Article Type: Research Paper

Does Government Spending in Health, Education, and Military Improve Welfare in Asian Developing Countries?

Wiksadana[1]* and Estro Dariatno Sihaloho[1]

Abstract: The study of government expenditure is essential for economists and policymakers. This study aims to analyze the impact of various government spending, mainly on education, health, and military, on the effect of welfare on Asian Countries. This study was conducted in 20 Asian countries constructed on panel data from 2013–2017 and is analyzed using the fixed effect general least square (FEGLS) method. The results show that, government spending in health, military, and education had a positive and significant effect on Asian Countries' welfare. This research concludes that, the government health expenditure had the highest impact on welfare, followed by education and military spending.
Keywords: Government Spending; Welfare; Asian Developing Countries
JEL Classification: E60; H30; O11; I38

AFFILIATION:
[1] Department of Economics, Faculty of Economics and Business, Universitas Padjajaran, West Java, Indonesia

***CORRESPONDENCE:**
Wiksadana18001@mail.unpad.ac.id

THIS ARTICLE IS AVALILABLE IN:
http://journal.umy.ac.id/index.php/esp

DOI: 10.18196/jesp.v22i1.9337

CITATION:
Wiksadana, W., & Sihaloho, E.D. (2021). Does Government Spending in Health, Education, and Military Improve Welfare in Asian Developing Countries?. *Jurnal Ekonomi & Studi Pembangunan, 22*(1), 59-74.

ARTICLE HISTORY
Received:
15 July 2020
Revised:
30 July 2020
Accepted:
12 Jan 2021

Introduction

Government expenditure and its various effect on the economy have been an essential issue for many researchers in the field of economy. On its most basic terms, government expenditure is composed of all the consumption, transfer of payments, and investment by the government (Barro & Grilli, 1994). In the 18th century, Adolf Wagner formulated Wagner's law that hypothesizes the correlation between the portion of government spending per income and the effect of economic development. It is also a recurrence that government spending reflected through public goods and services such as education, infrastructure, and the law has been deemed crucial for economic growth (Wu, Tang, & Lin, 2010). According to research that utilized panel data regression with 182 countries in 54 years, Wu et al. (2010) stated that government expenditure is crucial to economic growth. Other studies also support this study; research by (Loizides & Vamvoukas, 2005) found that by the granger test, the total government expenditure caused economic growth in the short run and long run in the United Kingdom and Ireland. Preceding research yielded a similar result of a significant positive correlation between government expenditure and economic growth through an analysis of 100 countries (Landau, 2013).

Other research on the effect of government spending on capital formation on economic growth in the South-Eastern Europe region resulted in a positive and significant relationship between variables (Alexiou, 2009). There has been much research on the effects on economic growth, either within the overall government expenditure or specific government expenditure, such as transportation, infrastructure, education, military, health, etc. Studies on the effect of government education expenditure on economic growth are reflected in studies such as in Michaelowa (2000), Mercan and Sezer (2014), and Kiran (2014). Studies on the effect of government health expenditure on economic growth are revealed in studies (Razmi, Abbasian, & Mohammadi, 2012) and (Gupta, Verhoeven, & Tiongson, 2003). Meanwhile, research on the effect of government military expenditure on economic growth is disclosed in studies such as in (Lindén, 1992) and (Yildirim, Sezgin, & Öcal, 2005).

In terms of the country classifications, a study by Taiwo and Abayomi (2011) found that government expenditure had a positive relationship with the growth of Nigeria's real gross domestic product, which is an underdeveloped country. A larger-scale study of 30 developing countries uncovered that government expenditure was positively and significantly correlated with economic growth (Bose, Haque, & Osborn, 2007). Research through a single analysis that consisted of developed and less developed countries in 25 years found that government expenditure positively impacted economic growth (Lin, 1994). A study of Sub-Saharan African countries that mainly consisted of developing and underdeveloped countries from 1987 to 1997 exposed that there was a positive and significant effect on economic growth (Yasin, 2003); furthermore, this study also included variables, such as trade, private investment, population, and foreign assistant. However, a contradictory result also persists, such as a study (Kweka & Morrissey, 2000). This study concluded that an analysis of public expenditure in Tanzania from 1965-1996, stating that productive government expenditure had a negative impact on economic growth; the paper argued that expenditure in Tanzania has been unproductive and inefficient. From these findings, it can be seen that government expenditure has a significant and positive impact on economic growth; however, it needs to be supported by efficient and productive government spending.

It is a widely known fact that investment in education is detrimental to economic growth. Education brings many benefits through society not only in raising the general education level and improving its workforce but also in improving other facets of human life, such as health, nutrition, and sanitation, and it also increases participation in a democratic society (Chandra & Islamia, 2010). Government expenditure in education promotes growth in the economic system through externalities/indirect effects, including better educational attainment and achievement among children, lower mortality rate and health of children, better individual health, and a lower birth rate promoting higher productivity that increased overall earning (Michaelowa, 2000). A study by (Mercan & Sezer, 2014) also reinforces the current statement, stating that investment in education is highly beneficial to the general population at a macro and micro level; education also has a significant effect on economic growth in both direct and indirect terms. A study in 18 Latin American countries consisting of developing and underdeveloped nations concluded that there is a cointegrating relationship between educational expenditures and economic growth; however, some countries such as Chile, Jamaica, Paraguay, Peru, Uruguay, Guyana, and Nicaragua do not comply with that results (Kiran, 2014). Kuhl Teles and Andrade (2008) found that the relationship between government expenditure on education and economic growth was affected by the composition of the education expenditure divided between basic and higher education; the paper concluded that the relationship was insignificant when higher education was non-existent. Research conducted in an underdeveloped country, Pakistan, uncovered that education expenditures positively and significantly impacted economic growth through a bound testing approach from 1972–2010 (Riasat, Atif, & Zaman, 2011). A larger-scale study of mainly developing countries in the SSA countries through the GMM estimator disclosed that expansion in education expenditure affected GDP per capita positively (Appiah, 2017).

Similar to government education expenditure, government health expenditure would improve higher quality and life expectancy, promoting better human capital, thus increasing economic growth. According to World Bank (1993), government expenditure on health care reduced diseases contracted in productive life years, and that diseases contributing to the burden of a developing nation could be substantially reduced through cost-effective clinical measures. A study by Razmi et al. (2012), through OLS regression, found a significant and positive relationship between government health expenditure and the human development index in Iran. In-depth research by Gupta et al. (2003) revealed that growth in government expenditure in 50 developing countries was significant to the improvements in schools and mortality rate that directly and indirectly promoted economic growth. A study that evaluates the effect of Community-Based Neighborhood Arrangement (PLBK) program in Sulawesi Selatan, Indonesia also resulted a positive relationship between government spending in health and economic welfare on that region (Ardiansyah, 2016). Furthermore, a study in the central African states Region (CEMSC) and selected African countries consisting of underdeveloped countries resulted in a positive and significant relationship between health expenditure and economic growth, analyzed through OLS regression (Piabuo & Tieguhong, 2017).

According to Harris (1986), given its component, government military expenditure is less likely to be reduced compared to another government spending. The given characteristics motivate the authors to include government military expenditure as one of this paper's variables. Unlike other government expenditures, military expenditure has a negative impact on economic growth; this is caused by a military expenditure seen more as a burden. It is reflected in a paper by Lindén (1992) that found that military expenditure resulted in a negative effect on GNP's growth in the middle east region from 1973–1985. Rothschild (1973) argued that the resources spent on the military could be reallocated for better purposes, such as infrastructure and investment expenditures that would yield a higher rate of economic growth. However, the authors found contradictory research, such as one by (Yildirim et al., 2005), revealing a significant positive relationship between military expenditure and economic growth in the middle east and Turkey from 1989–1999. Other in-depth research by (Alptekin & Levine, 2012) uncovered that in developed countries, the relationship between military expenditure and economic growth was insignificant for LDC’s (least developed countries) but positive in the developed countries.

Through these analysis, the authors found the lack of research in analyzing and comparing these various effects of government expenditures as a whole on welfare in Asian Developing Countries. Therefore, this study intends to fill the aforementioned research gap. In this study, three main government spending was studied, including health spending, education spending, and military spending. The novelty of the research is to provide an outlook to other academicians and policymakers and give a direction on which government spending has the highest impact on welfare.

Research Method

This study used four key variables to be observed and analyzed. These data were gross national income per capita (a proxy for welfare), domestic general government health expenditure per capita, government expenditure on education per capita, and government military expenditure per capita. These variables were in terms of current US$. The gross national income per capita data were obtained from the World Bank and the Organization for Economic Cooperation and Development (OECD) national accounts data files. The domestic general government health expenditure per capita data was attained from the World Health Organization (WHO) Global Health Expenditure Database. The government expenditure on education per capita data was acquired from the United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute of Statistics and various statistical publications from national statistical offices. The government military expenditure per capita data was gained from the Stockholm International Peace Research Institute (SIPRI). These data were collected from 12 Asian underdeveloped countries (Afghanistan, Bangladesh, Cambodia, Indonesia, Kyrgyz Republic, Mongolia, Myanmar, Nepal, Pakistan, Tajikistan, Timor-Leste, and Vietnam) and eight Asian developing countries (Armenia, Azerbaijan, Georgia, Iran, Kazakhstan, Jordan, Malaysia, and Sri Lanka) for the total of 20 Asian Countries. The classifications of underdeveloped and developing countries were obtained from the World Bank classification. The analyzed collected data had a time series component from 2013-2017 (five years).

Table 1 Descriptive Information of Variable Used

Variable	Notation	Description	Data Source
Gross National Income	$\mathrm{GNI.Per.Capita}$	Gross National Income Per Capita	World Bank
Health Expenditure	$\mathrm{GE.Health.per.capita}$	Government expenditure on health per capita	WHO
Education Expenditure	$\mathrm{GE.Educ.per.capita}$	Government expenditure on education per capita	UNESCO
Military Expenditure	$\mathrm{GE.Military.per.capita}$	Government expenditure on military per capita	SIPRI

Source: Data processed.

Two other supporting data were employed to measure and unify the unit of measurements across all variables. These data were population and Gross Domestic Product (GDP). Population data were sourced from United Nations Population Division, Eurostat, Census reports, and other statistical publications from national statistical offices. The Gross Domestic Product (GDP) data was gotten from the World Bank and OECD national accounts data files.

This paper utilized both cross-section and time-series components, hence constructing a panel data model. The analysis was not separated between the underdeveloped countries and developing countries. It was caused by a small sample size if both categorizations were to be separated. In this paper, panel data regression was used. Thus, several conditions should be tested to identify the optimized model between a fixed-effect model or a random-effect model. To determine this model, a Hausman model was employed. The Hausmann model identifies the usage between the fixed and random effect models by detecting the presence of endogeneity of the independent variable (Sheytanova, 2014). The Hausman formula was calculated as such:

$$\text{Hausman} = (\beta\,\text{RE} - \beta\,\text{FE})'\,\text{var}\,\beta\,\text{RE} - \text{var}\,\beta\,\text{FE} - 1\,(\beta\,\text{RE} - \beta\,\text{FE})$$

To ensure that this model was optimized, extra tests such as heteroskedasticity and autocorrelation tests were needed. Heteroskedasticity was tested using the Modified Wald test for GroupWise heteroskedasticity. Heteroskedastic means that the residuals within the model do not have a constant variance. In statistical analysis, it is assumed that the coefficients of variations are homoscedastic within the sample time duration (Yang, Koo, & Wilson, 1992).

On the other hand, autocorrelation represents similarity to a certain degree between a time series data and the lagged values of itself over its successive intervals. Autocorrelation is problematic in conventional analysis because it assumes independence of each sample/observation in the dataset. Autocorrelation was formulated as such:

$$\rho_k = \frac{\sum_{t=k+1}^{T}(r_t - r)(r_{t-k} - r)}{\sum_{t=1}^{T}(r_t - r)^2}$$

The presence of autocorrelation and heteroskedasticity prevented this paper from continuing its analysis through a fixed-effect or random-effect OLS panel data regression model. To mitigate these concerns and conditions, this paper utilized a fixed effect generalized least square regression (FEGLS) model. This GLS model is efficient in handling a certain degree of correlation of the residuals and estimating unknown parameters in a regression model.

The generalized least square regression (GLS) model was formulated as such:

$$GNI.Per.Capita = \beta 1 GE.Health.Per.Capita + \beta 2 GE.Educ.Per.Capita + \beta 3\, GE.Military.Per.Capita + \epsilon$$

In the GLS regression model, β is the minimum variance of the linear unbiased estimator, whereas y is expressed as the $n\ x\ 1$ response factor and ϵ is a $n\ x\ 1$ vector of errors.
The GLS regression model variance is expressed as such:

$$\mathrm{Var}[\varepsilon] = \sigma^2 V$$

V in the variance is known to be a $n\ x\ n$ diagonal matrix. The observations (y) will be uncorrelated when V has unequal diagonal elements. On the other hand, the observations (y) will be correlated when V has non-zero off-diagonal elements. Estimating β, with ordinary least square (OLS), $\beta *= (X'X)^{-1}y$, is not optimal. Thus, the model was transformed into a set of observations that would satisfy the constant variance assumption and used the least squares to estimate the parameters. With $\sigma^2 V$ as covariance matrix and V as an asymmetric non-singular matrix, it was concluded that $V = K'K = KK$. K is the square root of V. First, the authors defined:

$$z = K^{-1}y\ B = K^{-1}X\ g = K^{-1}\varepsilon$$
$$z = B\beta + g$$

Through matrix algebra,

$$E[g] = K^{-1}E[\varepsilon] = 0$$
$$\mathrm{Var}[g] = \mathrm{Var}[K^{-1}\varepsilon] = K^{-1}\mathrm{Var}[\varepsilon]K^{-1} = \sigma^2 K^{-1}VK^{-1} = \sigma^2 K^{-1}\ KKK^{-1}$$
$$\mathrm{Var}[g] = \sigma^2 I$$

The least-square function is,

$$S(\beta) = (z - B\beta)'(z - B\beta) = (K^{-1}y - K^{-1}X\beta)'(K^{-1}y - K^{-1}X\beta)$$
$$S(\beta) = (Y - X\beta)`K^{-1}K^{-1}(Y - X\beta)$$
$$S(\beta) = (Y - X\beta)`V^{-1}(Y - X\beta)$$

Using partial derivative concerning β and setting it to 0, the authors obtained:

$$(X`V^{-1}X)\beta = XV^{-1}y$$

The generalized least square estimator of β is:

$$\beta *= (X`V^{-1})^{-1}XV^{-1}y$$

And

$$E[\beta *] = (X'V^{-1}X)^{-1}XV^{-1}E[y] = (X'V^{-1}X)^{-1}XV^{-1}X\beta = \beta$$
$$\mathrm{Var}[\beta] = \sigma^2(B'B)^{-1} = \sigma^2(X'K^{-1}K^{-1}X)^{-1} = \sigma^2(X'V^{-1}X)^{-1}$$

The equation shown above is the basis for the model used in this analysis, and several papers, such as (Ahmad & Bano, 2015; Tongkong, 2012), have used the fixed-effect generalized least square method to mitigate similar issues.

Before continuing to analyze the results, the author would address some of the problems regarding missing data and the process of handling those missing data. On perfect data conditions, this research should have 400 data samples. However, there were a total of 28 missing data. Of those 28-missing data, 13 were untreated, and 15 of the remaining missing data were treated using linear data interpolation. Overall data performance was considered optimal; the untreated data only accounted for 3.25% of the total data available, lower than 5% considered the maximum upper threshold for data sets with large samples (Madley-Dowd, Hughes, Tilling, & Heron, 2019). The Table 2 reflects all the missing data and its treatment in this research paper.

Table 2 Missing Data List and Treatment Details

No	Variable	Country	Year	Treatment
1	Government expenditure on education % total GDP	Bangladesh	2014	Linear Interpolation
2	Government expenditure on education % total GDP	Bangladesh	2015	Linear Interpolation
3	Government expenditure on education % total GDP	Georgia	2013	Linear Interpolation
4	Government expenditure on education % total GDP	Georgia	2014	Linear Interpolation
5	Government expenditure on education % total GDP	Georgia	2015	Linear Interpolation
6	Government expenditure on education % total GDP	Indonesia	2016	Untreated
7	Government expenditure on education % total GDP	Indonesia	2017	Untreated
8	Government expenditure on education % total GDP	Jordan	2013	Untreated
9	Government expenditure on education % total GDP	Jordan	2014	Untreated
10	Government expenditure on education % total GDP	Jordan	2015	Untreated
11	Government expenditure on education % total GDP	Kazakhstan	2013	Linear Interpolation
12	Government expenditure on education % total GDP	Kazakhstan	2014	Linear Interpolation
13	Government expenditure on education % total GDP	Cambodia	2015	Untreated
14	Government expenditure on education % total GDP	Cambodia	2016	Untreated
15	Government expenditure on education % total GDP	Cambodia	2017	Untreated
16	Government expenditure on education % total GDP	Myanmar	2013	Linear Interpolation
17	Government expenditure on education % total GDP	Myanmar	2014	Linear Interpolation
18	Government expenditure on education % total GDP	Myanmar	2016	Linear Interpolation
19	Government expenditure on education % total GDP	Myanmar	2017	Linear Interpolation
20	Government expenditure on education % total GDP	Tajikistan	2013	Linear Interpolation
21	Government expenditure on education % total GDP	Tajikistan	2014	Linear Interpolation
22	Government expenditure on education % total GDP	Tajikistan	2016	Untreated
23	Government expenditure on education % total GDP	Tajikistan	2017	Untreated
24	Government expenditure on education % total GDP	Vietnam	2014	Linear Interpolation
25	Government expenditure on education % total GDP	Vietnam	2015	Linear Interpolation
26	Government expenditure on education % total GDP	Vietnam	2017	Untreated
27	Government expenditure on Military (current USD)	Tajikistan	2016	Untreated
28	Government expenditure on military (current USD)	Tajikistan	2017	Untreated

Source: Data processed.

In this paper, the authors used data interpolation only when the missing value had a preceding and proceeding value. Data interpolation is used instead of data imputation because the data have a time series component. The formulation for the data interpolation is defined as such:

$$X_t = X_{t-1} + (X_{t+1} - X_{t-1})/2$$

a. X_t = Data at time (t)
b. X_{t-1} = Data at the preceding year (t-1)
c. X_{t+1} = Data at the proceeding year (t+1)

X_t represents data at a time (t), while X_{t-1} reflects data at the preceding year (t-1). Finally, X_{t+1} signifies data at the proceeding year (t+1). Reflected on the list above, it was concluded that the main source of missing data came from the government expenditure in education data, sourced from the United Nations Educational, Scientific, and Cultural Organization.

Result and Discussion

In this research, the p-value used throughout all models was set at 5% or 0.05 significance level. Concerning the main result of the main model, the model testing results, such as the Hausmann test, heteroskedasticity, and autocorrelation, are shown and discussed. The Hausmann test results are specified as such:

Table 3 Hausmann Test Result

Variables	Coefficients			
	Fixed	**Random**	**Difference**	**S.e**
GE.Health.Per.Capita	6,604027	12,4452	-5,841174	1,93258
GE.Education.Per.Capita	0,3059014	7,173891	-6,86799	1,467388
GE.Military.Per.Capita	15,2239	11,15509	4,068809	0,8369074
chi2(3)	25,03			
Prob>chi2	0,000			

Source: Data Processed.

The Hausman test for his model returned a prob>chi2 value of 0.0121. This value was lower than the p-value of 0.05, meaning that Ho was rejected; thus, the fixed-effect model was optimized for this model. However, it has been stated that neither a fixed or random effect model was going to be used because of the presence of heteroskedasticity and autocorrelation. In this model, heteroskedasticity was tested with the Modified Wald test for GroupWise heteroskedasticity. The results are expressed as such:

Table 4 Modified Wald Test Results

Variable	Value
chi2(20)	8.3e+06
Prob>chi2	0.0000

Source: Data Processed.

The results returned a prob>chi2 of 0.000, which was smaller than the p-value of 0.05, indicating that Ho was rejected; thus, heteroskedasticity was present in this model. On the other hand, autocorrelation was examined employing the Wooldridge test for autocorrelation in panel data. The results are presented as such:

Table 5 Wooldridge Test Results

Variable	Value
F (1, 19)	123.440
Prob>F	0.0000

Source: Data Processed.

The results returned a prob>F of 0.0000, which was smaller than the p-value of 0.05, signifying that Ho was rejected. Thus, autocorrelation was present in this model. Through the predetermined test, the authors could conclude that autocorrelation and heteroskedasticity were present in this model.

Preceding the generalized least regression results, the authors would like to give more statistical insight into the data observed. Through covariance analysis as such:

Table 6 Covariance Analysis Results

	GNI.Per. Capita	GE.Health.Per .Capita	GE.Education.Per .Capita	GE.Military.Per. Capita
GNI.Per.Capita	8,9e+06			
GE.Health.Per. Capita	182177	4821.5		
GE.Education.Per.Capita	317977	6858.44	14529.6	
GE.Military.Per. Capita	145837	2934.64	4526.38	5403.64

Source: Data Processed.

It was denoted that all regressors had a positive correlation/relationship with gross national income per capita. However, covariance did not reflect how strong the relationship between the dependent and independent variables.

Table 7 Fixed-Effect Generalized Least Square Regression Results

Variables	GNIperCapita
GE.Health.Per.Capita	15.96***
	(2.801)
GE.Educ.Per.Capita	11.70***
	(1.536)
GE.Military.Per.Capita	8.525***
	(1.764)
Constant	374.76**
	(163.5)
Observations	93
Number of country_1	20

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Data Processed.

Table 7 displays the generalized least square regression. Through those results, the authors could be inferred some of the findings. GE.Health.Per.Capita value of 15.96 indicated that an increase of 1 unit or 1 US$ of government spending on health, on average, would increase gross national income per capita by 15.96 US$ at a 1% significance level in ceteris paribus. In simplified terms, the growth of government expenditure had a significant positive impact on the growth of gross national income or welfare. Preceding research by (Gupta et al., 2003), which focused on the 50 developing countries, resulted in and confirmed the same relationship between government health expenditure and economic growth/welfare.

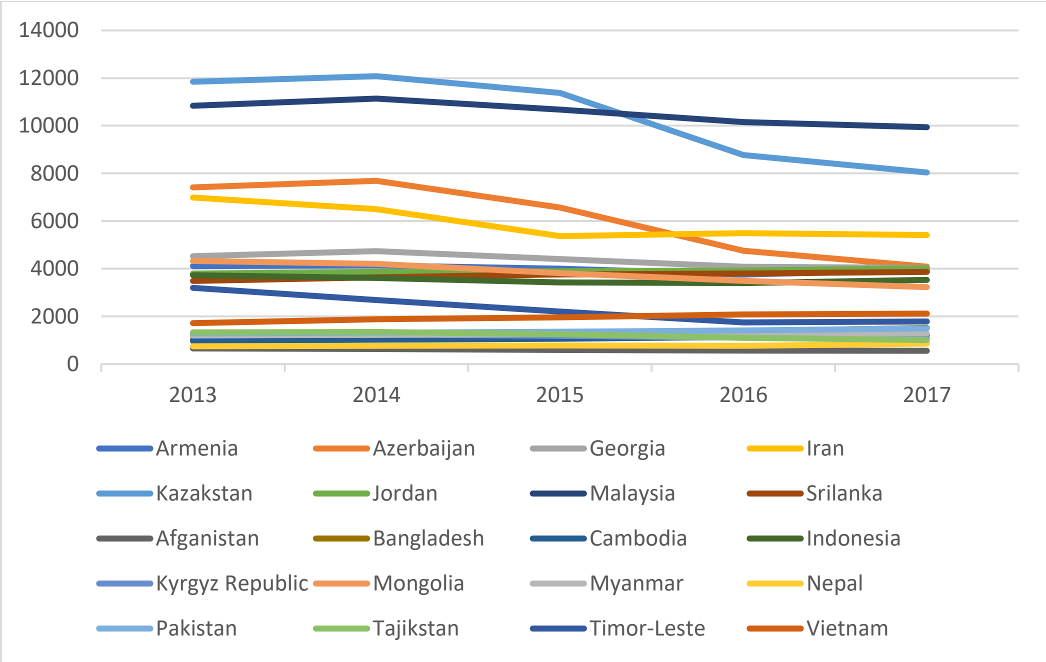

Figure 1 Gross National Income per capita
Source: World Bank, 2013-2017

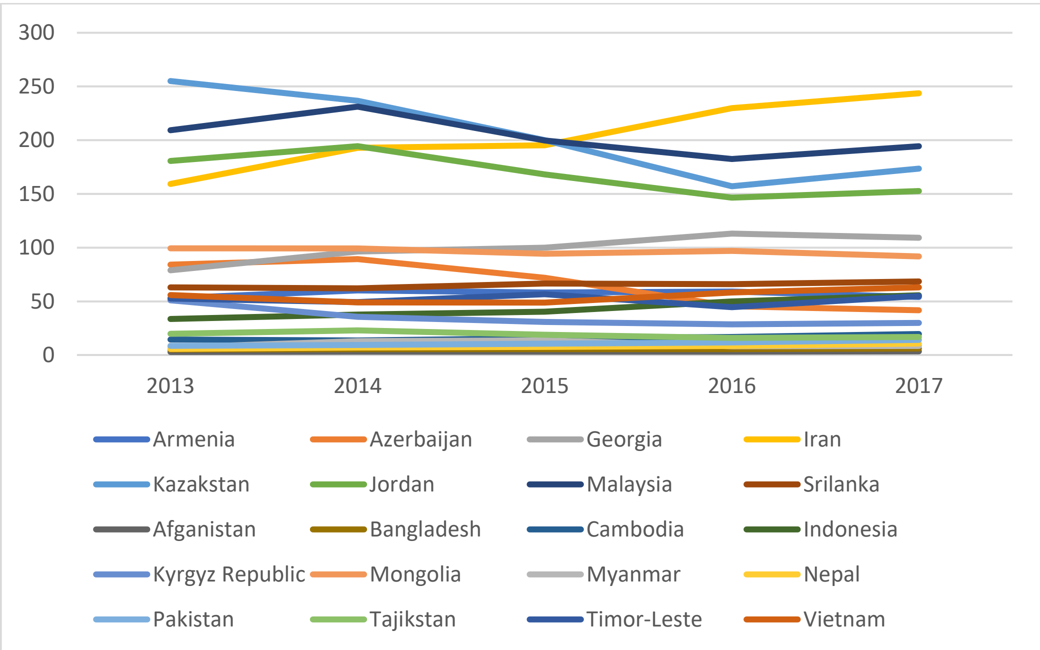

Figure 2 Gross Health Expenditure per capita
Source: World Health Organization, 2013-2017

From Figures 1 and 2, it is clearly illustrated that both GNI per capita and government expenditure on health per capita have moved in different manners over the past five years. In terms of GNI per capita, the average growth throughout the region was at -4.67%. The data showed that Azerbaijan had the slowest growth of GNI per capita in this region, with a growth rate of -44.8%. On the other hand, Bangladesh had the highest GNI per capita growth rate in this region, with a growth rate of 46.153% in the past five years. Indonesia's GNI per capita growth was at -5.361%, which was lower than the average growth in the developing Asian region (1.019%). Indonesia was in seventh place on the highest growth of gross national income in the developing Asian region.

In terms of government health expenditure per capita, the average growth throughout the region was at 13.536%. Azerbaijan had the lowest domestic general government health expenditure per capita growth rate, with -50.39% in the last five years. On the contrary, Nepal had the highest growth rate of government health expenditure per capita in this region, with a staggering growth rate of 89.027% in the past five years. On the other hand, Indonesia had a growth rate of 65.81% in the past five years. It made Indonesia be in second place in terms of growth in government health expenditure per capita. Figures 1 and 2 exhibits that the growth of government health expenditure promoted the growth of GNI per capita. The World Bank (1993) argued it could happen because government expenditure on healthcare lowers the number of diseases contracted in productive life years. A study in the same country on the data set, Iran, concluded a significant relationship between government health expenditure and the human development index through higher life expectancy (Razmi et al., 2012).

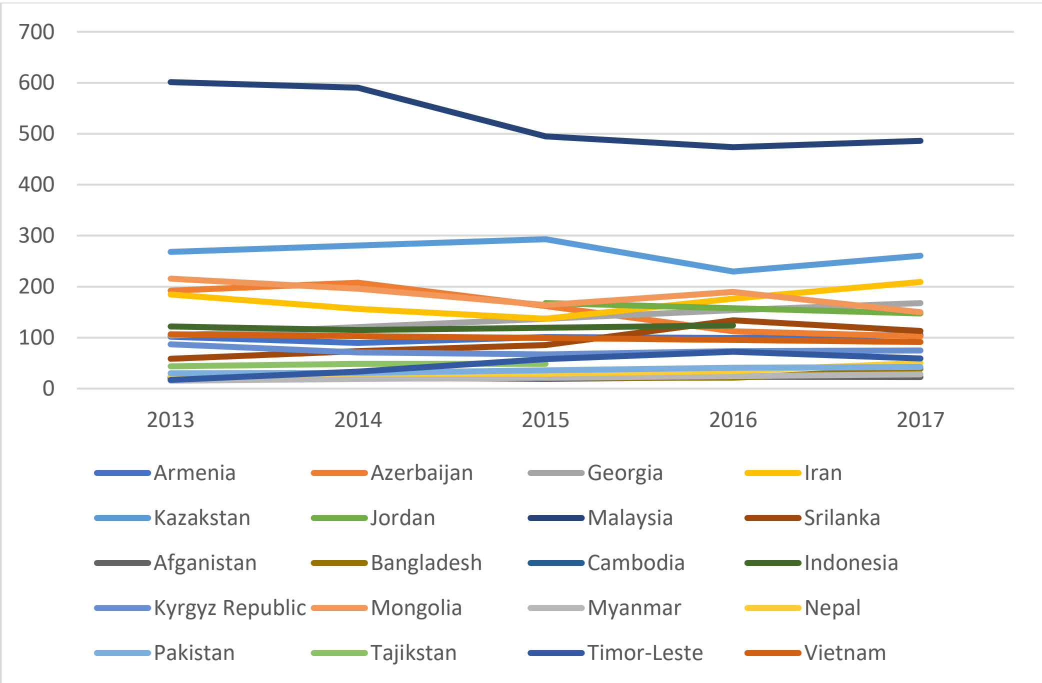

Figure 3 Gross Education Expenditure per capita
Source: The United Nations Educational, Scientific and Cultural Organization, 2013-2017

In terms of data, it is illustrated GNI per capita and government expenditure on education per capita grown in various manners over the past five years. Regarding government education expenditure per capita, the average growth throughout this region was around 31.36%. Timor-Leste had the highest growth rate at 248.51% in the past five years, while Azerbaijan had a negative growth rate of -46.66% in the past five years. In Indonesia, government education expenditure per capita had a growth rate of 1.85% in the past five years. It was lower than the average and placed Indonesia in seventh place in the region.

Through the regression results of GE.Education.Per.Capita value of 11.70, it signified that an increase of 1 unit or 1 US$ of government spending on education, on average, would increase gross national income per capita by 11.70 US$ at a 1% significance level in ceteris paribus. In simplified terms, the growth of government expenditure on education had a significant positive impact on the growth of gross national income or welfare. This significant impact on welfare is possible through direct and indirect effects (Mercan & Sezer, 2014). In terms of externalities or indirect effects, government expenditure promotes economic growth through better educational attainment and achievement among children, lower mortality rate and children's health, better individual health, and a lower birth rate (Michaelowa, 2000). A recent paper with the same sample of this research, Pakistan, supports the positive and significant relationship between education expenditures and economic growth through a bound testing approach from 1972-2010 (Riasat et al., 2011). However, the impact was slightly lower than government expenditure on health (11.70 < 15.96).

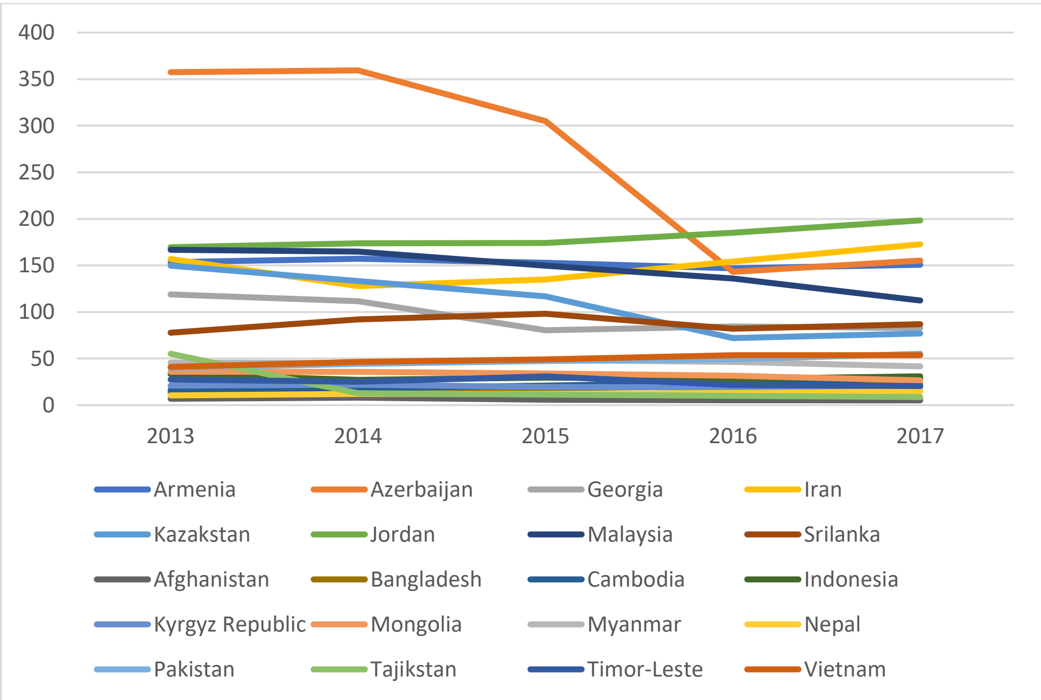

Figure 4 Gross Military Expenditure per capita
Source: Stockholm International Peace Research Institute, 2013-2017

Figures 1 and 4 reveal that GNI per capita and government expenditure on military per capita have grown in various manners in the past five years. On the topic of government expenditure on military per capita, the average growth rate throughout the region was around -2.732%. The highest government military expenditure per capita growth rate in this region was Cambodia, with a growth rate of 78.802% in the past five years. On the other hand, Tajikistan had a negative growth rate of -84.2% in the past five years. Indonesia's government military expenditure per capita had a growth rate of -7.18% in the past five years.

The regression results of GE.Military.Per.Capita value of 8.525 indicated that an increase of 1 unit or 1 US$ of government spending on the military, on average, would increase gross national income per capita by 8.525US$ at a 1% significance level in ceteris paribus. In simplified terms, the growth of government expenditure on the military had a significant positive impact on the growth of gross national income or welfare. A paper by (Yildirim et al., 2005) supports this relationship between government military expenditure and economic growth on a similar sample in the middle east countries.

Overall, the results revealed a positive and significant relationship from all independent variables on the dependent variable, with various impacts determined by its coefficient value. From the results, it was concluded that health expenditure had the highest impact on welfare, with education following it in the second place. Education had less impact than health because the effect of education expenditure on economic growth, or in other words, welfare, did not take an immediate effect. It was caused by a factor of lag, meaning that the investment in education did not take an immediate effect after a specific period. Chandra & Islamia (2010) found that this lag period was around 5-6 years. The current analysis also uncovered that military expenditure was the least impactful expenditure on welfare.

Conclusion

The topic of government spending has been an essential issue not only for an economist but also policymakers around the world. The composition and allocation of government spending are crucial to economic growth and welfare. However, the allocation is also needed to be supported by effective execution and planning. This paper analyzed three main compositions of government spending, mainly on education, health, and military. This paper utilized panel data analysis from 20 countries, consisting of 12 underdeveloped and eight developing Asian countries from 2013 - 2017 using the Fixed-Effect Generalized Least Squared method to compensate for autocorrelation and heteroskedasticity present in this model. Through the regression, the authors found that government expenditures on health, education, and military yielded a positive and significant relationship to welfare. Welfare was proxied by gross national income per capita. However, the positive and significant relationship of each spending was met with different impactful contributions to welfare. The authors uncovered that from these three different government expenditures, health expenditure yielded the most significant impact on welfare, followed by education and military spending. The deviation of the contribution of education and health was not high and probably caused by the lag factor of education spending that was not considered in this research. However, military spending had the lowest impact on economic growth, and its impact was small compared to health and education expenditure.

References

Ahmad, A., & Bano, S. (2015). Working Capital Management Matters Profitability of Textile Sector: With GLS Model. *International Journal of Economics and Empirical Research*, *3*(11), 543–549.

Alexiou, C. (2009). Government spending and economic growth: Econometric evidence from the South Eastern Europe (SEE). *Journal of Economic and Social Research, 11*(1), 1–16. Retrieved from https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.452.6517&rep=rep1&type=pdf

Alptekin, A., & Levine, P. (2012). Military expenditure and economic growth: A meta-analysis. *European Journal of Political Economy, 28*(4), 636–650. https://doi.org/10.1016/j.ejpoleco.2012.07.002

Appiah, E. N. (2017). The effect of education expenditure on per capita GDP in developing countries. *International Journal of Economics and Finance, 9*(10), 136. https://doi.org/10.5539/ijef.v9n10p136

Ardiansyah, M. A. (2016). Dampak program PLBK (Penataan Lingkungan Berbasis Komunitas) yang didukung oleh unit pengelola keuangan PNPM Mandiri terhadap perilaku masyarakat dan tingkat kesejahteraannya. *Jurnal Ekonomi & Studi Pembangunan, 17*(2), 114-126. https://doi.org/10.18196/jesp.17.2.3796

Barro, R., & Grilli, V. (1994). *European macroeconomics*. Red Globe Press.

Bose, N., Haque, M. E., & Osborn, D. R. (2007). Public expenditure and economic growth: a disaggregated analysis for developing countries. *The Manchester School, 75*(5), 533–556. https://doi.org/10.1111/j.1467-9957.2007.01028.x

Chandra, A., & Islamia, J. M. (2010). Does government expenditure on education promote economic growth? An econometric analysis. Munich Personal RePEc Archive, (25480). Retrieved from https://mpra.ub.uni-muenchen.de/25480/

Gupta, S., Verhoeven, M., & Tiongson, E. R. (2003). Public spending on health care and the poor. *Health Economics, 12*(8), 685–696. https://doi.org/10.1002/hec.759

Harris, G. (1986). The determinants of defence expenditure in the ASEAN region. *Journal of Peace Research, 23*(1), 41–49. https://doi.org/10.1177/002234338602300104

Kiran, B. (2013). Testing the impact of educational expenditures on economic growth: new evidence from Latin American countries. *Quality & Quantity, 48*(3), 1181–1190. https://doi.org/10.1007/s11135-013-9828-2

Kuhl Teles, V., & Andrade, J. (2008). Public investment in basic education and economic growth. *Journal of Economic Studies, 35*(4), 352–364. https://doi.org/10.1108/01443580810895635

Kweka, J. P., & Morrissey, O. (2000). Government spending and economic growth in Tanzania, 1965-1996. Centre for Research in Economic Development and International Trade, University of Nottingham. CREDIT Research Paper, 00(6), 1-53. Retrieved from https://www.nottingham.ac.uk/credit/documents/papers/00-06.pdf

Landau, D. (1983). Government expenditure and economic growth: A cross-country study. *Southern Economic Journal, 49*(3), 783-792. https://doi.org/10.2307/1058716

Lin, S. A. Y. (1994). Government spending and economic growth. *Applied Economics, 26*(1), 83–94. https://doi.org/10.1080/00036849400000064
Lindén, M. (1992). Military expenditure, government size and economic growth in the Middle East in the period 1973-85. *Journal of Peace Research, 29*(3), 265–270. https://doi.org/10.1177/0022343392029003003
Loizides, J., & Vamvoukas, G. (2005). Government expenditure and economic growth: Evidence from trivariate causality testing. *Journal of Applied Economics, 8*(1), 125–152. https://doi.org/10.1080/15140326.2005.12040621
Madley-Dowd, P., Hughes, R., Tilling, K., & Heron, J. (2019). The proportion of missing data should not be used to guide decisions on multiple imputation. *Journal of Clinical Epidemiology, 110,* 63–73. https://doi.org/10.1016/j.jclinepi.2019.02.016
Mercan, M., & Sezer, S. (2014). The effect of education expenditure on economic growth: The case of Turkey. *Procedia - Social and Behavioral Sciences, 109*, 925–930. https://doi.org/10.1016/j.sbspro.2013.12.565
Michaelowa, K. (2000). Returns to education in low income countries: evidence for Africa. In: Committee on Developing Countries of the German Economic Association. Annual meeting, Berlin, 30 June 2000 - 30 June 2000. Retrieved from http://www.ipz.uzh.ch/institut/mitarbeitende/staff/michaelowa/publikationen/Buechern/32-english.pdf
Piabuo, S. M., & Tieguhong, J. C. (2017). Health expenditure and economic growth - a review of the literature and an analysis between the economic community for Central African States (CEMAC) and selected African countries. *Health Economics Review, 7*(1), 1-13. https://doi.org/10.1186/s13561-017-0159-1
Razmi, M.J., Abbasian, E., & Mohammadi, S. (2012). Investigating the Effect of Government Health Expenditure on HDI in Iran. *Journal of Knowledge Management, Economics and Information Technology, 2*(5), 1-8. Retrieved from https://www.scientificpapers.org/economics/investigating-the-effect-of-government-health-expenditure-on-hdi-in-iran/
Riasat, S., Atif, R. M., & Zaman, K. (2011). Measuring the impact of educational expenditures on economic growth: Evidence from Pakistan. *Educational Research, 2*(13), 1839–1846. Retrieved from http://interesjournal.org/ER/pdf/2011/December%20Special%20Anniversary%20Review/Riasat%20et%20al.pdf
Rothschild, K. W. (1973). Military expenditure, exports and growth. *Kyklos, 26*(4), 804–814. https://doi.org/10.1111/j.1467-6435.1973.tb02777.x
Sheytanova, T. (2014). The accuracy of the Hausman test in panel data: A Monte Carlo Study. Retrieved from http://oru.diva-portal.org/smash/get/diva2:805823/FULLTEXT01.pdf
Taiwo, M., & Abayomi, T. (2011). Government expenditure and economic development : Empirical evidence from Nigeria. *European Journal of Business and Management, 3*(9), 18–29. Retrieved from https://core.ac.uk/download/pdf/234624111.pdf
Tongkong, S. (2012). Key factors influencing capital structure decision and its speed of adjustment of Thai listed real estate companies. *Procedia - Social and Behavioral Sciences, 40*, 716–720. https://doi.org/10.1016/j.sbspro.2012.03.254
World Bank. (1993). World Development Report 1993: Investing in Health. In World Development Report 1993. https://doi.org/10.1596/0-1952-0890-0
Wu, S.-Y., Tang, J.-H., & Lin, E. S. (2010). The impact of government expenditure on economic growth: How sensitive to the level of development? *Journal of Policy Modeling, 32*(6), 804–817. https://doi.org/10.1016/j.jpolmod.2010.05.011

Yang, S.-R., Koo, W., & Wilson, W. (1992). Heteroskedasticity in Crop Yield Models. *Journal of Agricultural and Resource Economics, 17*(01), 103–109. Retrieved from https://jareonline.org/articles/heteroskedasticity-in-crop-yield-models/

Yasin, M. (2003). Public spending and economic growth: Empirical investigation of Sub-Saharan Africa. *Southwestern Economic Review, 30*(1), 59–65. Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.531.9796&rep=rep1&type=pdf

Yildirim†, J., Sezgin, S., & Öcal, N. (2005). Military expenditure and economic growth in Middle Eastern countries: A dynamic panel data analysis. *Defence and Peace Economics, 16*(4), 283–295. https://doi.org/10.1080/10242690500114751