

# Foreign Direct Investment and Urban Infrastructure

## An Evidence from Southern Asia

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### Abstract

This paper applies the panel data model for estimation of the parameters for southern Asia countries. Before proceeding to estimate panel data, we carry out unit root tests to examine whether the variables are stationary. The data set used covers southern Asia countries over the period 1980-2009. In this paper we conclude that urban infrastructure has a positive effect on FDI and the governments in this zone should pay attention in this variable for FDI attracting.

**JEL Classification:** F21, F43

**Keywords:** Foreign Direct Investment, Urban Infrastructure, Southern Asia, Panel Data

## 1 Introduction

Dunning (1981, 1988) with eclectic theory have developed FDI theoretical framework. Foreign direct investment is determined by three advantages: Internationalization, Ownership, and Location.

In this article we focus on location advantage. Location advantage expresses the host country's resources importance to foreign firms for example, natural

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resources, cheap labor and infrastructures. Good infrastructure reduces the production cost and increase the productivity of firms. In this article we focus on infrastructure as a factor of location. International institutions like the World Bank stated that privatization increases the efficiency of infrastructure and reduces financial burden of government and attract more FDI. In the years 1990-2001 in developing countries, privatization of infrastructure in the telecommunications industry was 44%, 28% in the energy sector and 5% in sewerage respectively.

Globerman & Shapira (2003) have been examined the infrastructure effect on the probability of attracting FDI and the infrastructure to attract FDI. They found that public infrastructure such as the aspect of legal system is important for attracting of FDI.

Caughlin et al (1991) examined the determinants of foreign direct investment for the period from 1981 to 1983 in the USA and found that transportation infrastructure will increase FDI. Wheeler & Mody (1992) found that an important variable for developing countries that seek FDI from the USA is quality of infrastructure.

Cheng & Kwan (2001) with a model for FDI in China showed that infrastructure is important in China. Fung et al (2005) have examined the soft infrastructure and hard infrastructure effects for attracting of FDI.

## **2 Theoretical Literature Review**

Perhaps the most important goal of each country's economic is increasing economic growth, because increasing of economic growth improves the variables such as welfare, employment and etc .One of the factors that impact positively and significantly on economic growth is the capital. In developing countries which are faced with a shortage of capital, the best solution is foreign investment.

Until the 80's, developing countries were opposed to foreign investment, and they believed that this is a form of exploitation. But alongside process of globalization, these countries for funding the projects turned to FDI.

There are many factors that affect attraction of FDI: the market size, wage levels, government policies and economic political and institutional infrastructure. In this paper we investigate the role of economic infrastructure on attracting of FDI. Most of the infrastructure benefits for attracting of FDI can be seen in small and developing countries. It is true that more FDI attract in countries with strong economic infrastructure; but there is a decreasing efficiency in infrastructures this means the first unit of infrastructure is more important than the second unit, and the third ... .Therefore, a unit of infrastructure in developing countries to attraction of FDI is more efficient than the developed countries.

Poor infrastructure in roads, airports, telecommunications and ... violate the transportation, distribution and production, and production cost will increase. A good highway and advanced electronic communications accelerate and facilitate the transfer and production of raw materials and decrease production costs.

Infrastructure through inputs such as labor, capital and natural resource impact on investment environment and its improvement increases the efficiency of FDI. Investors are predicting that in a country with easy access to infrastructure, productivity and efficiency is higher, therefore they have more willing to invest there, so high infrastructure attract more FDI. Wei et al (2000) state that a location with good infrastructure is more attractive than other things.

However, some studies show a high infrastructure haven't strong impact on productivity, even if this equation is established, health infrastructure affect indirectly on spillovers and agglomeration, and reduce production costs and increase the attraction of FDI.

### 3 Methodology

According to research Adeisu (2002), we investigate effect of urban infrastructure on FDI. For studying of the urban infrastructure effect on foreign direct investment we will estimate the following model:

$$FDI_{it} = \alpha_0 + \beta_1GDP_{it} + \beta_2OPN_{it} + \beta_3INR_{it} + \beta_4TAX_{it} + \beta_5CPI_{it} + \beta_6DIV_{it} + \beta_7HUM_{it} + \varepsilon_{it}$$

where FDI is foreign direct investment, GDP is gross domestic production, OPN is penness, INR is infrastructure (the proxy for infrastructure is telephone line), TAX is tax, CPI is consumer price index, DIV is domestic investment, HUM is human capital and  $\varepsilon$  is stochastic disturbance.

This paper applies the panel data model for estimation of the parameters for southern Asia countries. Before proceeding to estimate panel data, we carry out unit root tests to examine whether the variables are stationary. The data set used covers 6 countries over the period 1980-2009. The sources of variables are UNdata, the World Bank Group, UNTACD and Growth Data Resources.

In this study, we use the number of telephones per 1,000 people as the indicator of urban infrastructure. Before estimating the model, to avoid spurious aggression, we perform unit root test IPS and ADF-Fisher.

Table 1: Panel data unit root tests

	GNP	INF	TAX	DIV	HUM	FDI
IPS	-4.18*	-2.93	-1.2**	-3.17*	-4.18*	-2.21*
ADF-Fischer	13.7	11.3**	10.3*	8.12	13.75**	15.5

\*\*\* (\*\*, \*) denotes rejection of null hypothesis: Panel series has a unit root. at the 1% (5%, 10%) level of significance, respectively.

Table 1 shows the results of IPS and ADF-Fisher tests for the variables GDP, INF, TAX, DIV, HUM & FDI. As specified in the table, we can deduce that all variables are stationary. So can be sure that the problem of spurious aggression is resolved.

Table 2: Impact of urban infrastructure on FDI inflow

	2.1	2.2	2.3	2.4	2.5	2.6
Constant	-2.11** (-2.31)	-3.61*** (-3.18)	-1.23** (-2.14)	-5.07 (-1.13)	-2.15** (-2.21)	-3.19 (-1.18)
GDP	0.03*** (3.17)	0.027*** (3.49)	0.041** (2.01)	0.052** (2.17)	0.029 (1.14)	0.017*** (3.19)
OPN	0.017** (2.14)	0.023 (1.14)	0.031*** (3.25)	0.041 (1.02)	0.037** (2.16)	0.029** (2.08)
INR		0.31*** (3.19)	0.45*** (4.1)	0.23** (2.12)	-0.12 (-0.92)	0.58 (4.12)
TAX			-0.015 (-1.35)	-0.012** (-2.19)	-0.013*** (-3.11)	-0.019** (-2.21)
CPI				-0.13** (-2.15)	-0.16*** (-3.75)	-0.21** (-2.31)
DIV					0.21 (1.19)	0.29*** (3.19)
HUM						0.32*** (4.18)

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Notes: t-values reported in parentheses; \*\*\* significant at 1% level; \*\* significant at 5% level; \* significant at 10% level.

Since the Hausman test statistic is  $\chi^2 = 21.1$  ( $p=0.00$ ), we apply fixed-effects model instead of random-effect.

## 4 Empirical results

Table 2, estimate principal model in 6 columns. In the first column initially we regress two variables of GDP and OPN on FDI and in the next columns we add the variables one by one to the model. In the sixth column, the model is completely estimated. The variables are on logarithm. In the first column one percent increase in GDP of countries, increase 0.031 percent in FDI. This value is 0.017 for trade openness. In this model, both variables GDP and OPN have positive and significant effect on attracting of FDI.

In the second column, we have entered urban infrastructure to the equation. In this equation, trade openness has no effect on FDI, but a very significant increase in urban infrastructure increased attracting of FDI.

In the third column, all variables except tax are significant. In this model, the increase in urban infrastructure, increase foreign investment too. Infrastructure is also positive and significant in subsequent models, except for fifth column in which the infrastructure is not significant but negative.

Generally, can be said urban infrastructure that here is the telephone number per 1,000 person cause attracting of FDI.

## 5 Conclusion

The main purpose of this paper is to investigate the effect of FDI on the urban infrastructure. To avoid spurious regression, first we have performed IPS and ADF-Fisher tests, and after confidence in stationarity, Hausman test shows that we must use a fixed effects model. The principal model estimated in the sixth column.

The results show that the urban infrastructure is an effective role in attracting of FDI. In most estimated models, infrastructure has a significant and strong impact on the FDI. Of course the other variables are included in this model, including GDP, trade openness, domestic investment and human capital. With increasing in these variables, attracting of FDI is more, but the variables such taxes and inflation reduce the level of FDI.

The above results should be considered when state infrastructure such as electricity, roads, phones, ports and ... high, investors are more willing to invest in that country. Hence the authorities are recommended to attract more foreign capital to further develop the infrastructure to attract more FDI and provide context. With improved infrastructure, the cost of domestic production will reduce and this plays an important role in controlling inflation. However, the private sector is helpful in this regard; the efficiency of the private sector is more general.

On the other hand, these countries should also invest in human capital and domestic capital, because these variables have a significant effect on attracting of FDI. But inflation as an economic risk reduces FDI which should be controlled.

Tax as reduce manufacturers income, reduce attracting of FDI. On the other hand, increasing in trade openness and GDP, increases FDI attraction, so the policies that will lead to an increase in these two variables can reduce barriers to attracting of FDI.

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