THE INFLUENCE OF CORRUPTION ON THE EFFECT OF PUBLIC SPENDING ON EDUCATION EFFICIENCY

Maytika PATTARATANARAT[1], Rossarin OSATHANUNKUL[2], Woraphon YAMAKA[2] and Chatchai KHIEWNGAMDEE[2]
[1] Faculty of Economics, Chiang Mai University, Thailand; maytikaptrn14@gmail.com
[2] Faculty of Economics, Chiang Mai University, Thailand

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ABSTRACT
Human capital theory gives a lot of weight to education because it is seen as the most important way to gain skills and knowledge. The paper aims to find out the effect of corruption on education outcomes in Asia-Pacific countries. We employed the Stochastic Panel Frontier model to analyze the technical efficiency of education. A proxy for corruption is the corruption perception index developed by Transparency International. Our result showed that countries with high level of corruption have less efficiency of education. In other words, in poor governance nations, increasing public spending on education is unlikely to lead to improved outcomes.
Keyword: Stochastic Panel Frontier, Technical Efficiency, Corruption, Public Spending

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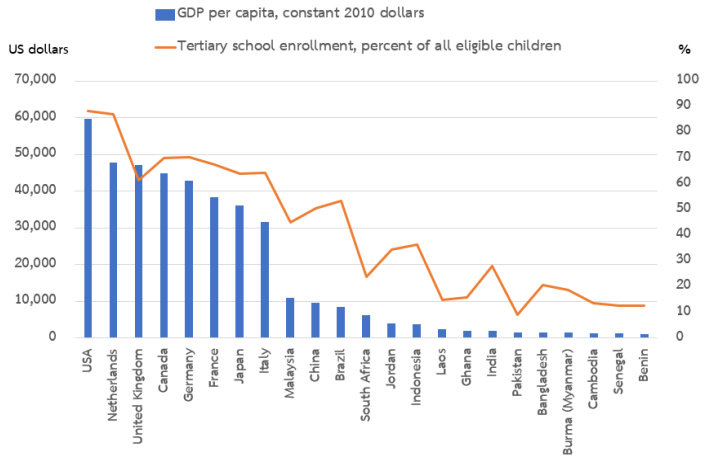
INTRODUCTION

Education is essential for the economic and national growth of both developing and developed countries. A basic right to human development is education because level of education is a way to measure the quality of labor. Currently, the education trend influences the GDP indirectly through research and development. The purpose of research and development (R&D) is to provide more people with access to and understanding technological innovations. As the economy expands, qualified human resources will form the foundation of the country's knowledge capital. In addition, the government places a strong focus on the education sector, which not only contributes to the reduction of social inequality but is also a driving factor in the country's sustained economic success. Human capital for the economy is improved through public investment in education.

Figure 1: Education and Income

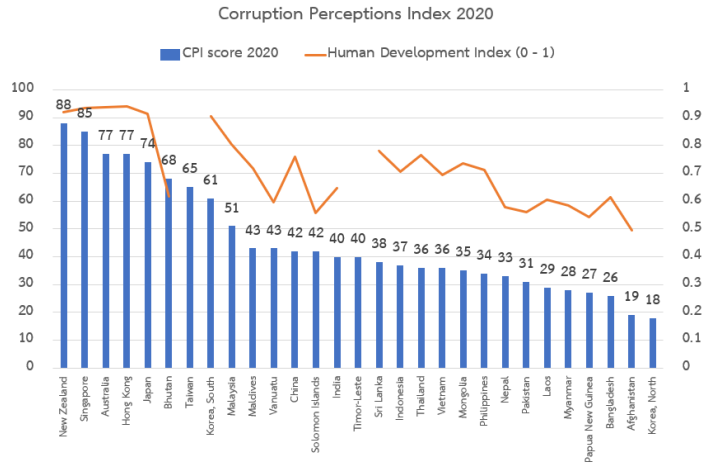


Source: (TheGlobalEconomy.com, 2022)

A nation with a highly educated population will have a higher per capita income than one with a low level of education.

Corruption is a complicated social, political, and economic problem that exists in all countries various levels. The negative impact that corruption has on the economic prosperity of nations. In this sense, corruption could result in the production and accumulation of unproductive human capital. It was shown by Alfada (2019) that corruption in Indonesia has a detrimental effect on the country's overall economic development. Similarly, Erum and Hussain (2019) found that corruption reduces economic growth and increases inflation. The progress of the country's educational system is also negatively impacted by corruption. Corruption in education has a larger effect than other sectors. Therefore, corruption affects public services not just through the outcomes per unit invested in a sector but also through the distribution of expenditures. In fact, corruption leads to resource misallocation, which might be detrimental to the economy and the general effectiveness of governments. Poor individuals appear to be more damageable to the negative outcomes of this effect because they depend more on public services than other people do, including education services.

Figure 2: Corruption Perceptions Index 2020



Source: (TheGlobalEconomy.com, 2022)

The level of corruption in the Asia-Pacific region continues to be high. As a result, in many countries, international aid for education has played a key role in supporting national policies aimed at expanding access to education and increasing equity and the quality of the educational sector. From literature reviewing, most studies focused on the relationship between corruption and education. Therefore, regarding the issue, this research is a study of the efficiency of education spending on educational results in Asia-Pacific countries. Moreover, this research will analyze the effect of corruption on the technical efficiency of education. The result of this study will be useful for the government. It may be used as a guide for proposals for instructional policies and frameworks for the effective growth of education in many countries.

METHODOLOGY

The methodology of this study includes 3 steps initiating with Unit Root Test, followed by a study of the technical inefficiency in education sector with Stochastic frontier Analysis (SFA), ending to study the long-run relationship by using Pooled estimator.

Unit Root Test

Unit Root Test is data best before using data for an analysis since the data to be estimated must be stationary first. If unstable data is used to estimate, spurious regression can occur. To do the unit root test of data, the researcher will use Levin, Lin and Chu test (LCC test) which has the following equation form.

Stochastic Frontier Analysis (SFA)

The stochastic frontier approach removes the influence of factors from inefficient behavior, so correcting the potential upward bias of deterministic methods' inefficiency.

The Functional Form

The function has been chosen in our paper among several other types as a functional form of the boundary of the production function.

$$ln(EY)_{it} = a_0 + a_1 ln(GDP)_{it} + a_2 ln(GEE)_{it} + a_3 ln(GE) + V_{it} - U_{it}$$

Where $ln(EY)_{it}$ is the natural logarithm of education expenditure output. (Excepted years of schooling)

$ln(GDP)_{it}$ is the natural logarithm of GDP per capita.

$ln(GEE)_{it}$ is the natural logarithm of Government expenditure on education.

$ln(GE)_{it}$ is the natural logarithm of Government effectiveness.

Based on an analysis of this equation of technical efficiency, country *i* at the time *t*. Then the effect of technical efficiency can be written as Eq:

$TE_{it} = exp\left(- U_{it} \right)$

Pool Estimator

Analyze relationship between model variables. Examine the influence of public expenditure on education, political stability, and economic growth on educational attainment using panel regression.:

$lnTE_{it} = \beta_0 + \beta_1 lnCPI_{it} + \beta_2 lnGEE_{it} + \beta_3 lnGINI_{it}$

where β_0, β_1, β_2, β_3 is estimated using the Pooled estimator, which is based on the Hausman Test to choose the Fixed effect model or the Random effect model.

Data

The data used in this study were based on secondary data of 29 countries, including Afghanistan, Australia, Bangladesh, Bhutan, Cambodia, China, Hong Kong, India, Indonesia, Japan, South Korea, Laos, Malaysia, Maldives, Mongolia, Myanmar, Nepal, New Zealand, Pakistan, Papua New Guinea, Singapore, Solomon Islands, Sri Lanka, Thailand, Taiwan, Timor-Leste, Vanuatu, and Vietnam. This is the annual panel data from 2012 to 2020, a total of 9 years, based on data collected from the World Development Indicators (WDI)

Table 1 Variables used in the study

Variable	Unit
Excepted years of schooling (EY)	Years
GDP per capita (GDP)	Current US$
Government expenditure on education (GEE)	Percentage
Corruption perception index (CPI)	Point
Government effectiveness (GE)	Percentage
Gini index (GINI)	Percentage

Source: The World Development Indicators (WDI)

RESULT

Descriptive statistic

The resource of a preliminary study of the influence of corruption on the effect of public spending on education efficiency in Asia Specific region found that the average of excepted years of schooling is 13.11 years meanwhile the average economic growth can be measured by GDP per capita is 12,410.09 USD. As for the average government expenditure on education is 3.90 percent of GDP and the average government effectiveness is 53.03. When considering other factors affecting technical efficiency of education, it was found that corruption perception averaged 44.5 percent and average of Gini coefficient is 36.15 percent.

Table 2 Descriptive statistic

Variables	Mean	S.D.	Maximum	Minimum
EY (Years)	13.1529	2.9372	23.2822	6.8092
GDP (Current US$)	12410.0923	18235.9048	68156.6300	485.6700
GEE (Percentage)	3.9789	1.6537	10.1700	1.3263
GE (Percentage)	53.0286	30.2317	100.0000	3.7915
GINI	36.1527	4.0355	46.7000	28.7000

Variables (Percentage)	Mean	S.D.	Maximum	Minimum
CPI (Point)	44.4170	20.6931	91.0000	8.0000

Source: Author's calculate

Result Stochastic Panel Frontier

Analysis of the technical efficiency between Excepted years of schooling, GDP per capita, government expenditure on education and government effectiveness in Asia pacific countries. The study was conducted using the Stochastic Panel Frontier model. Which define endogenous variable as excepted years of schooling, exogenous variables are GDP per capita, government expenditure on education and government effectiveness. The variable coefficients were then estimated in the Stochastic Panel Frontier model to find technical efficiency of education. Stochastic Panel Frontier model estimation result in Table 3.

Table 3 Stochastic Panel Frontier

Variable	Parameters	Coefficients
$lnGDP_{it}$	α_1	0.1022**
$lnGEE_{it}$	α_2	0.0615**
$lnGE_{it}$	α_3	-0.0004

Source: Author's calculate

Notes: *, **, and *** indicate significance at the 0.10, 0.05 and 0.01 levels, respectively.

For the Asia Pacific countries, the coefficients are estimated to be positive. The GDP, the government expenditure on education are positively and significantly correlated with the excepted years of schooling at 5% level. These results indicate that an increase of GDP by 1% would be an increase in excepted years of schooling by 0.10 % and an increase of government expenditure on education by 1% leads to an increase in excepted years of schooling by 0.06 %.

Table 4 Technical efficiency

Variable	Mean	Standard Deviation	Min	Max
Technical Efficiency	0.8687	0.0811	0.5618	0.9936

Source: Author's calculate

Therefore, we adopt the stochastic frontier analysis (SFA) model to find technical efficiency result in table 5. The result found that the average technical efficiency of education outcome was 0.87. This method of evaluating efficiency provides an estimation of the level of technical inefficiency at 0.13.

Panel Regression

The estimating method is used to determine the technical efficiency of educational outcomes. Which defines an endogenous variable as the technical efficiency of education outcomes, while exogenous variables include the corruption perception index, government expenditure on education, and the Gini index. The equation can be written in equation form:

$$lnTE_{it} = \beta_0 + \beta_1 lnCPI_{it} + \beta_2 lnGEE_{it} + \beta_3 lnGINI_{it}$$

The Hausman Test result was used to determine the most appropriate estimate. which the statistical value is significant. This rejects the null hypothesis that the random effects model is a suitable statistical model. In other words, the fixed effects model is an appropriate model for data estimation. However, if the statistical value is insignificant, this will result in the support

of the null hypothesis that the random effects model is an appropriate model. So these results support the null hypothesis that the random effects model is an appropriate model.

Table 5 Hausman Test

	Coefficient					
	(b)	**(B)**	**(b-B)**	$sqrt(diag(V\_b-V\_B))$		
	fixed	**random**	**Difference**	**Std. err.**	**Hausman Chi-square**	**Prob.**
$lnCPI_{it}$	0.0924	0.0856	0.0068	0.0054		
$lnGEE_{it}$	-0.0078	-0.0075	-0.0003	0.0006	3.3800	0.3378
$lnGINI_{it}$	-0.06167	-0.0613	-0.0004	0.0018		

Source: Author's calculate

According to the Hausman test results (table 5), Hausman Chi-square Statics is 3.38 and the probability is 0.33 at the 5% significance level. The null hypothesis (H_0) that each unit error term is correlated to the independent variable was therefore accepted. So these results support the null hypothesis that the random effects model is an appropriate model for this study.

Table 6 Random Effects Model

$lnTE_{it}$	**Parameters**	**Coefficients**
$lnCPI_{it}$	β_1	0.0856**
$lnGEE_{it}$	β_2	-0.0075
$lnGINI_{it}$	β_3	-0.0613**
$\_cons$		0.0856
$sigma\_u$		0.0999
$sigma\_e$		0.0220
rho		0.9536

Source: Author's calculate

The following table shows the results of the random effect model. The results presented in Table 6 show that analysis of the relationship between the corruption perception index and the technical efficiency of education at 5% significance level. The coefficient of the corruption perception index is 0.0856, means that a 1% increase in the corruption perception index, the technical efficiency of the educational outcomes changed by 0.0856% in the same direction. However, the relationship between the GINI index and the technical efficiency of education at 5% significance level. The coefficient of the GINI index is -0.0613, means that a 1% increase in the GINI index, the technical efficiency of the educational outcomes changed by 0.0613% in the reverse direction.

CONCLUSION

In this study, the research aims to analyze the efficiency of education spending on educational results in Asia-Pacific countries. In order to achieve the objectives of this research, the Stochastic Panel Frontier model was used to find the efficiency of education outcomes in 29 Asia-Pacific countries from 2012 to 2020. The study found that GDP per capita (GDP) and the government expenditure on education (GEE) have a positive effect. Then, to analyze the effect

of corruption on the technical efficiency of education. The study also found that the corruption perception index (CPI) has a positive effect on the efficiency of education. Meanwhile, the GINI index (GINI) has a negative effect on the efficiency of education.

From the study, the researcher found that efforts to improve education outcomes by increasing efficiency are feasible in Asia-Pacific countries since the existing level of efficiency has not reached its full potential. And at the same time These findings have significant implications for improving the efficiency of public expenditure on development. If countries have poor governance, then increasing public spending on education is unlikely to lead to improved outcomes. According to this result, studies have shown that increasing corruption perception index will increase technical efficiency of education. If Asia-Pacific countries have a low corruption score, the government's effective allocation of resources for education will improve education, increase the growth rate of human capital, and encourage economic growth.

In addition, the results obtained from the study can also be applied to developing countries in Asia-Pacific , for example, Sahnoun, M., & Abdennadher, C. (2020) as they provide consistent study results. Therefore, The public and private sectors should promote research on education to increase human capital and economic growth. Given that corruption in many countries may have a variety of responses. So, fighting corruption in education must be considered a first step in transforming educational institutions to create opportunities for fairness and quality. If the statistics currently available on corruption do not accurately describe some types of corruption, which, by definition, represent a country's level of corruption. Therefore, in-depth country analyses or case studies showing the prevalence of corrupt practices within the education sector continue to be important topics for further study.

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