Human Development and Government Expenditure in Asian Countries: An Empirical Study

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ABSTRACT: This study examines the impact of public spending on human development in Asian countries, considering both investment and current spending. The empirical method is a system-GMM, using a dataset of 35 Asian countries collected from 2005 to 2014 by the Asian Development Bank (ADB) and the United Nations Development Programme (UNDP). The findings indicated that government spending, both investment and current spending, had effects on the human development index, but these effects are not linear. Depending on the type of expenditure, the detected threshold effect is U-shape or inverted U-shape. According to this study, government spending could adversely impact human growth if the optimal expenditure thresholds are broken. These findings have significant implications for enhancing the effectiveness of public expenditure to improve the human development index. This study also provides meaningful lessons that are especially pertinent for Asian countries, including Vietnam.

KEYWORDS: Asian countries, Government spending, GMM, Human development.

1. INTRODUCTION

When addressing the role of government, economists frequently use gross domestic product (GDP) growth as a criterion to gauge economic capability. However, Meier and Stiglitz (2000) claims that countries have shifted from GDP-focused growth to growth accompanied by sustainable development in recent years, in which the human development index (HDI) plays an important role. Although GDP merely measures per capita income and is only indirectly associated with human life through medical and educational spending, the HDI directly measures per capita income, life expectancy, and education, and HDI is also a social development indicator. In contrast to GDP per capita, the HDI can discriminate between living standards and incomes, as in "... a country with a high GDP per capita, such as Kuwait, yet has a lower HDI - due to education level, whereas Uruguay has half the GDP per capita of Kuwait yet a higher HDI ranking"[1]. As a result, in order to fulfill the goals of poverty reduction and sustainable growth, countries must pursue development plans that aim to achieve both growth and social quality (Perry et al., 2006; Dalia and Neringa, 2012).

According to Keynesian economists, the government has a vital role in allocating resources and creating equity in society. Furthermore, the government serves as a supplier of goods like infrastructure construction, education, health care, and military, which the private sector has historically struggled to provide. Endogenous growth theory and empirical studies conducted worldwide have demonstrated this (Barro, 1990; Devarajan et al., 1996; Mittnik and Neumann, 2003). Until now, most studies have focused on the government's role in economic growth - GDP - whereas the current HDI trend is viewed as an aggregate measure of social development. There has been little research on the effect of government size and the quality of public governance in improving HDI. This study seeks to understand the impact of government spending in the context of governance quality on HDI. This is critical for policy-making efforts, particularly when the government has to speed up public management changes to boost spending efficiency in the context of increased integration toward more sustainable development. The author expands on prior studies in this study to fulfill the following research goals: (1) evaluate the impact of government expenditure size on growth - utilizing the HDI instead of the GDP growth; and (2) investigate the threshold effects of government expenditure on the efficacy of government spending. The research employs empirical analysis of panel data with a sample of 35 Asian countries from 2005 to 2014.

2. LITERATURE REVIEW

The United Nations Development Program in 1999 proposes the HDI index to calculate an aggregate measure of a country or territory's socio-economic development in all aspects, which is a measure to identify the level of development of countries in terms of income, life expectancy, and education, as follows:

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[1] www.undp.org/hdr2001/faqs.html

$$HDI = \frac{Health\ index + Education\ index + Income\ index}{3}$$

The HDI and the life index, and education indexes receive values ranging from 0 to 1. The higher the degree of human development, the closer the HDI is to 1, and the lower the level of human development, the closer to 0. According to this estimate, the development includes a gain in GDP and an increase in life expectancy, education, and life. As a result, future increases in HDI will add to GDP. Doryan (2001) says that when the government uses the gains of economic growth to finance primary health care and universal access to education, it has a twin benefit for the poor; they have better health and education, and so boost consumption, driving the economy to flourish. This means that a country with tremendous HDI growth will also have good GDP growth in the future, but the contrary is not always true (Davies, 2009).

The significance of the government in a country's socio-economic development has become increasingly recognized over time, both theoretically and empirically. If neoclassical growth theory held that the government only has a temporary impact on development through public policies that affect savings and human resources, then endogenous growth theory holds a positive long-term view. Previous studies contended that government influenced long-term growth through investments in human capital formation and technical innovation, whereas institutional theory emphasizes that institutions are the primary determinant. A long-term development helps to explain other disparities in economic growth between countries based on differences in human capital, physical capital, technical advances, and other economic factors (Branch, 2014). Ram (1986), on the other hand, contends that government spending should be restrained and entirely directed to essential public goods such as infrastructure, legal protections, and property rights. Government expenditure, once exceeded, will stifle economic growth by producing inefficient resource allocation, as seen by the Rahn curve. Many studies have been conducted on the relationship between government spending and growth, mainly research-based on endogenous growth models in the 1990s, with proposed empirical models relating government spending to the economy's long-run growth rate (Barro, 1990; Aschauer, 2000).

Aside from studies on the relationship between government expenditure and economic growth, numerous academics have looked into the relationship between government spending by industry (mostly in the areas of health, education, and infrastructure) and economic growth. Harbison and Hanushek (1992) investigated the relationship between educational investment and achievement in 12 developing nations. As a result, statistically significant positive relationships between these two values were found in six of the case studies. Gupta et al. (1998) discovered, after examining over 70 nations, that the association between public spending and bad health is higher in low-income countries than in high-income countries. Filmer and Pritchett (1999) offered empirical evidence on the relationship between government spending and health outcomes. According to their findings, increasing public spending from 3% to 6% of GDP would reduce child mortality by 9% to 13%. Scully (2001) investigated government spending on quality of life in general. According to research, government spending is substantially greater than what is required to enhance the quality of life, and reducing consumption expenditure does not imply that quality of life would be reduced.

In addition to the linear relationship, many studies have also discovered the expenditure scale between government spending and economic growth. Vedder and Gallaway (1998) use annual U.S. data on the size of government spending and the square of the size of government spending. Their results show that the regression coefficient of the government expenditure scale variable is statistically significant and has a positive sign, while the squared government spending size coefficient is statistically significant and has a negative sign. This implies that there exists an optimal size of government spending. Pevcin (2002) uses data for 44 European countries for the period 1950-1960 to test the relationship between government size and economic growth, using panel data for 12 countries and regressions over time for each country in 8 out of 12 countries. The results show that the 7/8 Governments in the sample have an excessive spending scale compared to the optimal size. Chen and Lee (2005), experimentally with Taiwan's quarterly data from 1979 to 2003, found that when government spending exceeds the threshold, there is a positive and negative effect on economic growth.

Thus, both economic theory and empirical studies have extensively discussed government expenditure's role in promoting growth. However, these studies only look separately at government spending on GDP growth, education, health care, and infrastructure. This study inherits and expands on Rajkumar and Swaroop (2008) and Davies (2009) investigations to re-experiment the impact of government spending on human development. The study's findings constitute scientific evidence that supports the declared research goal.

3. MODELS AND METHOD

The author's research model is developed based on the research model of Davies (2009) on the scale of government spending on human growth. According to Heitger (2001) and Davies (2009), the author considers the impact of different types of government spending separately, including CE_{it} is the percentage of government current expenditures (GCE) calculated on GDP and IE_{it} is the ratio of government investment expenditures (GIE) to GDP, t represents the time, i represents the respective country.

$$CE_{it} = \frac{\text{GCE}}{\text{GDP}_{it}} \text{ and } IE_{it} = \frac{\text{GIE}}{\text{GDP}_{it}}$$

Setting HDI_{it} is the human growth index published by the United Nations Development Program (UNDP), the research model on the size of government spending to HDI has the form:

$$HDI_{it} = \beta_0 + \beta_1 CE_{it} + \beta_2 CE_{it}^2 + u_{it} \tag{2.1}$$

$$HDI_{it} = \beta_0 + \beta_1 IE_{it} + \beta_2 IE_{it}^2 + u_{it} \tag{2.2}$$

Then, D_{it} is defined as: $D_{it} = \begin{cases} 1 \text{ if } \dfrac{RGDP_{it}}{Population_{it}} < \text{median}_t \left(\dfrac{RGDP_{it}}{Population_{it}} \right) \\ 0 \text{ otherwise} \end{cases}$

Equation (2.1) and (2.2) are transformed

$$HDI_{it} = \beta_0 + \beta_1 CE_{it} + \beta_2 CE_{it}^2 + \beta_3 CE_{it} D_{it} + \beta_4 (CE_{it} D_{it})^2 + u_{it} \tag{2.3}$$

$$HDI_{it} = \beta_0 + \beta_1 IE_{it} + \beta_2 IE_{it}^2 + \beta_3 IE_{it} D_{it} + \beta_4 (IE_{it} D_{it})^2 + u_{it} \tag{2.4}$$

This model aims to examine the difference in the size of government expenditure in countries with an average GDP ratio per capita is low compared with the overall sample average. The spending size, if any, will be determined as follows:

$$E\left(\Delta HDI_{it} \big|_{HDI_{i,t-1}} \right) = \gamma_1 CE_{it} + \gamma_2 CE_{it}^2 \text{ và } E\left(\Delta HDI_{it} \big|_{HDI_{i,t-1}} \right) = \gamma_1 IE_{it} + \gamma_2 IE_{it}^2$$

with $\gamma_1 = \beta_1 + \beta_3$; $\gamma_2 = \beta_2 + \beta_4$

3.1. Method

The research model is a dynamic tabular model, with the lagged variable $H_{i,t-1}$ both act as a dependent variable and an independent variable. This can lead to endogeneity problems in the model and bias the regression results using conventional OLS methods. Using the lagged values of the first difference of the endogenous variable as the instrumental variable, Arellano and Bond (1991) provided a suitable estimate known as the GMM estimator. However, Blundell and Bond (1998) have shown that when the explanatory variables are time-stable, the lag of the original series is a weak instrumental variable for first-difference series. Then, the authors proposed a systematic GMM estimation method (system GMM) to reduce the potential errors and inaccuracies associated with the estimation by the differential GMM method. In the systematic GMM estimation, to check whether the choice of instrumental variable leads to more efficient estimation results, the author uses two types of tests as follows:

Sargan/Hansen test: this test determines the appropriateness of the instrumental variables in the GMM estimation method in general and the systematic GMM in particular. This is an Over-identifying restrictions test of the model. Therefore, the larger the p-value of the Sargan/Hansen statistic should be greater than 0.1. Arellano - Bond autocorrelation test (AR) to check the autocorrelation of errors. The p-value of this test should be greater than 0.1.

4. FINDINGS

The research data are Government expenditure data for 35 Asian countries provided by the Asian Development Bank (ADB) and human development data HDI provided by the United Nations Development Program (UNDP) from the period 2005 to 2014. The results of descriptive statistics are shown in Table 1 as follows:

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Table 1. Data descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
HDI	340	0.692672	0.129231	0.449	0.97
CE	340	0.209177	0.103254	0.0414	0.6529
IE	340	0.065046	0.066313	0.003	0.4806
CED	340	0.097709	0.135928	0	0.6529
IED	340	0.039801	0.071402	0	0.4806

*(**Source:** author's calculation)*

Table 1 presents descriptive statistics of the variables in the study. The results show that the average value of the human development index (HDI) is 0.69, and the average value of the government's recurrent expenditure ratio to GDP (CE) is 20.91% when the ratio of government investment spending to GDP (IE) is 6.50%. It is noteworthy that in countries with GDP per capita rates lower than the averagevalue of sample, there is a tendency to spend more on investment, with an average value of 8.42% GDP. This shows that the loss of government spending sources in these countries will significantly affect output efficiency.

Table 2. The regression results by system-GMM from Equation (2.1) to Equation (2.4)

Model	(2.1)	(2.3)	Model	(2.2)	(2.4)
Variables	HDI	HDI	Variables	HDI	HDI
Lag of HDI	0.691*** (335.69)	0.530*** (74.93)	Lag of HDI	0.537*** (16.72)	0.509*** (14.74)
CE	0.273*** (18.56)	0.555*** (7.18)	IE	-2.279*** (-12.53)	-1.647** (-5.38)
CE2	-0.317*** (-16.11)	-1.268*** (-6.52)	IE2	5.567*** (16.51)	2.730*** (2.09)
CED		-1.261*** (-10.43)	IED		-0.683** (-2.26)
CED2		2.355*** (10.49)	IED2		3.043** (2.05)
Const.	0.178*** (40.35)	0.341*** (30.57)	Const.	0.425*** (16.51)	0.436*** (14.83)
Hansen teset (Prob > chi2)	0.260	0.198	Sargan teset (Prob > chi2)	0.166	0.112
AR (1) test (Pr > z)	0.092	0.500	AR (1) test (Pr > z)	0.224	0.280
Threshold	0.431***	0.219***/0.268***		0.205	0.302***/0.112***

*Note: *, **, *** are 10%, 5%, 1%, respectively. The t-statistic in ( )*
*(**Source:** author's calculation)*

The Hansen tests in all four models accept the hypothesis H0: the instrumental variable is exogenous; the instrumental variables are not correlated with the model's error at the 10% statistical significance level. At the same time, the Arellano - Bond autocorrelation test to test the autocorrelation property of errors when using the GMM estimation method also accepts the hypothesis H_0 at the 10% statistical significance level. This shows that the estimated model is valid and reliable.

The results of the regression model using the systematic GMM method show that the government's recurrent expenditure ratio as a percentage of GDP has a positive impact on human development at the 1% significance level, and the squared government's recurrent expenditure ratio as a percentage of GDP has a negative impact on human development with statistical significance at 1%. By contrast, government investment expenditure as a percentage of GDP also has a negative effect on human

development at the 5% level of significance, while the square of the ratio of government investment expenditure to GDP has a positive effect on human development at 5% significance level. This result provides empirical evidence to support the claim that there exists thresholds of government spending, but their impacts depending on type of spending are different.

To determine this rate, in the case of all countries, estimates of the government's current expenditure to improve the HDI is maximum of 43.10% and it is found by $E\left(\Delta HDI_{it}|_{HDI_{i,t-1}}\right) = 0.273CE_{it} - 0.317CE_{it}^2$. Similarly, the estimate of government investment spending to improve the HDI is minimum of 20.5% and is given by $E\left(\Delta HDI_{it}|_{HDI_{i,t-1}}\right) = -2.279IE_{it} + 5.567IE_{it}^2$. In the case of countries with a GDP per capita ratio lower than the Asian average, the empirical results show that the rate of current government expenditure to improve the HDI is minimum of 26.8% and it is found by $E\left(\Delta HDI_{it}|_{HDI_{i,t-1}}\right) = -1.261CED_{it} + 2.355CED_{it}^2$. Meanwhile, the empirical result shows that the ratio of government investment spending in this case to improve the HDI is minimum of 11.20% and is given by $E\left(\Delta HDI_{it}|_{HDI_{i,t-1}}\right) = -0.683IED_{it} + 3.043IED_{it}^2$. This result implies that countries with lower per capita incomes need to spend and invest more to be able to improve their HDI than countries with higher incomes.

5. CONCLUSION

This study provides empirical evidence on a panel database of 34 Asian countries for the period 2005 – 2014 on the role of government in human development. The results show an optimal size of the government's current spending with a statistically significant positive impact on human development. Specifically, current spending should be at a maximum of 21.90 – 43.10%, and government investment spending should be at a minimum of 20.50% - 30.20% of GDP in the whole sample. However, for countries with a GDP per capita ratio lower than the average, the empirical results show that the optimal size of government current spending is higher, it is a minimum of 26.80%, and the optimal size of government investment expenditure is a minimum of 11.20% on GDP. This is consistent with the observations of Scully (2001) when studying government spending on quality of life: government spending is often significantly higher than necessary to maximize the quality of life.

This result supports the view that the government has a crucial role in promoting social development in all three areas: education, health care, and income. However, the relationship between the size of government spending and human development is formed in both inverted U-shape and U-shape. Therefore, the impact of the size of government spending will be limited to the highest (lowest) threshold. The study's results provide lessons for Vietnam in restructuring public spending, which needs to control the size of government spending, ensure spending efficiency and promote human development. This poses to the Government of Vietnam the need to solve problems related to resource allocation, selection of programs, and projects to spend to achieve the highest efficiency of public spending.

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