The Impact of Public and Private Investment on Economic Growth: Evidence from Developing Asian Countries

Kongphet PHETSAVONG[*] and Masaru ICHIHASHI

Graduate School for International Development and Cooperation, Hiroshima University
1-5-1 Kagamiyama, Higashi Hiroshima, Hiroshima 739-8529, Japan

Abstract

This paper analyzes the factors affecting economic growth and the interrelationship of public investment, FDI, and private domestic investment using a panel data sample of 15 developing countries in Asia covering the periods 1984 – 2009 (26 years). The economic growth models based on Le and Suruga (2005) were used to estimate economic growth and the single effect of public investment on FDI and private domestic investment, respectively. A correlation test was applied to check the correlation among independent variables, and the results show that there is very low correlation existence; therefore, all variables were kept in the models.

The empirical results show that the private domestic investment plays the biggest important role in contributing economic growth, and the second most significant factor is FDI, while public consumption and Asian financial appears to harm economic growth. In addition, the investigations of the impact of public investment on FDI and private domestic investment show that public investment in developing Asian countries reduces the positive effect of FDI and private domestic investment on economic growth (crowding-out effect) when exceeding some extent levels. Regarding the second and the third model approaches, the interactive variables

[*] Corresponding author
 Email address: phetsavong@yahoo.com

FDI*Dm and PRICAP*Dm appear to become negative when public investment exceeds 6.6 - 7.5% and 4.9 - 8%, respectively, indicating that the positive effect of FDI and private domestic investment on growth becomes weaker because of an increasing in public investment. Overall, public investment of developing countries in Asia has a substitutable effect on FDI and private domestic investment.

Keywords: public investment, private domestic investment, FDI, economic growth, Asian developing countries

1. Introduction

Generally, public investment has been treated as one of the most important factors contributing economic growth. On the one hand, public investment may facilitate and stimulate private investment through the provision of infrastructural support. As a result, this can raise the productivity of capital, and expand the overall resource availability by increasing output.

On the other hand, public investment may crowd out private investment. This occurs when additional public investment requires raising future tax and domestic interest rate, or if the public sector produces investment goods that directly compete with private goods. In addition, the utilization of additional physical and financial resources, which would otherwise be available to the private sector, may also depress private investment (Blejer and Khan 1984, Aschauer 1989). The crowding-out effect could be also occurred when a distortion of public sector is too large. In order to finance an increasing in the capital spending, the government needs more financing which generating higher interest rates; therefore, minimizing the private sector's ability to access to monetary markets. Thus, economic growth slows down because of a declining in private investment or known as crowding out effect of public on private investments.

According to the above discussion, it is still not clear whether public investment produces positive or negative effect on economic growth as well as the private investment. Therefore, we continue to investigate within this issue by introducing new estimation method following Le and Suruga (2005)' models. In their empirical study, they first check the factors that affect per capita growth rate, and they found positive contributions in both public investment and FDI. They then examine the effect of public investment on FDI, and found that the positive effect of FDI on per capita growth reduces when public investment exceeds 8-9%. Their findings are interesting and impressive for us in order to test whether it also exists in developing countries or not, and we would also like to check the effect of public investment on another factor, especially private

domestic investment. To the best of authors' knowledge, there is no study that considers the interaction relationship between public investment and private investment as well as economic growths at the same time. The private investment in this study is classified into two factors: foreign direct investment and private domestic investment.

The purpose of this study is to investigate the complementary effect of public and private investment on economic growth of 15 developing countries in Asia. To specify the main objective of this study, we set some research questions as follows.

➢ Do Public and private investment have a different impact on economic growth?

➢ What is the level of public investment to be complimented to FDI?

➢ What is the level of public investment to be complemented to private domestic investment?

1.1 Descriptive Analysis of Data

In order to compare the proportion of GDP of the key variables adopted in this study, the trends of growth, private domestic investment, foreign direct investment, and public investment are illustrated as the following figures.

Figure 1-1 Average of Growth, private domestic investment, FDI, and public investment (15 developing countries in Asia, 1984-2009)
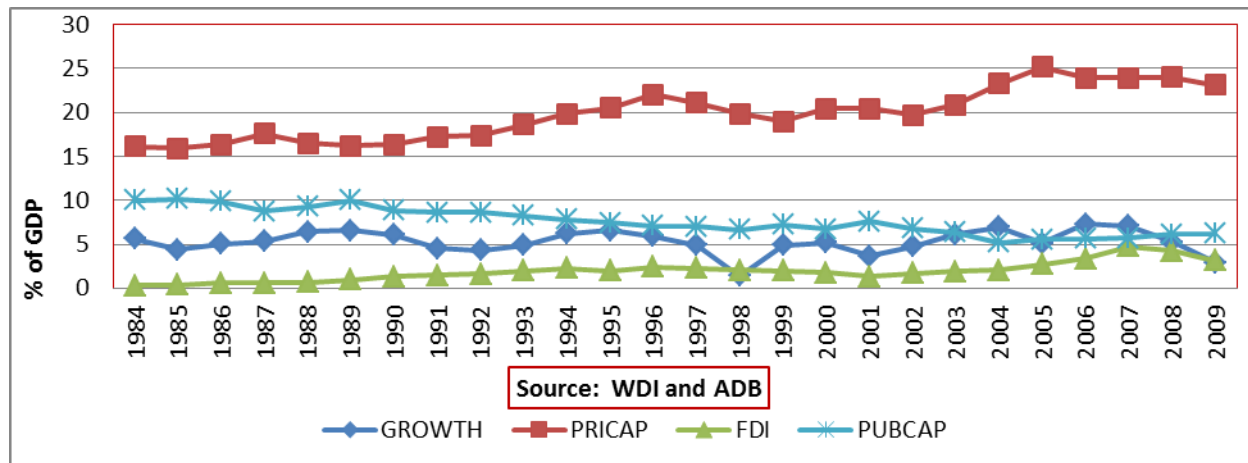
Figure 1-1 illustrates the trends of economic growth, the average proportion of GDP of private domestic investment, foreign direct investment, and public investment. Private domestic investment had fluctuated and shared the largest percentage comparing to other factors, while foreign direct investment had shared the smallest proportion. Economic growth declined sharply in 1998 because of Asian economic crisis. An average of public investment had declined dramatically since 1989 except of that in 2001.

Figure1-2 Average annual of economic growth, private domestic investment, FDI, and public investment (15 developing countries in Asia, 1984-2009)

Source: WDI & ADB
■ GROWTH ■ PRICAP ■ FDI ■ PUBCAP
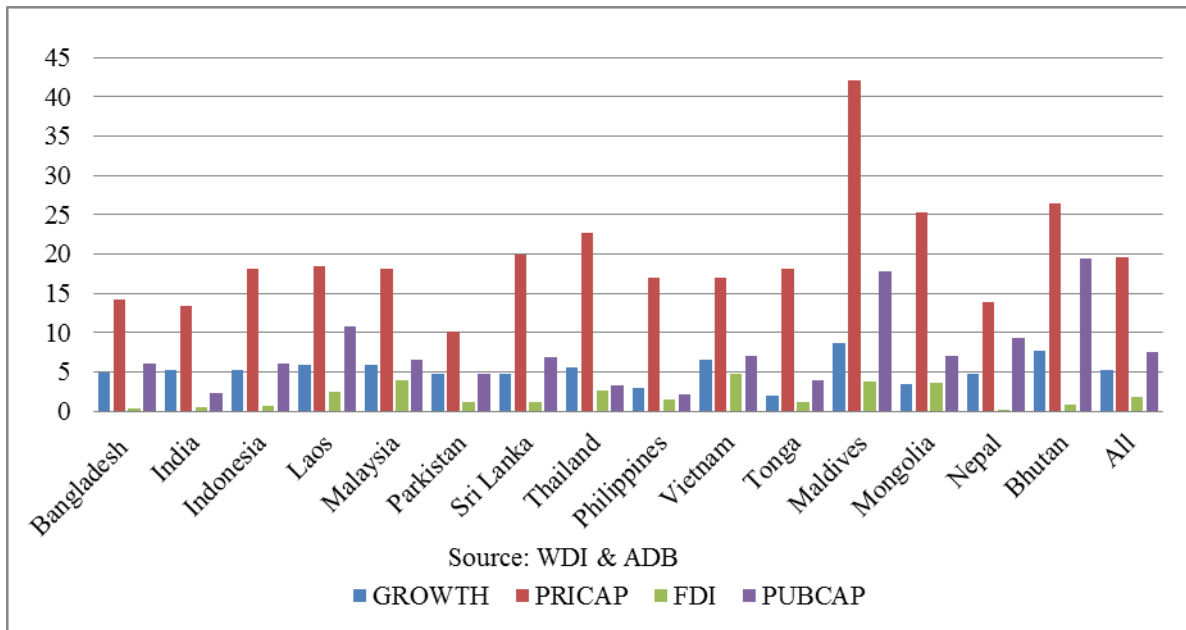
As shown in the chart, private domestic investment covers the biggest percentage comparing to other factors, and public investment is the second large. The growth rate of economic growth in these developing countries is generally high. However, there is only very small number of FDI inflows in all countries, especially in Bangladesh and India (0.35 and 0.45%). Comparing among countries, Maldives and Bhutan seem to have higher percentage of all sectors except FDI.

2. Theoretical and Empirical Review

2.1 Economic Growth Theory

Growth models are fundamentally of two folds; the neoclassical growth model, also known as the exogenous growth model developed primarily by Solow (1956) and the new growth theory, also known as the endogenous growth model, pioneered by Romer (1986), Lucas (1988), Barro (1990), and Rebelo (1991). Economic growth has been emphasized as a significant factor in many countries for decades. As a discipline core economic growth theory was born in the late 1960s. After two decades, growth theory became popular again in the mid 1980s by the emphasis on the long-run growth, which is now called endogenous growth theory. It is understood that long-run economic growth is at least as important as short-run fluctuations of growth and in fact it is even more important than that. For instance, it might be important to know why GDP of a country raised three or four percent in the last couple of months. However, it might be even more important to know why African countries have quite low GDP rates than their European counterparts. Or why a country's GDP fell during the last century. The new growth theory or the endogenous growth theory, underlines the importance of the latter questions, related with the long-run growth performances, rather than the former.

The name of endogenous growth models is given to these theories since according to these theories determination of long-run growth rates are explained within the models, rather than by some exogenous variables. The development of endogenous growth theory has followed the neoclassic growth theory. Romer (1990, 1997) introduced the incorporation of resource and development and imperfect of competition into the growth framework. Other researchers, especially, Aghion and Howitt (1992), and Grossman and Helpman (1991) also considered research and development (R & D) in the growth model.

Can the government decisions on the share of public expenditure in output or on the composition of expenditures and taxation affect the steady state growth rate? The answer is absolutely 'no' in the case of the neoclassical growth models of Solow (1956), Swan (1956), Cass (1965) and Koopmans (1965). In neoclassical growth models government policy cannot have sustained effects on growth rate of per capita income, although government can even influence the population growth which is assumed to affect the growth rate. In these models, if incentives to save or to invest in new capital are affected by fiscal policy, there will be a change in equilibrium capital output ratio and therefore the output path will change, leaving the steady state growth rate unchanged. The long-run growth rate is driven by exogenous factors of population growth and technological progress while public policy can only influence the transition path of the economy towards steady state growth rate. According to the economists supporting 'endogenous growth models' (Barro 1990, King and Rebelo 1990, Lucas 1990, Mendoza et al. 1997, Stokey and Rebelo 1995, and Easterly and Rebelo 1993), the share of public expenditure in output or the composition of expenditures and taxation affects the steady state growth rate. This is in contrast to the neoclassical growth theory where only investment in physical and human capital affects the steady state growth rate. Regarding to the endogenous growth model, the long-run growth rate depends on the stable environment of business, specifically, government policies and actions on taxation, law and order, provision of infrastructure services, protection of intellectual of property rights, regulation of an international trade, financial markets, and other aspect of the economy. Therefore, long-run growth rate has also guided by the government (Barro 1997).

In the endogenous growth model, investment is also treated as a significant factor. As noted, neoclassic growth theory assumes that the investment has a limited role in boosting

economic growth and a continuous increase in the factor of production is unlikely to yield growth. Under endogenous growth theory and despite the law of diminishing returns, a marginal factor of productivity can be increased. For instance, technical progress that is funded by capital investment increases productivity. Similarly, new skills through the improvement of education and training, and better health tend to increase the productivity of labor. Also, the endogenous growth approach argues that there is a role for government institutions that can overcome any market failures associated with the various types of investment. Hence, the investment is crucial in order to promote economic growth. Further, endogenous growth theory also indicates that the improvement of technology accessed by the investment drives economic growth. Thus, long-run growth may have been contributed by the investment.

2.2 Selected Empirical on Economic Growth

There has been a number of studies that investigating the relation of public and private investment. However, they got different results depending on a sample and method used.

Le and Suruga (2005) explore the impact of public investment and FDI on economic growth, and they also investigate the effect of public investment on FDI using panel data of 105 of developed and developing countries over the period 1970-2009. Their results show that both public investment and FDI have a positive relationship with economic growth; however, the threshold results indicate that the growth effect of FDI on economic growth becomes weaker when public investment exceeds 8-9%. They explain their results by pointing out that an excessive public investment can hinder the benefit from FDI. Blejer and Khan (1984) investigate whether public investment crowds out or crowds in private investment using a sample of 24 developing countries over the period 1971-1979. They provide evidence that public investment in infrastructure is complementary to private investment, while other types of public

investment lead to crowding out of private investment. Landau (1986) examines the relationship between government expenditure, revenue and economic growth using a cross section data of 96 countries cover various time period for 1961-1976. The government expenditure is divided into five categories: consumption, education, defense, transfers, and capital expenditure. He estimates his model by using ordinary least square (OLS) method. The results indicate that each type of government expenditure has either significant negative or insignificant positive effect on economic growth.

Ashauer (1989) investigates whether high public capital spending crowds out   private investment or not using annual data of the United Sates over the period 1925-1985. The results show that for a given rate of return, an increase in public capital spending may be expected to reduce private investment one-to-one as the private sectors utilize the benefit from the public investment; however, at the same time it also raises the marginal productivity of private capital which, in turn, crowds in private capital. The results show both crowding in and crowding out effect; therefore, the researcher indicates that public investment policy by no mean seems to be neutral in its effect on the real economy. Everhart and Sumlinski (2001) explore the partial correlation between public and private investment using a data panel of 63 developing countries over the period 1970-2000. They find some evidence of a negative correlation between public and private investment (consistent with crowding out), and that the correlation appears to be positive for the countries with better institutions.

Eduardo and Christian (2011) explore the relationship between public investment and private investment using a large sample size of 116 countries between 1980 and 2006. The results indicate that on average public investment has a negative impact on private investment. In the short-run, a one percent change in public investment results in a decrease in private investment

by 0.22%. They explain that the crowding-out effect of public investment through weak public institutions or financing constraints on average outweighs the crowding in effect coming through the channel of increasing in the marginal productivity of private investment. Moreover, they find that where either the countries with better public institutions or the financing channel is weakened (more open economies can effectively rely on foreign savings as an alternative source of financing for domestic investment), the average negative effect is broken. Their results have been confirmed by some of the previous studies, particularly Ashauer (1989), and Everhart and Sumlinski (2001). However, the results, which find negative effects of public investment on private investments, have been challenged by Erden and Holcombe (2005). Their work shows some evidence of a positive relationship between public investment and private investment for a sample of 19 developing countries over the period 1980-1997.

Barro (1994) investigates the determinants of economic growth using OLS method to estimate panel data of 116 countries cover the period 1965-1985. The results indicate that a large government size, government-induced distortion of the market, and political instability have a negative effect on economic growth. Barro (1997) outlines the historical development of economic growth models starting with the neoclassical growth models initially developed by Ramsey (1928) and Solow (1956) and more recent extensions in the form of endogenous growth models (see, e.g., Rebelo, 1991; Romer, 1986). Barro establishes from empirical analysis of over 100 countries that for a given initial level of real per capita GDP, growth rate is accelerated by factors such as lower government consumption, higher levels of human capital related to increased levels of schooling, lower inflation, better law enforcement, and improvements in trade. Using more disaggregated expenditure functions, Easterly and Rebelo (1993) find that only

public investment in transport and communication generates positive effect on economic growth for a mixed sample of both developed and developing countries.

Deverajan et al (1996) study the relationship of public expenditure and economic growth using a sample of 43 developed and developing countries over the period 1970-1990. Their results indicate that public capital expenditure has a negative effect on economic growth for developing countries, and the effect gets dramatically reverse for developed countries. They explain their results by suggesting that expenditures normally considered productive could become unproductive if there is an excessive amount of them. They conclude by indicating that policymakers have been misallocating their resources by excessive public investment. Their results are also supported by Ghosh and Gregoriou (2007) in an optimal fiscal policy framework of developing countries.

3. Methodology and Data

3.1 Methodology

This study follows Le and Suruga (2005)'s models, which adopted endogenous growth model to explore the effect of public investment on economic growth and its impact on FDI using fixed effect model. Differentiating from the previous work, private investment is divided into two factors: FDI and private domestic investment. The interrelationship between public investment, FDI, private domestic investment, and economic growth can be estimated by regressing the annual rate of real GDP growth as a regressor, including other control variables. Three specifications of the relationship are used here. In model 1, we explore the overall effect of all given factors on economic growth. This allows us to compare the effect of all control variables, specifically public investment, FDI, and private domestic investment on economic

growth. Model 2 and model 3 will be employed to capture the complementary effect of public investment on FDI and on private domestic investment.

➢ Factors Affecting Economic Growth

$$GROWTH_{it} = \alpha_0 + \alpha_1 PRICAP_{it} + \alpha_2 FDI_{it} + \alpha_3 PUBCUR_{it} + \alpha_4 PUBCAP_{it} \\ + \alpha_5 LABOR_{it} + \alpha_6 Dm1_{it} + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

➢ Complementary Effect of Public Investment on FDI and Economic Growth

$$GROWTH_{it} = \alpha_0 + \alpha_1 PRICAP_{it} + \alpha_2 FDI_{it} + \alpha_3 PUBCUR_{it} + \alpha_4 PUBCAP_{it} \\ + \alpha_5 LABOR_{it} + \alpha_6 FDI_{it} * Dm_{jit} + \alpha_7 Dm1_{it} + \varepsilon_{it} \dots\dots\dots\dots\dots (2)$$

➢ Complementary Effect of Public Investment on Private Domestic Investment and Economic Growth

$$GROWTH_{IT} = \alpha_0 + \alpha_1 PRICAP_{it} + \alpha_2 FDI_{it} + \alpha_3 PUCUR_{it} + \alpha_4 PUBCAP_{it} \\ + \alpha_5 LABOR_{it} + \alpha_6 PRICAP_{it} * Dm_{jit} + \alpha_7 DM1_{it} + \varepsilon_{it} \dots\dots\dots. (3)$$

Where Growth is a real growth of gross domestic product; PRICAP, FDI, PUBCUR, and PUCAP is a percentage share to GDP of private domestic investment, foreign direct investment, public nonproductive (public expenditure for consumption) expenditure, and public productive expenditure (public expenditure for investment), respectively. LABOR is a growth rate of labor force. *i, t,* and *j* denote for number of cross section country (1,2,3…), time period (1984,1985,1986…), and the level of public investment (4.9%, 5%, 6%...), respectively.

3.2 Data

The data used in this study is based on panel data of 15 developing countries in Asia. The study period runs from 1984 to 2009 (26 years). The data is obtained from two main sources: World Development Indicator (WDI) and Asian Development Bank (ADB). The dependent variable (Growth) is in a real term obtained from WDI; public investment (PUCUR) and public consumption obtained from ADB; other independent variables such as private domestic investment (PRICAP); foreign direct investment (FDI), and labor force (LABOR) obtained from

WDI. All independent variables exclude LABOR are measured as a percentage of GDP. LABOR is the growth rate of labor force.

4. Empirical Result

4.1 The Factors Affecting on Growth

Table 4-1 contains the estimates of equation 1 shows a positive and statistically significant relationship between the growth rate of real GDP and private domestic investment, FDI, and public investment. A unit increases in these factors increases the growth rate of real GDP by 0.10, 2.3, and 0.11 percentage points, respectively.

Table 4-1 Regression Result. Dependent Variable: GROWTH

Variable	Coefficient
Intercept	5.225 (5.128)***
PRICAP	0.099 (3.430)***
FDI	0.230 (2.504)**
PUBCUR	-0.185 (-4.650)***
PUBCAP	0.107 (1.797)*
LABOR	0.096 (0. 730)
Dm1	-4.182 (-4.646)***
Adjusted-R Squared	0.25
Estimation Model	Fixed Effect
F-Statistic	7.531
Observation	386
Derbin-Watson	1.41

Source: Authors' calculation
Note: * Significant at 10%, ** significant at 5%, and *** significant at 1%, respectively

The relationship between public current expenditure and economic growth is negative and significant. A unit increases in this public current expenditure would in turn reduce a real

growth by 0.19 percentage points. Labor force growth rate is found to be positive but insignificant. Another factor which found to have a statistically significant and positive relationship with economic growth is Asian Financial Crisis in 1997-1998 (Dm1), a unit increases in this variable would reduce economic growth by 4.18 percentage points.

4.2 Complementary Effect of Public Investment on FDI and economic growth

Following the approach adopted in Le and Suruga (2005), we introduce dummy variable as the interactive form (Dm multiplied by FDI) to check for the level of public investment that may be recognized by FDI, or the level of public investment which reduces the positive effect of FDI on economic growth. Dm is defined as 1 whenever the proportion of public investment in GDP equals or exceeds 6.4% to 7.5%, respectively[2]. Whenever, public investment less than these levels, and then the dummy variable Dm is defined as 0.

Table 4-2 Regression Results: Dependent Variable: GROWTH

Variable	If PUBCAP≥6.4%	(2) If PUBCAP≥6.6%	(3) If PUBCAP≥6.7%	(5) If PUBCAP≥7%	(6) If PUBCAP≥7.5%
Intercept	4.910	4.772	4.735	4.656	4.668
	(4.717)***	(4.596)***	(4.574)***	(4.496)***	(4.480)***
PRICAP	(0.098)	(0.099)	(0.098)	(0.099)	(0.098)
	(3.371)***	(3.390)***	(3.388)***	(3.404)***	(3.370)***
FDI	0.340	0.365	0.374	0.386	0.373
	(2.862)***	(3.171)***	(3.288)***	(3.424)***	(3.305)***
PUBCUR	-0.173	-0.169	-0.168	-0.166	-0.164

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[2] In fact the dummy variable Dm has been tested with various levels of public investment from 1% to 6.3%. However, none produces significant coefficients of public investment.

	(-4.282)***	(-4.158)***	(-4.160)***	(-4.103)***	(-4.028)***
PUBCAP	0.116	0.120	0.124	0.125	0.123
	(1.919)*	(1.992)*	(2.047)**	(2.079)**	(2.034)**
LABOR	0.117	0.123	0.121	0.124	0.120
	(0.889)	(0.932)	(0.921)	(0.947)	(0.913)
FDI*Dm	-0.207	-0.274	-0.298	-0.330	-0.311
	(-1.561)	(-2.058)**	(-2.255)**	(-2.493)**	(-2.292)**
Dm1	-4.290	-4.311	-4.303	-4.297	-4.271
	(-4.770)***	(-4.803)***	(-4.803)***	(-4.805)***	(-4.771)***
Adjusted-R Squared	0.26	0.26	0.26	0.26	0.26
Hausman test (x^2)					
Estimation Model	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect
F-Statistic	7.291	7.412	7.469	7.545	7.481
Observation	383	383	383	383	383
Derbin-Watson	1.44	1.45	1.46	1.46	1.45

* Significant at 10%, ** significant at 5%, and *** significant at 1%, respectively

The key variable in this table is FDI*Dm. The results indicate that FDI*Dm becomes significant but negative. The negative coefficient of the variable FDI*Dm suggests that the positive effect of FDI on economic growth reduces when the ratio to GDP of public investment exceeds 6.6-7.5%. For instance, regarding the result presented in the table 4-2, the coefficient of FDI is 0.365 while for FDI*Dm is -0.274. It means that the slope coefficient of FDI reduces from

0.365 to 0.091 when the public investment equals 6.6%. We can also calculate other levels of public investment by following the same process.

Comparison of this study and the previous study is presented by table 4-3, indicating that public investment in developing countries and in mix developing and developed countries show a similar effect on FDI in term of signs of coefficient; however, the levels of public investment that have been recognized by FDI (FDI*Dm) are different. The results from this study indicate that whenever public investment exceeds 6.6-7.5%, the interactive variable FDI*Dm is negative and significant. The study by Le and Suruga (2005) also produces interesting results, and their findings show that the positive effect of FDI on economic growth reduces when public investment exceeds 8-9%; however, their study includes both developed and developing countries, which is different from this study. The results for the comparison of this empirical study and the previous study are presented as the following table.

Table 4-3 Comparison of the effect of public investment on FDI

Variable	This study				Le and Suruga (2005)		
PUBCAP	≥6.6%	≥6.7%	≥7%	≥7.5%	≥8%	≥8.5%	≥9%
FDI	0.365 (3.171)***	0.374 (3.288)***	0.386 (3.424)***	0.373 (3.305)***	0.198 (5.930)***	0.200 (6.030)***	0.200 (6.040)***
FDI*Dm	-0.274 (-2.058)**	-0.298 (-2.255)**	-0.330 (-2.493)**	-0.311 (-2.292)**	-0.162 (2.380)**	-0.174 (2.600)***	-0.173 (2.590)***
Changes (FDI-FDI*Dm	0.091	0.076	0.056	0.042	0.036	0.026	0.027
Data	15 developing countries in Asia (1984 - 2009)				105 developed and developing countries (1970 - 2001)		
Model	Fixed Effect				Fixed Effect		
Observation	383	383	383	383	1436	1436	1436

Note: Note: t-statistics in parentheses
*** Significant at 1% and ** significant at 5%

4.3 Complementary effect of public investment on private domestic investment and economic growth

In order to explore the interactive relationship between public investment and private domestic investment, a similar technique as applied previously is also adopted in this section. Dummy variable Dm employed into our model to capture the interrelationship between public investment, private domestic investment, and economic growth. Dm is classified into 6 levels: 4.9%, 5%, 5.5%, 6%, 7%, and 8%, respectively[3]. Dm is defined as 1 whenever it equals or exceeds these percentage points, and it is defined as 0 whenever it is less than the given levels.

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[3] In fact the dummy variable Dm has been tested with various levels of public investment from 1% to 4.8%. However, none produces significant coefficients of public investment.

Table 4-4 Regression Results: Dependent Variable: GROWTH

Variable	(1) If PUBCAP ≥4.9%	(2) If PUBCAP ≥5%	(3) If PUBCAP ≥5.5%	(4) If PUBCAP ≥6%	(5) If PUBCAP ≥7%	(6) If PUBCAP ≥8%
Intercept	4.307	4.341	4.484	4.407	3.854	4.274
	(3.906)***	(3.937)***	(4.090)***	(3.939)***	(3.438)***	(3.741)***
PRICAP	0.152	0.147	0.135	0.134	0.152	0.135
	(3.945)***	(3.915)***	(3.796)***	(3.770)***	(4.358)***	(3.810)***
FDI	0.242	0.241	0.234	0.225	0.204	0.203
	(2.621)***	(2.609)***	(2.537)**	(2.448)**	(2.231)**	(2.199)**
PUBCUR	-0.167	-0.166	-0.167	-0.167	-0.156	-0.162
	(-4.114)***	(-4.073)***	(-4.105)***	(-4.073)***	(-3.814)***	(-3.890)***
PUBCAP	0.153	0.151	0.146	0.148	0.172	0.146
	(2.391)**	(2.361)**	(2.275)**	(2.282)**	(2.677)***	(2.276)**
LABOR	0.123	0.122	0.114	0.124	0.137	0.123
	(0.936)	(0.929)	(0.867)	(0.942)	(0.108)	(0.931)
PRICAP*Dm	-0.067	-0.063	-0.052	-0.051	-0.081	0.057
	(-2.214)**	(-2.149)**	(-1.910)*	(-1.867)*	(-2.877)***	(-1.931)*
Dm1	-4.092	-4.084	-4.112	-4.305	-4.303	-4.227
	(-4.565)***	(-4.553)***	(-4.580)***	(-4.792)***	(-4.826)***	(-4.715)***
Adjusted-R Squared	0.26	0.26	0.26	0.26	0.27	0.26
Hausman test (x^2)						
Estimation Model	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect	Fixed Effect
F-Statistic	7.457	7.438	7.372	7.361	7.684	7.378
Observation	383	383	383	383	383	383
Derbin-Watson	1.44	1.44	1.42	1.43	1.45	1.43

* Significant at 10%, ** significant at 5%, and *** significant at 1%, respectively.

Generally, public investment and private domestic investment produce a positive effect on economic growth as stated; however, after checking the interactive relationship between these two factors, the interactive term shows a negative and statistically significant coefficient when public investment exceeds 4.9-8%, indicating that the positive effect of private domestic investment become weaker when public investment increases at some extent levels. We can explore how the coefficient of private domestic investment changes by differentiating the coefficient of PRICAP and the coefficient PRICAP*Dm. For example, at the level of 4.9% of public investment, the coefficient of private domestic investment reduces from 0.152 to 0.085 (0.152 -0.067).

5. Conclusions and Policy Implications

This study implemented the interrelationship between public investment, FDI, private domestic investment, and economic growth using a panel dataset of 15 developing countries in Asia covers the period 1984 – 2009. The empirical results show that public investment crowds out FDI and private domestic investment at some extent levels. Therefore, any increasing in public investment more than its proper level would only reduce the positive effect of FDI and private domestic investment on economic growth. The negative effect of public investment has been recognized by FDI and private domestic investment when its proportion share in GDP exceeds 6.6%-7.5% and 4.9%-8%, respectively.

Thus, the results may suggest that public investment needs to be considered carefully in order to avoid the negative impact on FDI and private domestic investment, which would reduce the growth rate of real GDP. Because the intention of this study is to consider the effect of public investment on both FDI and private domestic investment; therefore, we need to identically investigate both of these factors. Although we cannot find the optimum level of public

investment as stated in the objectives; however, our study has shown some significant evidence, which also found in Le and Suruga (2005)'s study that public investment may harm economic activity when exceeding the proper levels (8-9%). In order to select the optimum level of public investment, the authors select the minimum level that has a statistically significant coefficient. Therefore, this empirical study may imply that the government may have to invest less than 4.9 percentage points share to GDP in order to avoid the negative effect (crowding out effect) on FDI and private domestic investment.

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