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Determinants of Public Education Expenditure: A Review

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Abstract

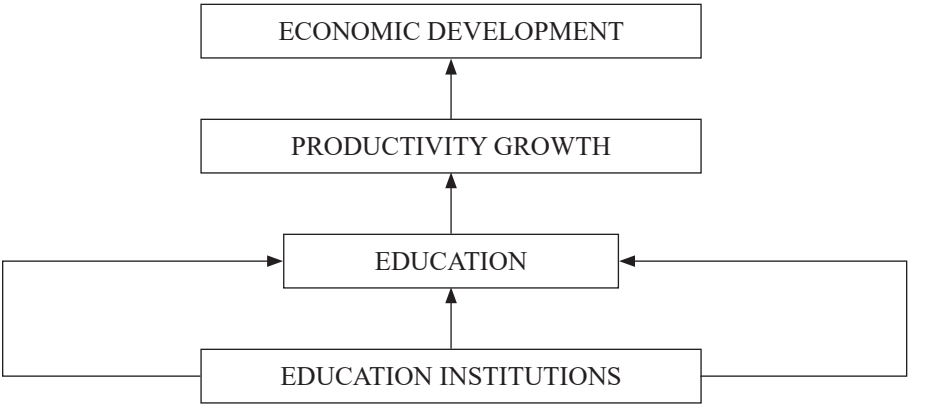
It is the primary aim of this review paper to shed light on the empirical studies which have identified factors that explain the allocation of public education expenditure. This paper takes a comprehensive review of the past and current literatures from various countries to evaluate the determinants that influence public education expenditure. Existing integrative studies builds upon a number of established economic theories positing that public education expenditure is determined by multidimensional factors. The review concludes that sufficient public allocation for the education sector was seen to be both necessary and crucial. The understanding of the variables that determine public education expenditure policy therefore serve as a fundamental key element to assist in improving the future planned allocations.

Keywords: Determinants, Review, Education Expenditure, Economic Factors, Demography

1. Introduction

The development of human capital is the key factor to drive productivity. However, human capital development is only possible through improved education systems. According to Downes (2001), education plays three basic roles in society. Firstly, education provides for the preparation and training of skilled human resources to cater to the needs of the economy. Secondly, it facilitates, by means of trained personnel, the generation and advancement of knowledge in the pure and applied fields. Thirdly, education performs a consciousness-raising function of the social, political, economic and physical environments. The positive impacts of education expenditure on productivity growth are well-recognised by economists. Education assists in the development of both cognitive and non-cognitive skills of labourers, thereby increasing the efficiency and productivity of these workers. Cognitive skills refer to the continuous improvement to knowledge and skills, while, non-cognitive skills refer to the adoption of appropriate attitudes for individual and societal development. Downes (2001) proposed the following model (Figure 1) to illustrate how the education system eventually leads to a higher level of economic development. A review of the past literatures as performed in Section 2 evaluates public education expenditure and its desirable outcomes and shows largely positive significant relationships between productivity and government education spending.

Figure 1. Productivity Improvement and Economic Development



Source: Downes (2001)

With the positive nexus between public education expenditure and economic development well-established, it is justifiable to conclude that sufficient provision for education is necessary in any economy. Hence, any changes to the trends and distribution of the public education expenditure becomes worth investigating. However, it should be noted that the researches in this specific area have been receiving less attention in the past. As such, this particular study presents a highly interesting and intriguing subject. In this review article, we will explore and evaluate the existing empirical researches in this area.

2. Efficiency of Public Education Expenditure

Voluminous literatures had firmly established that public education expenditure was highly efficient in stimulating economic growth through human capital development. A quick look at the papers reviewed, clearly showed substantial empirical evidences that were in support of the human capital theory which postulated positive and desirable effect of education on economic growth. Highly skilled and knowledgeable human capital will in turn become an engine for future economic growth. In fact, education expenditure did not just enhanced economic growth with higher productivity but also fostered social cohesion and promoted social welfare (Kelly, 1997). In addition, our review further linked the efficiency of education sector with its size of public allocation. The efficiency of education sector was observed to be greatly influenced by the size of the budgetary allocation.

Despite evidences of public education expenditure's positive effects on human capital development and economic growth was largely reported. However, a clear linkage between the size of allocation and the positive effects of education seemingly was lacking. As such, Judson (1998) applied a cross-country growth decomposition regression to study the linkage between economic growth and education expenditure by taking the size of allocation into consideration. In this paper, a period of five years average panel data that involved 138 countries over the period of 1960 to 1990 was empirically examined. The findings revealed that the correlation of human capital accumulation and GDP growth was not significant in countries with poor allocations. However, the correlation between the variables was positively

significant in countries that had better and more efficient allocations. In a nutshell, a higher allocation was definitely required to achieve better outcomes and to sustain higher economic growth.

Likewise, a study by Jorgenson and Fraumeni (1992) on U.S. economic growth revealed that education expenditure significantly affected individual's lifetime labour income. Individuals were more likely to earn higher lifetime income when equipped with education. This accentuated the importance of the investments in human capital through education investment as predominant sources of economic growth. On another note, Hutchinson and Schumacher (1997) highlighted that education expenditure may have been proven as a merit good which significantly influence the performance of economic growth. Through the application of the extreme bound analysis (EBA), the fiscal expenditure and economic growth of 16 Latin American and Caribbean countries from 1972 to 1991 examined clearly demonstrated that fiscal policy especially with regards of spending on merit goods (in this case education) played fundamental role in improving the performance of any economy.

In most economies, societal inequalities were view as undesirable due to its negative influences upon the economic environment. Sylwester (2002) had therefore proposed that the public allocation in education may in fact be proven as the most effective tool to address this problem. The least square regression conducted on the 50 cross sectional data of OECD and non-OECD countries from 1970 to 1990, evidently pointed out that the public education expenditures appeared to cause a fall of the level of income inequality. It was concluded therefore that higher devotion of resources to education sector helped in reducing income inequality within a country. Public education expenditure indirectly enhanced economic growth by narrowing income gap disparity. Meanwhile, Jung and Thorbecke (2003) applied a multi-sector CGE model to investigate the impact of public education expenditure in Tanzania and Zambia. The simulation results from their paper indicated that the increase of public education expenditure contributed to both economic growth and poverty alleviation. Sufficient high level of investment was therefore required to maximise benefits from education expenditure.

Effective allocation of resources for education will increase the growth rate of human capital and stimulate economic growth. An empirical

analysis which lend support to the preposition that government education spending acted as an important indicator of human capital formation was offered by Conrad (2011). By employing the instrumental variable (IV) technique on the pool series data during the period of 1970 to 2004, Conrad (2011) showed positive findings in both Jamaica and Guyana. Education was frequently considered as social sector that generated direct economic significance with positive spill-over effects. Aqil *et al.* (2014) demonstrated the prominent role played by education in creating human capital and enhancing Pakistan's economic growth. Time series data from 1971 to 2012 was empirically investigated by employing simple linear regression model. Robust significant positive relationship between GDP per capita and public education expenditures was similarly reported as in the past researches.

Knowledge was regarded as the main source of long term economic growth of the world economies. Education system contributed to empower people to work in the economy and through knowledge they can contribute to the technological development. Thus, allowing the development of a nation towards having a competitive advantage. A comparative analysis of the education expenditures contribution to economic growth between European Union and BRICS countries as presented by Zoran (2015) showed consistent findings. Multiple regression analysis with model developed from classical production function applied in this paper revealed positive correlation between education investments and economic growth for both sets of data. Thus, re-affirmed that public education expenditure indeed contributed to economic growth.

Similarly, an adoption of Cobb-Douglas production function for estimation of the relationship between government expenditure and economic growth in Malaysia from 1970 to 2013 by Ramli *et al.* (2016) showed that Malaysian government spending on education was among the dominant factor that affected the economic growth. Their findings confirmed that public education expenditure was one of the most important factor that drives country's economic growth in the long run. Hence, government should not ignore the role played by education expenditure. Increase of government spending on education each year will propel its economic growth in the long run. The current contemporary economy would require citizens to be equipped with knowledge and skills.

Positive externalities resulted from public education expenditure can enhance economic growth through technological innovation. Sufficient funding on education sector was necessary to maintain productive labour force with in-demand skills. A long run growth accounting model as employed by Frank (2018) to analyse panel data from 179 countries over the period of 1970 to 2014 showed that education expenditure does exhibit positive effect on economic growth. Although education was believed to positively influence the economic growth through human capital accumulation, however, education was also considered as an essential element for technological innovation. Only through technological development, countries will have better chances to dominate international market.

The review in this section clearly established the following: (1) Education has multidimensional impacts on economy and promoted the economic growth positively, reduces poverty, providing social and political environment that will attracts more future investment. (2) A clear linkage was established between the public allocation sizes in education sector that can effectively promotes the efficiency of the education sector. The review on these papers purely portrait that any fluctuation on the trend of public education expenditure was an interesting issue worth examined.

3. Determinants of Public Education Expenditure

The earlier literatures reviewed in Section 2 clearly demonstrated the crucial role of education sector in promoting economic growth and bringing positive benefits to the society as a whole. With growing awareness of the significant role of education in human capital development, increasing public education expenditure had been generally deemed as necessary. In other words, the public education allocation does matter very much given its significance in contributing to economic growth and other desirable outcomes. However, this brings to the question as to what determines the allocation and distribution of public education expenditure? In this section, therefore, we will review on the past literatures which had identified several factors that are responsible in explaining the trends of public education expenditure allocation and its distribution.

Hirsch (1960) identified five main determinants which affected the per capita expenditure spent on education for the American states. These five determinants comprised of population size, sociological characteristics, physical characteristics, economic characteristics and governmental characteristics. The sociological characteristics here referred to the demography variables such as age structure of population. Meanwhile, the physical characteristics were indicating sizes of school district. Data for two different periods from 1951 to 1952 and 1954 to1955 with two year interval were employed in this paper.

Meanwhile, McMahon (1970) empirically examined the major determinants of expenditures on public education using both cross-section and time-series analysis by considering the demand, production cost and tax behaviour in the development of its equations. Empirical regression on the cross-sectional data highlighted several factors such as school age children population, public schools substitutions, and pupils per teacher as important determinants for the public education expenditures. However, the time-series regression displayed a different result by pointing out that only the school age children population remains to be a significant factor of the public education expenditures. In addition, other determinants such as state aids and unemployment were found significantly affected public education expenditures under the time series analysis. Meanwhile, state revenue from taxes failed to generate significant result on the regression analysis.

Economic volatility was often cited as the cause of justification in any government measure to tighten budgetary allocation. In fact, economic conditions are often regarded as very significant in influencing any government policies development. Tilak (1989) proposed that education allocation was least influenced by economic factors under normal conditions of economic well-being. In other words, the GNP per capita and public expenditure on education was not significantly related during the normal period. On the contrary, periods of economic uncertainty such as recession may adversely affected the level of public spending on education. In a nutshell, one can assume that education was a highly vulnerable sector under adverse economic conditions. This was because policymakers were slow in recognising the benefits of education due to its intangibility and that its benefits were not

immediately forthcoming. Adoption of the country-wise data analysis for the Latin American and Caribbean region between 1965 till 1980 was performed by Tilak (1989). In addition, Tilak (1989) further showed that the public education expenditure allocation was also affected by two other factors namely population growth and inflation. The population growth resulted in the increase of public education expenditure. Meanwhile, high inflation rate causes a decline of the public expenditure on education sector in real terms.

Similarly, a study by Castle (1989) also indicated that economic and demographic variables were important factors that influence the variation of public education expenditure in the OECD countries' public education expenditure levels since 1960. Another consistent empirical findings by Falch and Rattso (1997) also stressed on the importance of macroeconomic factors such as inflation and unemployment, demographics such as elderly population and public debt in affecting the given situation. Poterba (1997) further suggested that the fraction of elderly population has negative impact on resources devoted to education. On the other hand, increasing fraction of school age population has little effect on education spending. Somewhat rather surprisingly, the total education spending was found to be independent of the relative size of school population. A closer examination on the estimation results also indicated that there was no relative effect coming from the fraction of population over 65 on the education spending.

Verbina and Chowdhury (2004) conducted a panel data estimation on the data of transitional economy Russia from 1999 to 2000 using the GLS random-effects model. Findings from their study showed that factor such as per capita revenue was positively significant to the public education expenditure. On the other hand, population density exhibited a negative impact on total education expenditures. High population density allowed a lower cost of education provision due to developed infrastructure and economies of scale. Meanwhile, Grob and Wolter (2005) discussed on the influence of children population and elderly population respectively on public education budgetary allocation. Panel data from Switzerland over the years of 1990 to 2002 showed that education spending has little elasticity in adjusting to changes of the young age population. However, the share of elderly population exhibited a significant negative influence on the public education spending. This implied

that the changes of demographic gives rise to competition for public financial resources between elderly and younger age population.

A pooled time-series framework analysis was later presented by Busemeyer (2007) to determine the factors of public education expenditure in 21 OECD countries from 1980 to 2001. As in the past literatures, the findings from this analysis highlighted that the level of economic development and demography variables as the core determinants of public education expenditure in OECD countries. The level of economic development as measured by GDP was positively associated with public education spending. Meanwhile, a study on the demographic influence showed that share of young population has a positive impact on public education expenditure, while share of elderly population has no discernible influence. In another research by Akanbi and Schoeman (2010), empirical estimations was carried out on a panel data of 15 selected African Countries by employing the two stage least square technique over the period of 1995 to 2004. The share of education expenditure increases when expansionary fiscal policy was implemented. The positive response of education spending to the higher real per capita GDP showed that higher welfare level of a country induced higher education spending. Meanwhile, the results revealed that the increasing size of population under 14 years lead to higher education spending.

Building upon the established theories of public policy analysis, economics and public finance, Sagarik (2013) offered an integrative analysis of the determinants of the public education expenditure in Thailand. A multi-dimensional framework was constructed based on economic-demographic, political, institutional and decision-making theories to determine the important determinants that influence public education expenditure in Thailand. It was proven that the public education expenditure in Thailand was found to be quite responsive to the changes of economic condition. Economic factors such as inflation was found negatively related to the total educational expenditure. Similarly, a negative relationship was also found between unemployment and education expenditure. It can be concluded from Sagarik (2013) that the Thai government seemingly ignored certain factors such as demographic factors when deciding the allocation of public education spending. This highlighted a concern therefore that the allocation of education expenditure should be made more responsive towards the demographic demand.

Chatterji, Mohan and Dastidar (2014) continued to explore the demographic effects and extended to other factors that contribute to the growth of public education expenditure across the Indian States from the year 2001 to 2010. In their econometric estimation, the Feasible Generalized Least Squares (FGLS) method and Mundlak's approach were used. Their study revealed that the economic variables such as tax revenue and grants from central government exerted positive impact on education expenditure. Meanwhile, a negative relationship is found between child population and education expenditure. This means that a larger number of school-going children lead to the reduction of per capita spending on education. A re-run of the Mundlak model using elderly population as the alternate proxy for demographic variables showed that that elderly population share does not exert any influence on the public education expenditure.

Non-parametric Data Envelopment Analysis (DEA), panel data Tobit and Fractional Logit regression techniques were applied by Fonchamnyo and Sama (2016) in their analysis to identify the factors of public education spending in Cameroon, Chad and Central African Republic from 2000 to 2012. Empirical evidence revealed that economic variables such as inflation produced a negative effect on the efficiency of the public spending in the education spending. This indicated that public expenditure efficiency seems to have drop at times of high inflation. The increasing prices due to high inflation, in fact was accountable for the economic instability. On the contrary, economic growth demonstrated positive influence on the efficiency of public expenditure in education. This pointed out that an economy that grows faster will foster growth in these respective sectors.

Another strand of literature by Bischoff and Prasetyia (2015) similarly discussed on the empirical investigation of the education spending determinants involving 398 Indonesian panel data between the year 2005 and 2012 by employing random effects and fixed effects models. Their empirical result revealed that the public education expenditure increased with a larger share of children. This suggested that governments responded to the demand for education that comes from the increasing share of children population. Bischoff and Prasetyia (2015) further indicated that citizens are more reluctant to support high shares of public expenditure invested in education if the funds

were to stem from locally collected taxes. Kurban *et al.* (2015) presented a conflicting finding which refuted the earlier notion of elderly population hindering the growth of the per-pupil education expenditure. By conducting a re-examination on the U.S. data, Kurban *et al.* (2015) revealed that the increase of the elderly population has in a way resulted in improvement to the education expenditure. They offered to reinterpret the earlier findings by using the baseline parameter estimates, hence suggesting that an aging U.S. population was likely resulted in an increased per pupil spending and not a decline.

As in the most literatures, Imana (2017) similarly found that economic factors such as real GDP per capita, budget deficits, education lagged expenditure were significant in affecting public education expenditure. Imana (2017) studied on the trends and factors affecting growth of public education expenditure in Kenya from 1980 to 2014. Analysis on the primary education expenditure implied inflation was positively significant on the allocation. However, urbanization and budget deficit seems to have negative impact on the primary education expenditure. On another note, it was found that inflation and domestic debt were positively significant to the secondary education level (Imana, 2017). Increase in government borrowing causes an increase in revenue which entices government to spend more. High inflation cause prices of commodities and services to become relatively more expensive and this will parents to be unable to meet high school fees and others school necessities. Hence, explaining the negative effect of inflation. Government intervention through fund allocation is therefore required to meet the high cost of living for every citizen.

An examination of the determinants of education expenditures within Malaysia context was conducted by Abdul Jabbar and Selvaratnam (2017) and Wong and Yusoff (2018). In a study by Abdul Jabbar and Selvaratnam (2017), both economic-demographics and political factors was incorporated into the investigated model to empirically explore the multidimensional determinants of Malaysia's public education expenditure from 1990 to 2015. Their empirical result revealed that revenue was positively significant to the education expenditure, while budget deficit was negatively significant. Unemployment rate indicated an inverse yet insignificant impact on the education expenditures.

Economic indicators such as GDP per capita and poverty rate were also not taken into account by policy makers the determination of public education spending. Demography factors seemed to have been overlooked in the government's education allocation decisions. The insignificant findings with political factors also showed that public education expenditure does not vary according to the political situation in the country.

In a similar manner, Wong and Yusoff (2018) indicated that economic variables such as real GDP growth rate, unemployment rate, inflation rate significantly affected the public education expenditure in the long run. However, a varying effects were found in the short run. Hence, proving that the determinants of public education expenditure does possessed a time-varying effects. In addition, their study also showed that the demography factors too played a significant role in explaining the pattern of the allocation for public education expenditure. A highly responsive public education allocation towards socio-economic conditions will allow policy-makers to develop a highly efficient policies with desirable outcomes.

From the literature reviewed, it was clear that both the economic factors and demography factors played significant roles in explaining the public education expenditure growth pattern. However, different governments would face with different constraints, which vary according to the socioeconomic and political context of each society (Sagarik, 2013). Hence, findings from different countries had posited mixed findings concerning the indicators which influence the public education expenditure. Assessment on the factors that shaped the public education expenditure will assist in future decision-making process with regards to education spending and future education policy making. The empirical examination of the key determinants further reflected the government education spending behaviour.

4. Conclusion

As reflected in the past literatures, the positive findings with regards to the education allocation – desirable outcomes nexus was strongly consolidated. Recognising the positive effects of public education expenditure which leads to human capital development and economic growth, an adequate provision on education sector become ever more necessary. As such, a number of papers

had sought to explore what exactly determines the public education expenditure in any economies. Although, a diverse findings was found in most literature which lead to the suggestion that each country was subjected to variant distinct constraints. Regardless, all of these findings similarly leads to unanimous conclusion advocating that economic conditions and demography variables played significant role in influencing the trends of public education allocation for many economies.

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