The Role of Economic Growth and Information Technology in Military Development

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Abstract

A number of study show that the relationship between economic growth, information technology, and military development is ambiguous. Some countries with good economic growth reduce their military budget. However, some more developed countries even increase their military budget. In addition, some less developed countries yet promote their military development. This study aims to examine the relationship between economic growth and information techology, such as internet and mobile phone subscription, with military development. The data used came from the World Development Data of the World Bank covering 260 countries in the world and employing panel data regression using the fixed effects model. The dependent variable is the military expenditure (current USD) and the independent variables are GDP (current US$) and the number of mobile cellular subscriptions. The results of the study show that GDP and mobile cellular subscriptions have positive and significant associations with military expenditure. An increase of one US dollar in GDP is associated with an increase of US$ 0.0109002 in military expenditure (current USD). Meanwhile, an increase of one unit of mobile cellular subscription is related with an increase of US$ 38.28941 in military expenditure.

Keywords:

Economic Growth, Mobile Cellular Subcription, Military Developement, Regression, Panel Data Fixed Effects

Introduction

The world's expenditure on military is dynamic, sometimes declines, sometime increases. In 2012, military expenditure declined to $1,753 billion which was 2.5% of global gross domestic product (GDP). Meanwhile, in a number of regions, it increased in 1999 (Smith, R.P., 2011). Sementara itu di sejumlah region pada tahun 1999 (Smith, 2011). The decline in military expenditure happened for a long period after the Cold War. The world's military expenditure in total increased 2.1% and in monetary term reached $780 billion. The increase in the world's military expenditure in 1999 was mainly caused by the increase in some countries, including the USA, France, Russia, and China (Smith, 2011).

It can be seen from Table 1 that between 2004 and 2019, the world's and region's military expenditure increased. In particular, in the Unites States the military expenditure increased till 2010 and then declined and increased again in 2018. Meanwhile, in Africa the military expenditure reached its peak in 2014 and in Asia and Oceania it continuously increased and in Europe tended to be stable. What were the causes of the variation in military expenditure across countries?

Table 1
World and Regional Military Expenditure (in constant 2018 billion US dollars) 2004-2019

Year	World total	Africa	Americas	Asia and Oceania	Europe
2004	1,385.9	22.6	708.3	242.0	309.8
2005	1,445.9	23.5	741.6	255.1	313.2
2006	1,488.3	25.5	753.9	270.2	318.0
2007	1,550.7	26.8	777.4	288.2	326.7
2008	1,640.9	31.5	834.2	305.8	335.9
2009	1,757.2	33.2	899.0	344.4	342.0
2010	1,793.5	35.5	924.0	352.5	335.8
2011	1,798.5	39.2	914.2	366.5	329.6
2012	1,782.6	40.4	868.3	380.9	331.5
2013	1,755.6	45.1	808.4	399.9	326.1
2014	1,749.6	46.4	764.5	422.8	328.3
2015	1,776.0	44.3	750.5	445.8	337.4
2016	1,784.8	43.3	747.0	467.3	351.5
2017	1,807.3	42.5	746.5	488.7	342.4
2018	1,854.8	41.0	768.3	506.9	348.1
2019	1,922.1	41.6	804.8	531.5	365.4

Source: SIPRI (2020) (Author's compilation).

A number of studies have been carried out to investigate the association between economic growth and military expenditure. Alptekin and Levine (2012), using a meta-analysis, reviewed two empirical studies with 169 estimates on the impacts of military spending on economic growth. They found a negative association between military spending and economic growth in the least developed countries and positive association in developed countries. Least developed countries were still struggling to promote its development in all sectors and military spending could reduce budget allocation to foster economic growth. Meanwhile, developed countries could advance its economic growth through military spending by better security in all aspects of development.

On the other hand, Pieron (2009) carried out a test about the relationship between military spending and economic growth using an economic growth model using the endogenous technology. It was found that there was a negative relationship between military spending and economic growth in countries with high military burden level. In this study, the association between economic growth and military expenditure was examined.

In addition, the use of communication and information technology (ICT) has increased remarkably in the last two decades. The use of ICT has affected many aspects of life and development including military development. Samosir (2016) studied the impacts of creative economy, where ICT was included as a part of creative economy, on economic growth in Asia. Further, Samosir et al (2020) studied the role of ICT in contraceptive discontinuation di Indonesia. Furthermore, Rajagukguk (2020) conducted a study on the impacts ICT on transportation industry and economic growth. The results of these studies confirmed the importance of ICT in development. The role of ICT in military spending was also investigated in this study.

Based on the above discussion, this study aims to analyze the association between economic growth and ICT with military spending. It was hypothesized that higher military spending is associated with higher ICT and economic growth.

Data and Methods

Data

The data used in this study came from the World Developement Indicator of the Word Bank (2020). These data were panel data from 82 countries in the world during 2009–2017. These 82 countries represented all continents and were selected based on the data availability. The dependent variable is military expenditure (current USD). The independent variables include time, GDP (current US$), fixed broadband subscriptions, and mobile cellular subscriptions.

Methods

The data in this study were analyzed using univariate, bivariate, and multivariate analyses. With univariate analysis, descriptive statistics of variables in the model were presented. These include number of observations, mean, standard deviation, minimum, and maximum values. With bivariate

analysis, scatter diagrams between time, GDP (current US$), fixed broadband subscriptions, and mobile cellular subscriptions and military were displayed.

With multivariate analysis, a panel data linear regression with generalized least square (GLS) random effects was employed (StataCorp. 2017; Rajagukguk, 2016).

Results

The descriptive statistics (number of observations, mean, standard deviation, minimum, and maximum values) of variables in the model were presented in Table 2. It can be seen that military expenditure (current USD) ranged from none to 11,5 billion, GDP (current USD) varied between 185 million and 1,310 billion, fixed broadband subscriptions ranged from none to 17 million, and mobile cellular subscriptions varied between15,500 and 43,5 million.

Table 2
Variables, Number of Observations, Mean, Standard Deviation, Minimum, and Maximum

Variable	Obs	Mean	Std. Dev.	Min	Max
Military expenditure (current USD)	738	1.11e+09	2.01e+09	0	1.15E+10
GDP (current US$)	738	7.89e+10	1.70e+11	1.85E+08	1.31E+12
Fixed broadband subscriptions	738	641,439	1,820,122	0	1.70E+07
Mobile cellular subscriptions	738	2.43e+07	4.54e+07	15,500	4.35E+08

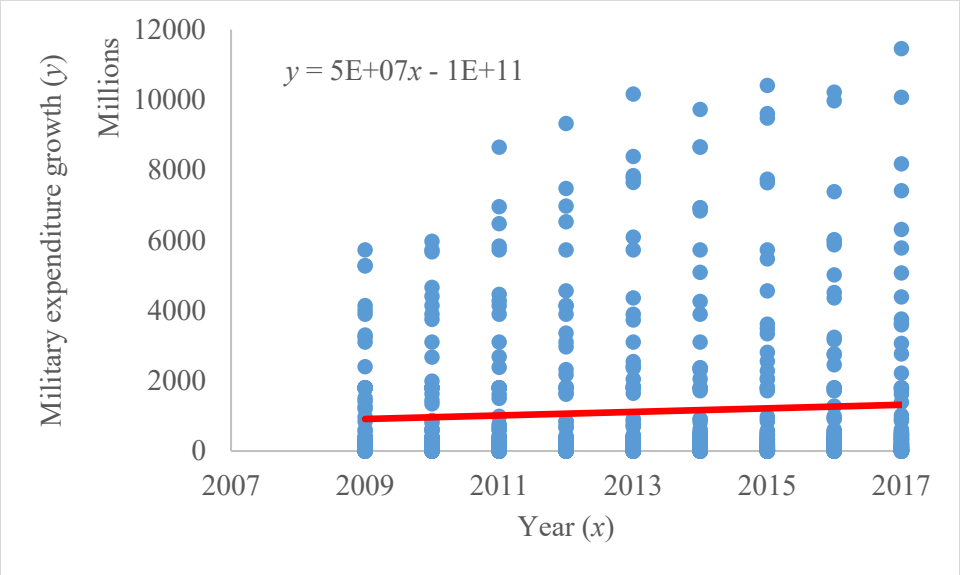
Source: World Bank (2020) (Author's compilation).

In Figure 1 the scatter diagram between time and military spending was presented. It can be seen that, on average, there was an increasing trend of military spending over time. There was an increase of 50,6 million (current US$) in military spending annually.

In Figure 2 the scatter diagram between GDP (current US$) and military spending was displayed. It can be seen that there was a positive association between GDP and military spending. On average, an increase of one US$ in GDP was associated with an increase of 0.0085 US$ in military spending.

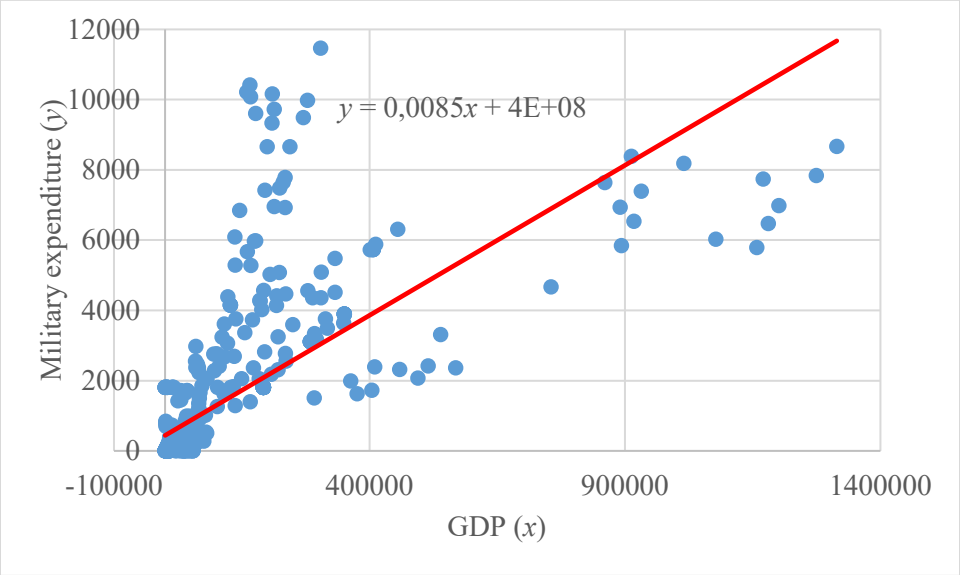
In Figure 3 the scatter diagram between fixed broadband subscriptions and military spending was shown. It can be seen that there was a direct relationship between fixed broadband subscriptions and military spending. On average, an increase of one unit fixed broadband subscriptions was associated with an increase of 678.11 US$ in military spending.

In Figure 4 the scatter diagram between mobile cellular subscriptions and military spending was presented. It can be seen that there was a direct relationship between mobile cellular subscriptions subscriptions and military spending. On average, an increase of a unit mobile cellular subscriptions was associated with an increase of 30,523 US$ in military spending.



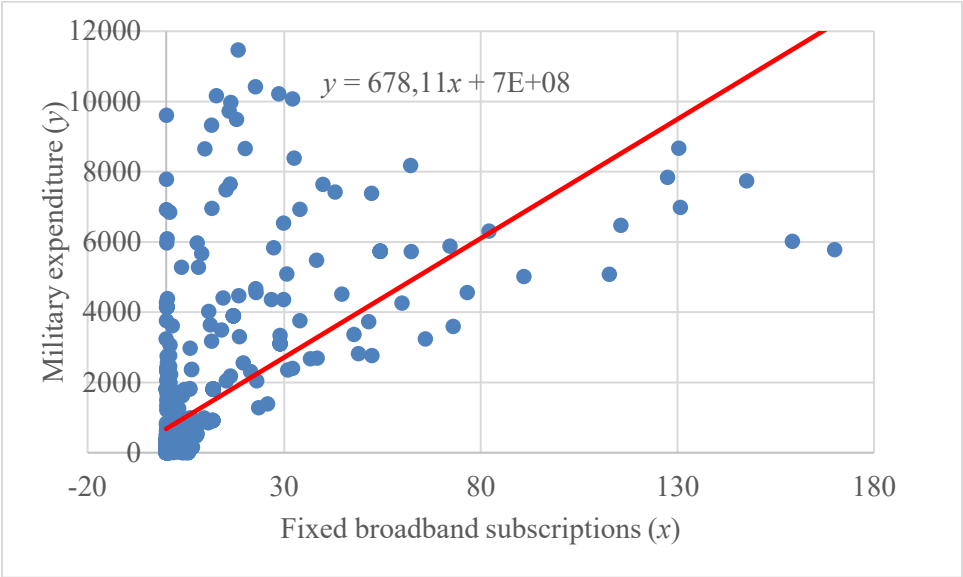
Source: World Bank (2020) (Author's compilation).

Figure 1
Military Expenditure Growth 2009-2017



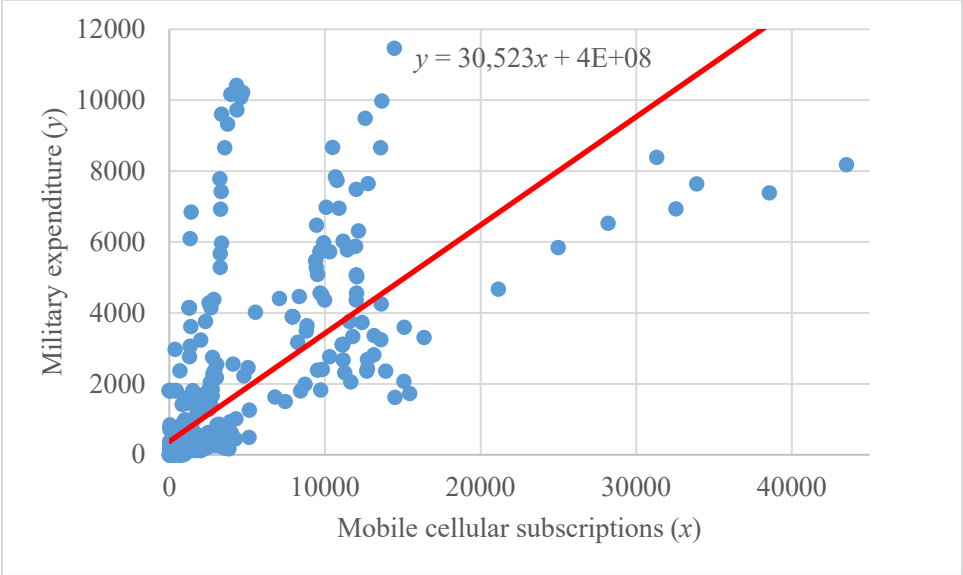
Source: World Bank (2020) (Author's compilation).

Figure 2
GDP(current million US$) and Military Expenditure (current million US$)



Source: World Bank (2020) (Author's compilation).

Figure 3
Fixed Broadband Subscriptions (hundred thousand) and Military Expenditure (current million US$)



Source: World Bank (2020) (Author's compilation).

Figure 4
Mobile Cellular Subscriptions (ten thousand) and Military Expenditure (current million US$)

The results of multivariate analysis of the effects of time, GDP, fixed broadband subscriptions, and mobile cellular subscriptions on military spending employing a panel data random effects linear regression with GLS are given in Table 3. These include the coefficients, standard error, *z* statistic, and P > |*z*|. It can be seen that all time, GDP, fixed broadband subscriptions, and mobile cellular subscriptions are all statistically and significantly associated with military spending.

Time is significant at the 0.001 significance level. Other things being the same, on average, an increase of one year in time will increase military spending by 23,600,000 current US$. In this study, time was the third strongest factor of military spending.

GDP was significant at the less than the 0.001 significance level. After controlling for the effects of other factors, on average, an increase of one current USD in GDP will increase military spending by 0.004215 current US$. In this study, time was the first strongest factor of military spending.

Fixed broadband subscriptions was significant at the 0.05 significance level. Ceteris paribus, on average, an increase of one unit in fixed broadband subscriptions will increase military spending by 65.91827 current US$. In this study, the number of fixed broadband subscriptions was the fourth strongest factor of military spending.

Mobile cellular subscriptions was significant at the less than 0.001 significance level. Other things being the same, on average, an increase of one unit in mobile cellular subscriptions will increase military spending by 9.06366 current US$. In this study, the number of mobile cellular subscriptions was the second strongest factor of military spending.

Table 3
Coeffients, Standard Error, *z* , P > |*z*|

Military expenditure (current USD)	Coefficients	Std. Err.	*z*	P > |*z*|
Constant	-4.69E+10	1.42E+10	3.31	0.001
Time	2.36E+07	7046269	3.34	0.001
GDP (current US$)	0.004215	0.000492	8.57	0.000
Fixed broadband subscriptions	65.91827	32.14031	2.05	0.040
Mobile cellular subscriptions	9.06366	1.717383	5.28	0.000

Source: World Bank (2020) (Author's compilation).

Conclusions

Military spending can be influenced by several factors. The results from the panel data of 82 countries during 2009–2017 in this study show that time, GDP, and the number of fixed broadband and mobile cellular subscriptions are all positively associated with military spending significantly and statistically. However, further studies to find the total factor productivity to develop a nation and to improve human welfare should be carried out.

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