

# JOINT VENTURE INVESTMENT, INFRASTRUCTURAL SPILLOVER AND ECONOMIC GROWTH: A SOUTH ASIAN PERSPECTIVE

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**ABSTRACT:** Asia is the largest recipient of foreign direct investment inflows in the world, which is the 9% of the total FDI inflows of Asia. This research analyzes the multidimensional spillovers from FDI inflows on the economic growth of selected South Asian economies (India, Srilanka, Pakistan and Bangladesh). This study focuses upon the long run relationship between economic growth and joint venture investment foreign direct investment and domestic investment. Further, this research examines the role of infrastructural spillover through FDI on the economic growth. The data for respective variables is taken from World Development Indicators (WDI) for the time period of 1990-2013. The long run relationship is estimated by Mean Group, Dynamic Fixed Effects and Pooled Mean Group panel co-integration test. The results show positive technological spillovers of foreign direct investment through infrastructure and trade openness on the economic growth of South Asian economies.

**Key Words:** Foreign Direct Investment, Joint Venture Investment, Economic Growth, Panel Cointegration.

## 1. INTRODUCTION

International trade plays a significant role in shaping economic integration [31,27]. A striking feature of economic integration is the unprecedented growth of foreign direct investment around the globe [28]. Trade encourages greater efficiency through access to advance inputs and providing new opportunities for growth. Endogenous growth models explain the multidimensional aspects of trade [1,34]. As it promoted economic growth in the developed economies of modern era [10]. FDI generates competition in the home economy and promotes various spillovers. It forces domestic markets in productive activities leading to economic growth. [7; 20; 24; 38; 41; 45 ,30] support the positive contribution of FDI in the economic growth of developing economies.

The developing economies are subjected to poor infrastructure, low productivity and technological backwardness. Therefore, the presence of multinationals become an easy way out for them because it creates various spillovers in the domestic market: encourages domestic investment, enhances productivity, improves domestic infrastructure and economic growth. Therefore, the removal of trade barriers becomes an imperative tool for developing economies to generate competition [36]. This competition increases the productivity of the domestic markets because there exists an incentive to innovate in terms of capturing larger market share. So, trade openness results in economic growth through productivity spillovers ([5]; [6] and [26]). Moreover, [16] support the positive spillovers from FDI in improving infrastructure spillover and thus economic growth. The influx of FDI improves domestic infrastructure and attracts more multinationals in return.

World Investment Reports suggest that Asia is the largest recipient of FDI inflows with \$426 billion in 2013 and South Asia accounts for 9% of this share in Asia. Moreover, India is the largest recipient of FDI inflows in South Asia. India received inflows of \$28 billion in 2013. The second recipient of foreign direct investment inflows is Srilanka with \$1.2 billion in 2013. Pakistan recorded \$810 million of FDI in 2012. Similarly, Bangladesh received \$806 million of foreign direct investment in 2012 [33].

This research estimates the long run and short run relationship between joint venture investment, infrastructural spillover from FDI and economic growth of South Asian economies. It also examines the causality between given variables. This study focuses upon Pakistan, India, Srilanka and Bangladesh for the time period of 1990-2013.

This paper is divided into four sections. The second section explains the theoretical analysis of our model for empirical investigation. The third section provides an account of data and methodology including variable definitions and empirical results of the analysis. The last section presents concluding remarks of the present research.

### 1.1 Objectives

Following are the objectives of the paper:

1. To estimate the long run relationship between economic growth and joint venture investment foreign direct investment and domestic investment.
2. To find the role of infrastructural spillover through FDI on the economic growth.

## 2. LITERATURE REVIEW

FDI is viewed as the composite bundle of capital inflows and productivity gains [15]. Hence, FDI has a manifold impact on the economic growth [11]. The existing literature points out the effort by nations to attract MNCs. MNCs are a source of growth through productivity gains to local firms. Likewise, the influx of knowledge about global markets would promote spillovers to natives: promoting growth and strengthening the export sector [2].

For this purpose, the international trade literature highlights the importance of FDI for the growth of developing economies. As a result, the catch up process of developing economies to advance technology becomes uncomplicated [34]. Due to less trade barriers, the domestic market enjoys productivity gains in the presence of multinationals. This promotes efficient allocation of resources and infrastructure related technological improvement leading to economic growth of the host economy [26]. The influx of FDI is a stable source of capital for developing economies as it also helps to prevail over shortage of capital leading to economic growth. Empirical studies of [4;14; 25,29;35] support the positive impact of FDI on the economic growth of host

economies. Moreover, FDI can complement domestic investment enhancing production capacity of the host economy. Economic literature also identifies the pivotal role of local investment for the successful operation of MNC's in the host economy. So, the relationship between FDI and DI becomes more crucial for low-income countries because the parallel movement of both FDI and domestic investment can envisage a sustainable economic growth in these economies. [3; 9,13] support the argument of positive contribution of FDI in nurturing domestic investment and thus economic growth. Similarly, FDI and DI jointly have a positive impact on the economic growth of developing economies. The joint venture investment results in more productivity, management control and economic growth than individual investments.

The spillover effects of FDI provide intensity to the growth process. As the developing economies are subjected to economic backwardness and poor infrastructure. Somehow, it facilitates multinationals to make their place in the domestic markets. At start, the MNCs would mostly confine the markets due to comparative advantages. The provision of cheap labor and their capability to innovate provides them an edge over local investors. But, it also ascertains various spillovers to the host economy. As the MNCs capture local markets, the spur to innovate makes other firms to compete because multinationals themselves helps the transfer of technology to host economies. But, the precondition of resourceful infrastructure for the successful contribution of foreign direct investment in the host economy remains important. Because it enhances the productivity of FDI, leading to economic growth. [21] envisages infrastructure as a precondition for economic growth through FDI. As the efficient infrastructure level helps in the technological transfer through MNCs in the host economy [16]. There is a bidirectional relationship between infrastructure and FDI inflows. The positive feedback of infrastructure further helps in FDI inflows and in return, more FDI inflows improve the existing infrastructure in the host economy. It is viewed as the absorptive capacity of an economy which adds to the existing knowledge, communication sources and thus, reduces the cost of doing business. This attracts more MNCs contributing to the economic growth [21,42]. The flow of FDI provides infrastructural assistance to domestic markets. This presence of multinationals positively affects the domestic infrastructure and together positively contributes to the economic growth of developing economies.

Although, South Asia accounts for 9% of the total FDI inflows in whole Asia but there has not been enough empirical literature about the role of FDI in this region. [40] also proved a significant and positive relationship between FDI inflows and economic growth of South Asian economies using GMM for period 1995-2008. The results also showed a robust relationship of economic growth with trade openness, population and infrastructure. Review of literature shows that

existing literature on South Asian economies does not offer a detailed analysis about the role of joint venture investment, FDI led infrastructure in the economic growth. Therefore, we make an attempt to evaluate the multidimensional aspects of FDI in the economic growth of South Asian economies.

**3.DATA AND METHODOLOGICAL ISSUES**

Data of national income (Y), joint venture investment (JV) and infrastructural spillovers (SIN) from 1990 to 2013 is used. FDI is multiplied with domestic investment to obtain a proxy for joint venture investment. While FDI is multiplied with technological gap and infrastructure to obtain infrastructural spillover term (SIN). The data is obtained from World Development Indicators, WDI (2014). The list of countries includes Pakistan, India, Srilanka and Bangladesh. All of the variables are in logarithmic form for linearization. The countries and time dimensions are taken according to availability of data for selected South Asian countries.

Model to be estimated is as follows:

$$\ln(Y_{i,t}) = \alpha_i + \beta_i \cdot \ln(JV_{i,t}) + \epsilon_{i,t} \dots\dots\dots(1)$$

$$\ln(Y_{i,t}) = \alpha_i + \beta_i \cdot \ln(SIN_{i,t}) + \epsilon_{i,t} \dots\dots\dots(2)$$

Y, JV and SIN stand for Gross Domestic Investment, Joint Venture Investment and Infrastructural Spillover (SIN), respectively. JV is obtained by multiplying foreign direct investment and domestic investment accounts for joint venture investment. Infrastructural Spillover is the product of foreign direct investment, technological gap and infrastructure represents the technological spillover of FDI dependent upon infrastructure. It shows the effect of FDI on the domestic infrastructure which improves technological capacity of domestic economy [16].<sup>1</sup> The spillover effects of FDI correspond to absorptive capacity being dependent upon trade openness and infrastructure for transfer of technology in the host economy. [16; 23,46] used similar interaction terms to define absorptive capacity for the host economy.

We use three different tests to confirm our results. Results from all these tests are given in Table 1. The selection of the appropriate lag length was made using the Schwarz Bayesian Information Criterion. Results from majority of unit root tests suggest that Y and independent variables (JV and SIN) are stationary at first difference, I(1).

Table 1: Unit Root Tests						
	Y	ΔY	JV	ΔJV	SIN	ΔSIN
LLC	3.239	-2.315 <sup>b</sup>	-3.043 <sup>a</sup>	-4.463 <sup>a</sup>	-3.483 <sup>a</sup>	-3.904 <sup>a</sup>
IPS	5.224	-1.932 <sup>b</sup>	-0.469	-5.369 <sup>a</sup>	-1.469 <sup>c</sup>	-2.332 <sup>a</sup>
MWADF	0.121	16.253 <sup>b</sup>	8.573	42.954 <sup>a</sup>	14.102 <sup>c</sup>	18.345 <sup>b</sup>
MWPP	0.078	38.042 <sup>a</sup>	3.613	70.498 <sup>a</sup>	35.133 <sup>a</sup>	26.619 <sup>a</sup>
Source: Authors' estimates						
Δ denotes first difference. Both variables are taken in natural logarithms. All tests take non-stationarity as null. Note: Table shows the individual statistics and p-values with the lag length selection of one. Intercept is included in all terms with or without first differences. Probabilities of fisher type test are using asymptotic $\chi^2$ distributions while other type of tests assumes asymptotic normality.						

<sup>1</sup> Technological gap is measured as:  $TG_{it} = \frac{GDP_{usa,t} - GDP_{it}}{GDP_{it}}$

After investigating stationarity of the Y, JV and SIN, we use panel cointegration to find long run relationship. In addition to ARDL in time series analysis, Pesaran has contributed to panel data context of ARDL. Pesaran and Smith provided mean group estimator of dynamic panels for large number of time observations and large number of groups. They suggested pooled mean group (PMG) estimator of dynamic panels for large number of time observations and large number of groups. In addition to PMG and MG, Dynamic Fixed Effects (DFE) is also used to estimate the cointegrating vector. DFE specification controls the country specific effects, estimated through least square dummy variable (LSDV) or generalized method of moment (GMM). Dynamic fixed effect relies on pooling of cross-sections. Like the PMG estimator, DFE estimator also restricts the coefficient of cointegrating vector to be equal across all panels. PMG estimable model has an adjustment coefficient  $\phi_i$  that is known as the error-correction term.

	Y = F(JV)			Y = F(SIN)		
	MG	DFE	PMG	MG	DFE	PMG
	<b>Long Run Coefficients</b>					
JV	0.4799 (0.005)	0.8176 (0.241)	<b>0.6772</b> <b>(0.017)</b>	-	-	-
SIN	-	-	-	0.0058 (0.187)	0.0024 (0.127)	<b>0.0021</b> <b>(0.006)</b>
	<b>Convergence Term</b>					
$\phi_i$	-0.0346 (0.591)	-0.0210 (0.383)	<b>-0.0385</b> <b>(0.000)</b>	-0.0243 (0.598)	-0.0233 (0.270)	<b>-0.0458</b> <b>(0.003)</b>
	<b>Short Run Coefficients</b>					
$\Delta JV$	0.0189 (0.000)	0.0176 (0.115)	<b>0.0238</b> <b>(0.074)</b>	-	-	-
$\Delta SIN$	-	-	-	-0.0005 (0.109)	-0.0003 (0.009)	<b>-0.0005</b> <b>(0.071)</b>
C	-0.2692 (0.788)	-0.1497 (0.707)	<b>-0.1059</b> <b>(0.017)</b>	0.6357 (0.564)	0.6043 (0.231)	<b>1.1521</b> <b>(0.003)</b>

Source: Authors' estimations

Long run coefficients in Table 2 show a positive impact of JV and SIN on Y. It is statistically significant. Moreover, the convergence reveals a long run relationship between the JV and SIN with Y. Short run coefficients show the impact of JV and SIN on Y in the short run. The results in terms of signs are consistent in MG, DFE and PMG estimations techniques.

Using Hausman test, we find that MG is more efficient and consistent estimator than DFE. As the probability of Hausman statistic is 0.930. Moreover, Hausman test applied for decision between MG and PMG shows that PMG is more efficient and consistent estimator than MG. The probability value in this case is 0.130. Therefore, we depend on the estimations of PMG.

### 3.1 Estimation of Long-Run Cointegrating Vector

For checking the stability for results of slope coefficient, Pooled OLS (POLS), Fully Modified OLS (FMOLS), Dynamic OLS (DOLS), Dynamic Fixed Effects (DFE), Mean Group (MG) and Pooled Mean Group (PMG) estimators are listed in Table 3.

Dependent variable is Y and independent variable JV			
Technique	Slope	S.E.	p-value
POLS	0.576	0.002	0.000
FMOLS	0.247	0.023	0.000
DOLS	0.252	0.025	0.000
DFE	0.817	0.697	0.241
MG	0.479	0.172	0.005
PMG	0.677	0.284	0.017

Source: Authors' estimates

In Table 3, the slope coefficients are both positive and statistically significant at 1% for all techniques except for DFE. Since, PMG is statistically most sophisticated and rigorous estimator, it validates the long run relationship between national income and joint venture investment. Similarly, we apply same estimation techniques for spillover of infrastructure. Only DFE and MG give statistically insignificant results as shown in Table 4.

Dependent variable is Y and independent variable is SIN			
Technique	Slope	S.E.	p-value
POLS	0.0171	0.004	0.000
FMOLS	0.0011	0.000	0.000
DOLS	0.0009	0.000	0.000
DFE	0.0024	0.002	0.127
MG	0.0058	0.004	0.187
PMG	0.0022	0.001	0.006

Source: Authors' estimates

### 3.2 Panel Granger Causality Test

On ascertaining the presence of cointegration and quantifying the slope coefficient, we find the cause and effect relationship between national income, joint venture investment and infrastructural spillovers, shown in Table 5.

Causality	F-Statistic	p-value	Remarks
JV → Y	8.164	0.005	Bi-causality exists
Y → JV	5.422	0.022	
SIN → Y	6.966	0.010	Bi-causality exists
Y → SIN	20.912	0.000	

Source: Authors' estimates

Table 5 shows the pairwise panel granger causality results. The results are in compliance with the theoretical literature. There is bidirectional causality between national income and joint venture investment. As joint venture investment increases, national income increases. And as national income increases, it attracts more joint venture investment. These findings are compatible with [17] and [12]. Moreover, the results also show bidirectional causality between national income and infrastructural spillovers. As infrastructural spillover increases, national income increases and as national income increases, it raises infrastructural capacity. These findings are compatible with that in [32], [8] and [39]. These results reveal national income gets positively and significantly affected by joint venture investment, infrastructure spillovers and vice versa.

#### 4. CLOSING REMARKS

This paper empirically examined the economic growth of Pakistan, India, Srilanka and Bangladesh being dependent upon joint venture investment and infrastructural spillover. Pooled Mean Group (PMG) estimator shows positive and significant long run estimates. Using PMG, the term joint venture shows a long run coefficient of 0.6772 which is significant at 1% level of significance. While, the infrastructural spillover term shows a long run coefficient of 0.0021 which is significant at 1% level of significance. The convergence term  $\phi_i$  (using PMG) for JV shows a coefficient of -0.0385 and -0.0458 for SIN. Whereas, the short run coefficient (using PMG) came insignificant at 1% level of significance. The results also show that the influx of JV has a LR and SR relationship with economic growth. The increase in JV promotes economic growth at both LR and SR. Infrastructural spillover from FDI also positively contributes to economic growth. The FDI led technological spillover through infrastructure also promotes economic growth. For the stability of slope coefficients of both explanatory variables, Pooled OLS (POLS), Fully Modified OLS (FMOLS), Dynamic OLS (DOLS), Dynamic Fixed Effects (DFE), Mean Group (MG) and Pooled Mean Group (PMG) estimators are used. Both explanatory variables tend to support positive and significant relationship with economic growth. This research also shows bidirectional causality between economic growth and joint venture investment. As JV increase, national income increases and in return, positively affects the JV. Similarly, there exists bidirectional causality between economic growth and SIN. The infrastructural spillover tends to increase national income, and in return, national income also positively affects the infrastructure spillover. This paper supports the influx of FDI in South Asian economies because it positively collaborates with DI to promote economic growth. FDI also positively promotes technological spillover of infrastructure in South Asia. Therefore, the focus should be on improving law and order situation, especially in Pakistan because India, Srilanka along with Bangladesh enjoys a significant share of FDI mainly due to stable law and order situation. In this way, South Asia can become the hub of FDI ensuring more economic growth. Although, this study contributes to the existing FDI literature, but more time period along with other spillovers from FDI can be targeted to further analysis to determine the role of FDI in South Asian economies.

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