defense is also at the cost of health and education. It is very important to keep a balance between the two to ensure the public welfare of a country and its very existence. In many countries, due to various reasons and influences, this balance does not exist. Hence either huge spending on defense undermines the significance of health and education, or the security of a country is compromised. Empirical evidence by Yildirim and Öcal (2016) shows that military expenditure has a positive and significant effect on economic growth. On the other hand, Solarin (2016) claimed that productivity can be enhanced through spending on health and education instead of military expenditure. Similarly, Gupta, Verhoeven, and Tiongson (2002) found that corruption is highly associated with higher defense spending. Another study by Ismail (2016) revealed that public spending on agriculture and infrastructure has a positive effect on economic growth, whereas public spending on health and education has a negative effect on economic growth. The mixed results demand a specific study on this topic. This research approaches the issue by considering the data of all the developed countries of the world and determining the impact of spending on health, education, and defense on economic growth. There is no doubt about the phenomenon that proper utilization of resources increases economic growth. Likewise, a penalty of inefficient expenditure on different sectors adversely affects economic growth. Broadly speaking, the main objective of this study is to analyze the impact of government spending

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on health, education, and defense, on economic growth. More specifically, the study has the following objectives:

1. To review and analyze the effect of government expenditure related to defense on economic growth
2. To determine the impact of public spending in the area of education on economic growth
3. To examine the influence of health expenditure on economic growth
4. To examine whether various components of government spending stimulate or adversely affect economic growth using econometric modeling

This research explores the trends of spending of countries to analyze their intentions and priorities leading to develop an understanding of the policies of these countries. Another significant aspect is by considering a sample of developed countries to set some benchmarks in underdeveloped or developing countries. Further, this study hypothesizes that spending in each of the three mentioned areas has a significant impact on the economic growth of the country.

REVIEW OF LITERATURE

Literature is reviewed as public spending on defense and economic growth, public spending on education and economic growth, public spending on health and economic growth, and government spending and economic growth. Hirnissa, Habibullah, and Baharom (2009) investigated the relationship between education, health, and defense of South Asian countries by using Autoregressive Distributed Lag (ADRL) Model and Error Correction Model (ECM); results suggested that there is no significant relationship found between the variables. Another study of Freeman (2011) argued about the priorities of education, health, and defense allocations in the budget; it explained that defense spending increased since 2003 due to conflicts with neighboring countries and increase in internal violence, this study depicted the negative effect of increasing military spending on health and education.

To find the output of Millennium Development Goals (MDGs) set by United Nations Organization (UNO) in the year 2000, an investigation was carried out in which developing countries were analyzed to study the spending pattern of various countries to know that how many funds were spent according to MDGs. The researchers used developing countries data by taking an average of all the sectors individually and compared them horizontally as well as vertically. This study revealed a tremendous shift after the year 2000 in public expenditure, particularly in health and education (Rahman, Khan, & Sadique, 2015). In a study, Ekpung (2014) explored the trends of public spending and its relationship with economic growth of Nigeria. Data was taken from 1970 to 2010 and this study concluded that urbanization, revenue of government, and type of government have a positive and significant impact on economic growth, particularly in the short run. There are some other results related to the impact of defense spending on economic growth in which Na and Bo (2016) found that a decrease in military expenditure stimulates economic growth. Barro (2013) observed the effect of education spending on economic growth for 100 countries during 1960-1995 by applying the endogenous-growth model and concluded that highly educated women are not well utilized in the labor markets of many countries, thus not supporting economic growth.

Bloom, Canning, and Sevilla (2004) inquired the effect of health spending on economic growth for a panel of 100 countries with the help of Seemingly Unrelated Regression (SUR), Ordinary Least Squares (OLS), Generalized Method of Moments (GMM), Two-Stage Least Squares (2SLS) and observed that good health has a positive, sizable, and statistically significant effect on economic growth. Mayer, Lopoo, and Groves (2016) applied Fixed Effect Model (FEM), Two-Stage Least Squares (2SLS) and Ordinary Least Squares (OLS) as estimators for 34 nations of Organization of Economic Cooperation and Development (OECD) and found that social spending of a state has a positive effect on growth in income per capita over the subsequent 10 years. Bayraktar and Dodson (2015) applied Ordinary Least Squares (OLS), Generalized Method of Moments (GMM) as Estimators for seven fast-growing developing nations constructed Arellano Bond Test and found that there is a strong positive effect on economic growth of public spending in countries where GDP per capita is fast growing. If a nation increases spending on defense, health, and education spending is reduced. So, health and education spending have an inverse relation with defense spending. On the other hand countries with greater GDP can afford to spend more on defense without affecting other welfare sectors. Developed countries are developed, because of the fact they invest their resources in sustainable development, which includes health and education. Musgrave proposed the government functions in three categories, allocation, stabilization, and distribution, however, economic growth becomes an additional issue for a government, which does not meet the theory of Musgrave (Buchanan, 1960). The theory of economic growth normally deals with an economy's long-run trends. It studies the causes that lead to economic growth over time and investigates the forces that permit some nations to grow speedily, some slowly and others not at all. On the subject of early growth theories, Mercantilists highlighted a surplus balance of trade, while the Cameralists focused on taxation and state rule for a strong economy. Later, by the end of 18th century, Physiocrats emphasized agriculture as the basis of all wealth of a country and of the wealth of citizens since they believed that it has the capacity to make investible excess (Lombardini, 1996).

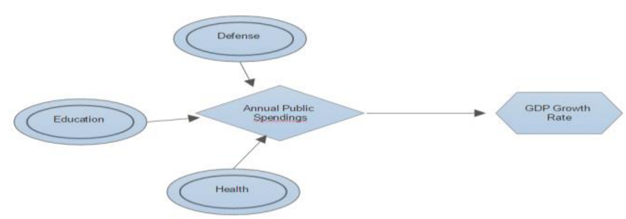

Figure 1: Explaining the Proposed Relationship between Public Spending and Economic Growth

RESEARCH METHODOLOGY

This research is causal in nature, which helps to describe the priorities of countries in selected areas of spending as well as to estimate the impact of this spending pattern on economic growth. The following are the brief descriptions of the variables used in this study.

Economic Growth Rate (Annual GDP Growth Rate) is the percentage of increase in Gross Domestic Product. It captures the change in the value of goods and services produced in a given economy for a specified period of time. It is calculated as a percentage rate of change of GDP. This is used as a dependent variable; as a proxy for economic growth. Public Spending on Health (PSH) is the share of public expenditure on health as a percentage of GDP. It consists of government spending on construction of hospital buildings, equipping the hospitals, providing drugs, training of doctors and nurses, paying their salaries, that is both development cost and operating expenses. Public Spending on Education (PSE) is the share of expenditure on education as a percentage of GDP. It includes the expenditure of government on primary and higher education, payment to teachers, construction of learning infrastructure and providing equipment. It also includes expenses on scholarships whether local or abroad. Public Spending on Defense (PSD) is the fraction of public expenditure on defense as a percentage of GDP. It includes expenses such as buying military gadgets and equipment, salaries, training the defense force, supporting missions and operations, and several other related expenses.

World Bank has given lists of developed, developing, and underdeveloped countries. There are 78 developed countries, underdeveloped countries are 31, and there are 107 developing countries (World Bank, 2016). The data in this study is in the form of Panels. Only developed countries are studied in this research and data from 41 countries is taken due to availability. Rahman, Khan, and Sadique (2015) also used panel data on developing countries public expenditure for a similar comparison.

Models and Tests

Following is the proposed equations of the study:

$$GDPD_{it} = \alpha_0 + \alpha_1 PESD_{it} + \alpha_2 PDSD_{it} + \alpha_3 PHSD_{it} + \mu_{it}$$

Where GDPD is the dependent variable, which represents annual percentage change of Gross Domestic Product of Developed countries, PESD stands for Public Education Spending of Developed countries, PDSD is Public Defense Spending, and PHSD is Public Health Spending of developed countries.

An empirical investigation of public spending on health, education, and defense and its impact on economic growth is done in three steps. In the first step whether each panel variable contains a unit root is examined. In this study, four unit root tests are applied namely Levin, Lin and Chu (2002), Im, Pesaran, and Shin (2003), Maddala and Wu (1999), and Chontanawat, Hunt, and Pierse (2006). In case of the problem of a unit root, Lagrange Multiplier (LM) test developed by Breusch and Pagan (1980) is applied to investigate the existence of cross-sectional dependence, this test is also helpful to determine whether there is the existence of Random Effect or not. If there is no Random Effect the easy way to estimate data is simply pooling it while ignoring the panel structure and Pooled Regression Model (PRM) is applied as by Engen and Skinner (1992), Grier and Tullock (1989) or Least Square Dummy Variable Model (LSDVM) as suggested by Nelson and Singh (1994) is applied. If it has a Random Effect then pooled data is not a better option, instead of it Random Effect or Fixed Effect Model is applied. Hausman Test (2005) helps to decide whether to use the Fixed Effect Model (FEM) or Random Effect Model (REM). Some post regression tests are also applied like, to test the coefficient of time variables significance, Modified Walt Test as by Baum (2001) for group-wise heteroskedasticity, and Wooldridge Test (2002) to detect autocorrelation.

$$Y_{it} = \beta_O + \beta_1 X_{it} + \beta_2 X_{it} + \varepsilon_{it}$$

Here there are two subscripts, which show the panel structures; '*i*' is for an individual country and '*t*' stands for the time dimension. 'ε_{it}' represents the error term or disturbance factor. These error terms include the aggregate disturbance of all individuals, there is no possibility to observe the individual effect in this model and some characteristics remained unobserved. Here individual characteristics can be separated by assuming this equation:

$$\varepsilon_{it} = \mu_i + u_{it}$$

Here, μ_i is individual effect and U_{it} is the overall error term. This is called a one-way error component model. It can also be a two-way error component model like, here U_i is the time effect.

$$\varepsilon_{it} = \mu_i + \upsilon_i + u_{it}$$

Now considering the model with $\varepsilon_{it} = \mu_i + u_{it}$ when the assumption is used that μ_i to be constant for one individual country and different for the other country then it is called fixed-effect model; if μ_i is drawn from some probability distribution then it is called random effect model.

Analysis of Data

Analysis of developed countries is done with available data from 41 countries. The descriptives are shown in the table below:

Table 1: *Descriptive Statistics of Developed Countries*

Statistics	GDP	PSD	PSE	PSH
Mean	2.825690	2.173318	5.084277	5.699677
Median	2.820222	1.603491	5.092630	6.032418
Maximum	26.17025	14.80693	8.617970	10.05202
Minimum	-14.81416	0.508177	2.068210	0.887040
Std. Dev.	3.897234	2.036833	1.180256	2.009438
Skewness	0.301966	3.301394	0.283639	-0.361493
Kurtosis	9.665191	14.96418	3.220376	2.496490
Jarque-Bera	875.2616	3649.180	7.237637	15.16886
Observations	469	469	469	469

Note: p<0.01=significant at 10%, p<0.05=significant at 5%, p<0.0001=significant at 1% and ***=10%, **=5%, *=1%.

Table 1 contains mean, median , maximum value, minimum value, standard deviation, skewness, kurtosis, Jarque-Bera, and observations of all variables. The mean value of GDP is 2.82% whereas maximum value which is observed is 26.17%, which is the huge differential point, the minimum value is -14.80% again is a differential point among all developed world. GDP of developed countries is positively skewed with 0.30. Its kurtosis shows the value of 9.66, which is the symbol of leptokurtic nature of data, it is confirmed from Jarque-Bera test that the data is not normally distributed by viewing its value that is 875.26, which is much higher. The standard deviation of GDP shows that it is almost 1% deviated from its mean value.

The second variable is PSD, which has a mean value of 2.17%, whereas maximum value is 14.80%, which is an enormous differential point, minimum value 0.50% again is a differential point between developed nations. PSD of developed countries is positively skewed with 3.30. Its kurtosis shows the value of 14.96 which is a symbol of leptokurtic nature of data, it is confirmed from Jarque-Bera that data is not normally distributed by viewing its value 3649.18 which massively high. The standard deviation of PSD is almost 0.14% of its mean value.

The value of PSE Mean is 5.08% and the maximum value is 8.61%, which is a vast difference point on the other side the minimum value is 2.06%, which shows. PSE of developed countries is positively skewed with 0.283 and kurtosis of PSE shows the value of 7.23 which is the sign of leptokurtic nature of data, it is confirmed from Jarque-Bera that data is not normally distributed by viewing its value 7.23, which is higher. The standard deviation of PSE shows that it is almost 3.90% deviated from its mean value.

PSH stands form public spending on health and it is the fourth variable, the value of PSH mean is 5.69% and the maximum value is 10.05% and the minimum value is 0.88%. PSH of developed countries is positively skewed with -0.36 and kurtosis of PSH show the value of 2.49 which is the sign of leptokurtic nature of data, from Jarque-Bera value is 15.16, which is higher than the normal value. The standard deviation of PSH shows that it is almost 3.69% from its mean value.

To inspect whether the data is stationary or not, we applied four main unit root tests such as Im, Pesaran and Shin W-Stat Test, Levin, Lin and Chu Test, Augmented Dickey-Fuller Test (ADF) and Phillips-Perron Test (PP).

Table 2: *Results of Unit Root Tests*

Test Name	GDP	PSD	PSE	PSH
Im, Pesaran and Shin W-stat	0.000*	0.000*	0.000*	0.000*
ADF	0.000*	0.000*	0.000*	0.000*
Levin, Lin & Chu	0.000*	0.000*	0.000*	0.000*
PP	0.000*	0.000*	0.000*	0.000*
Significant at	Level	Level	1st Diff.	1st Diff.

Note: *p*<0.01=significant at 10%, *p*<0.05=significant at 5%, *p*<0.0001=significant at 1% and ***=10%, **=5%, *=1%

Table 2 contains the results of four unit root tests for stationary, their *P-Value*s, show that these are significant at the given levels. For Gross Domestic Product (GDP) the *P-Value* of Im, Pesaran and Shin W-stat, Levin, Lin & Chu, Augmented Dickey-Fuller and Phillips Perron tests are 0.00 so the null hypothesis is rejected and it is concluded at 1% level of significance that there is no unit root in GDP data. The *P-Value* of Im, Pesaran and Shin W-Stat, Levin, Lin, and Chu, Augmented Dickey-Fuller, and Phillips-Perron Tests in Public Spending on Defense (PSD) is 0.00 so the null hypothesis is discarded and it is concluded at 1% level of significance that there is no unit root in PSD data and total 41 cross sections and 606 number of observations traced and it is significant at level.

For public spending on health the *P-Value* of Im, Pesaran, and Shin W-stat, Levin, Lin, and Chu, augmented dickey fuller and Phillips-Perron Tests is 0.00 so the null hypothesis is rejected and it is concluded at 1% level of significance that there is no unit root in PSH. The *P-Value* of Im, Pesaran and Shin W-stat, Levin, Lin, and Chu, Augmented Dickey-Fuller and Phillips-Perron Tests are 0.00 so the null hypothesis is rejected and it is concluded at 1% level of significance that there is no unit root in PSE.

Table 3: *Estimation of Panel Least Square Regression*

Variable	Coefficient	t-Statistic	Probability
C	8.908427	11.06332	0.0000*
PSD	-0.187787	-2.088143	0.0373**
PSE	-0.154177	-0.968006	0.3335
PSH	-0.858073	-8.286854	0.0000*

R-squared	Adjusted R-squared	F-statistic	Prob. (F-statistic)	Durbin-Watson
0.188875	0.183642	36.09265	0.000000*	1.248874

Note: *p*<0.01=significant at 10%, *p*<0.05=significant at 5%, *p*<0.0001=significant at 1% and ***=10%, **=5%, *=1%,

Table 3 contains Estimation of Panel Least Square Regression with Coefficient of Independent Variables and there Significant *P-Values*. After the unit root tests panel least square regression was run (see table 1.3 in annexure) and results shown that public spending on defense is significant at 5% level and public spending on education is insignificant because its *P-Value* is greater than 10%. Public spending on Health is significant at 1% level and overall model seems to be a good fit because its *F* value is 0.00 so it is a good fit at 1% level of significance it R^2 having the value of 18.88% which shows the variation independent variable is almost 19% due to independent variables. The value of the Durbin-Watson test is less than 2 so it is concluded that there is no serial correlation contained by residuals.

But it is important to consider there might be a random effect in panel data, to check this here is a diagnostic test for the presence of variance across the entities which is called Lagrange Multiplier test. Table 3 shows the results of this test, which predicts the rejections of the null hypothesis of no variance across the units and concluded that the panel effect exists in this panel data.

Table 4: *Tests for Diagnostics of Cross Section Dependency*

Test	Statistic	d.f.	Prob.
Breusch-Pagan Chi-square	2021.484	820	0.0000*
Pearson LM Normal	28.68080	-	0.0000*
Pearson CD Normal	29.21096	-	0.0000*
Friedman Chi-square	173.8393	15	0.0000*
Frees Q	6.364878	-	-

Note: *p*<0.01=significant at 10%, *p*<0.05=significant at 5%, *p*<0.0001=significant at 1% and ***=10%, **=5%, *=1%,

Table 4 contains Breusch-Pagan Chi-square, Pearson LM, Pearson CD, Friedman Chi-square, Test for diagnostics of cross-section dependency and there *P-Value*s. Because LM test for the detection of random effect showed in table 4, concludes that random effect exists, the obvious way is to run random and fixed effect models. Table 5 depicts the summary of fixed and random effect models in which all the variables are significant except PSE, which is insignificant in the random effect model. In both models, all independent variables are having a negative effect on GDP.

Table 5: *Fixed Effect and Random Effect Model for Developed Countries*

FEM				REM			
Variable	Coeff	t-Stat	P	Variable	Coeff	t-Stat	P
C	17.677	8.78	0.000*	C	10.631	9.63	0.00*
PSD	-1.033	2.64	0.085*	PSD	-0.269	-2.15	0.03**
PSE	-1.577	-	0.001*	PSE	-0.421	-1.93	0.05**
PSH	-0.804	-	0.005*	PSH	-0.889	-6.40	0.00*

Model	R-squared	Adjusted R-squr	F-statistic	Prob. (F-statistic)	Durbin-Watson
FEM	0.377120	0.314099	5.984052	0.000000*	1.524928
REM	0.132888	0.127293	23.75425	0.000000*	1.399686

Note: $p<0.01$=significant at 10%, $p<0.05$=significant at 5%, $p<0.0001$=significant at 1% and ***=10%, **=5%, *=1%.

Table 5 contains *P-Value*s of REM and FEM and R-squared, Adjusted R-squared, F-statistic, Prob. (F-statistic), Durbin-Watson Stat. Fixed effect model has strong explanatory power than a random effect model, both models seem to be a good fit, but it is still to be decided which model is appropriate for this study. For this purpose, the Hausman test is applied to investigate the choice between two models. Table 6 present the summary of Hausman test output, in which the null hypothesis was a random effect model is appropriate. The *P-Value* is 0.0001, which rejects the null hypothesis and concludes that the fixed effect model is appropriate.

Table 6: *Hausman Test*

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	20.432967	3	0.0001*

Note: $p<0.01$=significant at 10%, $p<0.05$=significant at 5%, $p<0.0001$=significant at 1% and ***=10%, **=5%, *=1%,

Table 6 contains *p* of cross section random.

Table 7: *Group wise Modified Wald Test*

Test Statistic	Value	d.f.	Probability
F-statistic	36.09265	(3, 465)	0.0000*
Chi-square	108.2780	3	0.0000*

Note: $p<0.01$=significant at 10%, $p<0.05$=significant at 5%, $p<0.0001$=significant at 1% and ***=10%, **=5%, *=1%

Table 7 shows the results of group-wise Wald test conducted for the detection of heteroscedasticity in panel data. The *P-Value* of the test is 0.0000, which is significant at the 1% level, and rejects the null hypothesis of homoscedasticity and concludes that there is heteroscedasticity in the residuals of the model.

Table 8: *Wooldridge Test for the Detection of Autocorrelation in Model*

F(1, 40)	12.462
Probability	0.0011*

Note: $p<0.01$=significant at 10%, $p<0.05$=significant at 5%, $p<0.0001$=significant at 1% and ***=10%, **=5%, *=1%,

Table 8 contains Wooldridge test for detection of autocorrelation and *P-Value*s. Table 8 shows the results of Wooldridge test conducted for the detection of auto/serial correlation. The *P-Value* of the test is 0.0011, which is significant at the 1% level, and rejects the null hypothesis of no serial correlation and concludes that there is a serial correlation in this data.

Table 9: *Test for Detecting the Time fixed Effect*

F(15, 410)	6.61
Probability	0.0000*

Note: $p<0.01$=significant at 10%, $p<0.05$=significant at 5%, $p<0.0001$=significant at 1% and ***=10%, **=5%, *=1%,

Table 9 contains Time fixed test and *P-Value*s. Table 9 shows the results of Time Fixed Test conducted for the detection of the value of time variable in panel data. The *P-Value* of the test is 0.0000, which is significant at 1% level, and rejects the null hypothesis of zero value of time variable and concludes that there is no zero value in time variable in this data, it is suggested that we should use time variable in this data.

Table 10: *Estimation of Panel Least Square Regression with Cluster Option*

Variable	Coefficient	t-Statistic	Probability
C	17.6776	4.68	0.0000*
PSD	-1.0336	-1.96	0.056***
PSE	-1.5717	-2.76	0.009*
PSH	-0.8047	-1.42	0.164

Note: $p<0.01$=significant at 10%, $p<0.05$=significant at 5%, $p<0.0001$=significant at 1% and ***=10%, **=5%, *=1%.

Table 10 contain post regression test, predicts the heteroscedasticity and serial correlation problem in a fixed effect model, which disturbs the results to avoid these issues a cluster regression was run and table 10 shows the results of this analysis. According to table 10, public spending on defense is significant at the 10% level and public spending on health is insignificant but it became significant at 16.4%, which is not acceptable. Public spending on education is significant at 1% level and overall model seems to be a good fit because its *F*-Value is 0.0010 so it is a good fit at 1% level of significance. Its R^2 has the value of 9.08%, which shows the variation independent variable is almost 9.8% due to independent variables. The value of the Durbin-Watson test is less than 2 so it is concluded that there is no serial correlation contained by residuals.

FINDINGS AND DISCUSSION

The study aims at exploring the impact of the public expenditures on economic growth in the developed world during the time period from the year 2000 to 2015. For empirical analysis, panel data techniques are used by taking GDP as predicted variable whereas, public spending on health, education, and defense are taken as outcome variables.

The findings of this study do not the reject the first null hypothesis and conclude that there is no significant effect of public spending on health on GDP. The second hypothesis of this study is about public spending on education on economic growth, the results are significant and it has a statistically significant impact on GDP but the direction of the relationship is inverse that is negative. The results of this hypothesis did not support the Rostow's model, which claims that once the economy reaches the maturity stage the mix of public expenditure shifts from expenditure on infrastructure to increasing expenditure on education, health, and welfare services. In the mass consumption stage, income maintenance programs, and policies designed to redistribute welfare grow significantly relative to other items of public expenditure. The finding of the third hypothesis suggests that public spending on defense is an insignificant variable to explain the predicted variable.

The German economist Adolf Wagner (1835-1917) developed his law of rising public expenditure by analyzing movements in the growth of public expenditure and in the volume of public divisions in many countries of the world. Wagner's law or the law of rising public expenditure assumes that the increase in public spending is more than the comparative rise in the state income (income elastic wants) and consequently results in a relative growth of the public sector. The finding of this study contradicts the law of rising public expenditure.

These findings advise four significant policy implications. First is, defense programs are not a well-organized way to generate employment. Thus, it is not wise for states to use defense spending to create jobs for the purpose of stimulating their economies, it is suggested that governments should not focus on defense spending because it does not have any effect on GDP, it should be a suitable size for necessary defense needs, second implication is that developed countries already spent a lot on defense sector, so it is an overspending to allocate more funds in this head, and the third recommendation is that government should revisit the spending on health because it is possible that government is spending on non-productive area of health sector because our findings suggest it has an insignificant effect on economic growth, fourth policy implication is education sector help to develop human capital that in response has an effect on the economic growth but this is slow process, our findings suggest that education spending has significant negative effect on GDP, because it has long-lasting impact.

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