Justifying Higher Education Expenditure Using Saturation Analysis

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Abstract
The massive allotment of funds for tertiary education in the Philippines prompted the researchers to examine whether this high budget is justifiable in terms of contribution to the GDP of the country. This study determined the extent of money that the Philippine government will spend for tertiary education per student, that will help increase the GDP per capita to the highest level using saturation analysis. The findings show that the saturation point for the government expenditure per tertiary student for ASEAN countries is 22.20% of the GDP per capita.

Keywords: Gross domestic product; Higher education expenditure; Saturation analysis

Introduction
The emphasis on putting human capital as source of improving economic condition in a country is globally prevalent. This circumstance insists on providing quality education to human capital in order to sustain the growth and development of a nation. According to Karacor et al., (2014) the brain power has increased in importance over the arm power or workforce. In this, the idea of people investing in themselves has begun to be widely accepted and education as one of the important dynamics plays a vital role in this context. This accepted setting made governments allocate budget for education. Given this scenario, Asian countries are spending millions for education in tertiary level, which is evident in the World Bank data. Thus, an assumption made by this study is that the more the country spends for education, the higher is the contribution to the Gross Domestic Product (GDP). Conversely, saturation point by definition is the act or result of supplying so much of something that no more is wanted (Merriam – Webster Dictionary). It is a point at which some capacity is at its fullest. In this study, saturation analysis is done to determine how much the government spends for the tertiary education students that may result to an optimum value for the GDP.

The study of Kaur, Baharom, and Habibullah (2014) specifies trending relationship between income level Gross Domestic Product per capita (GDP) and education expenditure in both China and India. A unidirectional causal relationship was detected for these countries, running from income level to education expenditure for the case of China, while for the case of India, education expenditure causes income level. Moreover, an investigation conducted by Mallick, Kumar, and Pradhan (2016) who utilized balanced panel data from...
1973 to 2012 revealed a statistically positive significant impact of education expenditure on economic development to 14 Asian countries and similarly in Turkey (Mercan & Sezer, 2014) and in developing countries (Appiah, 2017). Frank (2018) found out that the relationship between the education expenditure and the socio-economic status in non-oil, developing, and Organization for Economic Co-operation and Development countries is positive, negative and not significant, respectively.

At present, the Philippines is implementing Republic Act (RA) 10931 or known as “Universal Access to Quality Tertiary Act”. This Act provides free tuition and other school fees in State Universities and Colleges, Local and Universities and Colleges and State-Run Technical Vocational Institutions, establishing the tertiary education subsidy and student loan program, strengthening the unified student financial assistance system for tertiary education. Full implementation of free tertiary education gives fair access to quality education to every Filipino that may open better opportunities for growth and a huge budget was allocated for this purpose. This enormous allocation of funds prompted the researchers to examine whether this huge budget for tertiary education is justifiable to the contribution in the GDP of the country.

Framework of the Study

Adolph Wagner, the German economist made an in depth study on the rise in government expenditure in the late 19th century. Based on his study, he propounded a law called "The Law of Increasing State Activity", which states that the activities and functions of the government tends to increase as the economy develops over time (Akrani, 2011). His idea was tested under several considerations over the years using different techniques. Some studies have confirmed the Wagner’s Law of increasing public expenditure while other studies have shown that this is not true for every country (Wijeweera & Garis, 2009).

Moreover, Lamartina and Zaghini (2011) claimed that there is a structural positive correlation between public spending and gross domestic product (GDP) per-capita, which is consistent with the so-called Wagner’s law. They emphasized that the correlation is usually higher in countries with lower per-capita GDP, suggesting that the catching-up period is characterized by a stronger development of government activities with respect to economies in a more advanced state of development.

In fact, relationship between economic growth and public expenditures by Granger causality test using annual data for Turkey between 1961-2012 period has been investigated (Tuna, 2013). The causality relationship has not been found as direction from economic growth to government spending (as cited in Bayrakdar et al., 2015). Thus, Wagner’s Law is invalidated in Turkey over the considered period.

In this study, the GDP per capita is dependent on the government expenditure per student. GDP per capita is a gross domestic product divided by the midyear population. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes, minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. However, government expenditure per student is the average general government expenditure (current, capital, and transfers) per student in the given level of education.

Methodology

The purpose of this study is to scrutinize if there is really a need for the Philippine government to spend a lot of money for tertiary education and to what extent the government spends per student that may help increase the GDP per capita after 6 years to the highest level.

To facilitate people in addressing the world's
development challenges, the World Bank Open Data offers a growing range of free, easy-to-access tools, research and knowledge that are comprehensive and downloadable indicators on the development of countries around the globe (World Bank Open Data, 2018).

This study used secondary data, which are data that have been previously gathered. The data for GDP per capita in 2016 and the government expenditure per tertiary student in 2010 were retrieved from the World Bank Open Data. There is a six-year time difference between the GDP and the expenditure since it is expected that the effect of the said expenditure on the GDP can be observed six years after. The GDP per capita and the government expenditure per tertiary student are expressed in U.S. dollars and as a percentage of GDP per capita, respectively. The ASEAN countries covered in this study are Brunei Darussalam, Indonesia, Lao PDR, Malaysia, Philippines, Thailand, Vietnam and Singapore.

The gathered data were analyzed using saturation analysis to obtain the saturation point. Saturation point by definition is the act or result of supplying so much of something that no more is wanted (Saturation Point, n. d.). Thus, it is a point at which some capacity is at its fullest.

Figure 1. Framework of the study

Results and Discussion

GDP and Government Expenditures of ASEAN Countries

The association between the country’s GDP and its expenditure for education has been studied extensively. Figure 2 shows the countries’ GDP per capita with respect to their expenditures for tertiary education per student. Singapore has the highest GDP of 52,962.49 US$ per capita in 2016 with a government expenditure per tertiary student of 27.37% of the GDP per capita in 2010. Based on the report made by the Central Intelligence Agency, the progress on the GDP in 2016 is composed of 74% in services, 26% in industry and 0% in agricultural sector. According to the Ministry of Trade and Industry in Singapore (MTI), for the whole of 2016, all sectors contributed positively to the overall GDP growth, except for the business services sector. The manufacturing sector was the largest contributor (0.6 percentage-points), followed by “other services industries” (0.3 percentage-points) and the transportation and storage sector (0.2 percentage-points). Singapore places great emphasis on high-end manufacturing including semi-conductors and consumer electronics, as well as machinery, transport equipment, and ships (Inter Nations connecting Global Minds, n.d.). The government is also trying to foster future growth sectors such as aerospace, precision engineering, and the life sciences including biotechnology, medical equipment, and pharmaceutics.
Brunei Darussalam ranked as the second to the highest Gross Domestic Product of 26,939.42US$ per capita in 2016 with a government expenditure per tertiary student of 31.36% of the GDP per capita in 2010. This country spent more money on tertiary education compared to Singapore in 2010 but its GDP was lower than of Singapore in 2016. The growth rate of total exports (mainly oil exports) significantly influenced long - run economic growth rates in Brunei Darussalam (Anaman, 2004). However, its GDP growth in 2016 was attributed by 38.5%, 60.4% and 1.1% in terms of services, industry and agricultural sectors, respectively (Central Intelligence Agency, n.d.).

Vietnam had the lowest Gross Domestic Product of 2,170.65US$ per capita in 2016 considering that this country spent more money for tertiary education compared to Singapore and Brunei Darussalam in 2010. Nguyen Bich Lam (2016), head of the General Statistics Office in Vietnam, pointed out that as a whole, the economy has been growing strongly, except for agriculture and mining sectors due to adverse climatic events. The aforementioned finding is in consonant with the report made by the Central Intelligence Agency that the services sector (44%) was the largest contributor to the GDP growth, followed by the industry (39%) and agricultural sector (17%).

Among the eight countries studied, the Philippines had the lowest government expenditure for tertiary students in 2010 and its GDP per capita in 2016 is 2951.07 US$. Services (59.8%) was the top contributor on the GDP growth in the Philippines for 2016 and was followed by the industry (30.5%) and agricultural sector (9.7%) (Central Intelligence Agency, n.d.). Rosellon and Medalla (2017) mentioned that services have experienced relatively steady growth, with an average of 6.1 percent, from 2006 to 2016. They added that the most remarkable was that in the same period, industry, particularly manufacturing, registered similar average growth and even better performance in recent years, resurging from a sluggish performance for nearly three decades. Meanwhile, growth in agriculture has been declining in the last decade, from 13.1 percent in 2006 to 8.7
Figure 3. Saturation Analysis for the government expenditure per tertiary student percent in 2016 (Rosellon & Medalla, 2017). Service and industry are the most prominent sectors that significantly contributed to the increase in the GDP. The government should invest more money for higher education since educated workers are more productive. These people are well driven to perform better and demonstrate the desire to complete the given task. Kwon (2009) highlighted that recent challenges such as globalization, a knowledge-based economy, and technological evolution, have promoted many countries and organizations to seek new ways to maintain competitive advantage. He added that the prevailing sense is that the success depends in large part on the people with higher levels of individual competence. Thus, the people are becoming valuable assets and can be recognized within a framework of human capital.

Saturation Analysis for the ASEAN Countries

The saturation point for the government expenditure per tertiary student for ASEAN countries as can be seen above is about 22.20% of the GDP per capita. At this point, the GDP per capita is projected to be its maximum level. Consequently, the Philippines could have reached the optimum GDP growth in 2016 if its expenditure for tertiary students in 2010 is 22.20% (Php24,651.01) of the GDP per capita instead of 11.72% (Php13,132.26), a difference of about 10.48% (Php11,518.75). Moreover, it is reasonable to increase the government expenditure for tertiary students and it should not be more nor less than 22.20% (Php24,651.01) of the GDP per capita but exactly equal to that value to obtain an optimum GDP growth.

Mallick, Das, and Pradhan (2016) examined the dynamics education expenditure and economic growth in 14 major Asian countries using balanced panel data from 1973 to 2012. Their study revealed a positive impact of education sector to economic growth and that this sector shall be given priority among these countries. Moreover, based on the endogenous growth theory and by using the extreme boundary model of Zhu’s study (2014) among China’s 30 provinces from 2000 to
2010 data, the result showed education’s significant robust relationship with economic growth.

**Conclusion**

The huge amount of money allocated for tertiary education, when in fact this could be used for other government sectors, stimulated the researchers to examine whether this high budget for tertiary education is justifiable to the contribution in the GDP of the country. Moreover, this research can also help to encourage the Philippine government particularly the policy makers to supervise at the fullest level the allocation and utilization of money.

Results of the saturation analysis justified the increase of the Philippine government’s expenditure on tertiary education in order to obtain a maximum growth in the GDP and the government’s expenditure on tertiary education per student should be 22.20% of the GDP per capita. This manifest that investing more money for tertiary education overtime is equitable because once educated, workers demonstrate better performance and therefore become valuable assets in the human capital. However, spending more than the saturation point value of 22.20% for tertiary education per student, the country’s GDP would likely to decrease or increase but will not reach to its highest level. This study support Wagner’s Law of increasing public expenditure and encourage the Philippine government particularly the policy makers in supervising the allocation and utilization of government money since this will generate a highest possible amount of money that should be used for tertiary education that may significantly contribute to the improvement of the country at the fullest level.

**Recommendation**

This study has only investigated the effect of the expenditure for tertiary education on the country’s GDP; it has not made an assessment of the expenditures for elementary and secondary education. It is recommended that these factors be assessed. Expenditures for elementary and secondary education should be quantified and analyzed against GDP in order to establish the optimal level of impact on the GDP considering the source of expenditures for education. Further research is required to establish the validity of the claim that the expenditure for tertiary education should not exceed the identified saturation point as this will impact on the GDP of the country.

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