

Telecommunication Infrastructure and Foreign Direct Investment in Pakistan: An Empirical Study

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Abstract

This paper explores the role of infrastructure availability, particularly with respect to telecommunication in stimulating Foreign Direct Investment (FDI) in Pakistan. Mobile cellular subscription is taken as a proxy variable for infrastructure along with market size, labor force and trade openness as explanatory variables. The study covers the time period from 1990 to 2012 based on the fact that mobile cellular service introduced in 1990s in Pakistan for the first time. Johansen test of Co-integration has been used to check the long run relationship between the variables and then ordinary least square technique has been applied to estimate the coefficients of all the variables. The results of empirical analysis indicate the positive significant effect of infrastructure in attracting FDI to Pakistan.

Index terms— FDI, telecommunication infrastructure, market size, Pakistan.

1 Introduction

The growth of world Foreign Direct Investment in recent years has created opportunities and challenges for economic development and growth, especially for developing nations like Pakistan. Employment creation, capital formation, managerial skills and technology, export promotion and market access are among the main benefits of FDI to the receiving host countries. The inflow of world Foreign Direct Investment increased from US \$200 billion in 1993 to US \$1.3 trillion in 2000. The share of developing countries as recipients of FDI flows increased considerably, reaching from 77.1% in 1988 77.1% in 1990 77.1% in 2000 21.4% in 1998 77.1% in 2000 77.1% in 2000 (UNCTAD, 2000)). Over the last decade, FDI has witnessed a dramatic increase, grew at least twice as fast as trade (Gorg and Greenaway, 2004; Meyer, 2003).

In the mid-1980s, attraction of FDI has been one of the most important goals of many countries in the world. These economies not only liberalized trade policies and investment regime but also provided fiscal incentives to foreign investors through number of tax concessions and tariff reduction. During 1993-2003, 94% of 1718 regulatory changes made by countries all over the world that were favorable to Foreign Direct Investment (UNCTAD, 2006). Government policy changes made it easier for foreign investors to invest into more economic sectors.

In 1990s, Government of Pakistan liberalized its trade policy and opened the sectors of energy, telecommunication, agriculture, banking and insurance to FDI which were not allowed before. Despite this, the level of FDI in Pakistan remained meager as compared to other developing countries due to rapid changes in political environment and inconsistent investment policies. However, FDI steadily increased in the post liberalization era. One factor that has drawn attention lately is infrastructure availability in the host countries. Analysts agree that telecommunication has become an enabling industry for business and commerce in today's world. Maintenance of a stable telecom sector results in increased businesses and trade and thus increasing economic performance of the country. In the mid-1980s, utility of telecommunication sector were recognized in the world and it was considered as prerequisite for economic development. This study is mainly conducted to investigate the impact of telecommunication infrastructure on Foreign Direct Investment in Pakistan. The study is structured as follows:

Section 2 provides the review of literature while analytical model is described in section 3. Section 4 discusses the analytical model's results followed by the concluding remarks in section 5.

2 II.

3 Review of Literature

Vast empirical literature exists on the relationship between Foreign Direct Investment and quality of Infrastructure in developing countries. Most empirical studies in FDI literature have found infrastructure to be a robust and significant determinant of FDI. Several studies have used large sample of countries and have used different proxy variables for infrastructure quality e.g. telephone mainlines, total length of roads, electricity generation etc. to be significant determinant of FDI. For instance Asiedu (2002)

4 Analytical Model

To build an econometric model, it is necessary to explain the relevance of variables that determined FDI entrance in Pakistan. Although there are many factors that affect FDI but four variables were taken under consideration in the present study. The following model is proposed for regression analysis: $FDI = \beta_0 + \beta_1 (INF) + \beta_2 (LF) + \beta_3 (MS) + \beta_4 (OPEN) + \epsilon$.

The data comprises the period of 1990 to 2012 for Pakistan. The linkage between Foreign Direct Investment and Infrastructure is our particular concern. All the variables are treated as natural logarithmic form (ln). The relationship between FDI and its determinants is analyzed using ordinary least square method. The variables and source of data is in the following table: IV.

5 Results and Discussion

Augmented dickey Fuller test developed by Fuller (1979 and 1981). Results of ADF test are shown in Table 3. The results presented in table 3 show that all the series were non stationary at level. When differentiated one, all the series became stationary with 1% and 5% level of significance. Since all the series are integrated of same order, it becomes necessary to determine the possible co-integration relationship between them. For this purpose, we use Johansen (1988) model which was further extended by Johansen and Juselius (1990) to find out the long run relationship between the variables. Initially we need to set the optimal lag length for our model. According to Enders, SC test is thriftest among others and it has specified one lag for our model. The results are presented in table 4. Year 2014 © 2014 Global Journals Inc. (US)

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The first procedure in time series data is to verify stationary of the series. This will be done through 5 show the existence of one cointegrating vector. This confirms the existence of long run relationship between Foreign Direct Investment and Infrastructure. As the long run relationship between the variables was reached, now we can estimate the coefficients of our variables by using ordinary Least Square method. Table 6 shows the results of OLS. Labor force variables are having negative relationship with FDI but the results were not found significant. The coefficient of our last variable is positive and has significant impact on FDI. It is concluded that if trade openness increases by one percent then FDI will also increase by almost 15%. The value of $R^2 = 0.91$ shows that 91% variations in dependent variable is explained by independent variables. Value of F-statistics is 46.06 and the probability is 0.000 which is less than one percent, this indicates the significance of our model. Moreover, DW statistic is 1.96 which shows that there is no autocorrelation exist in our model.

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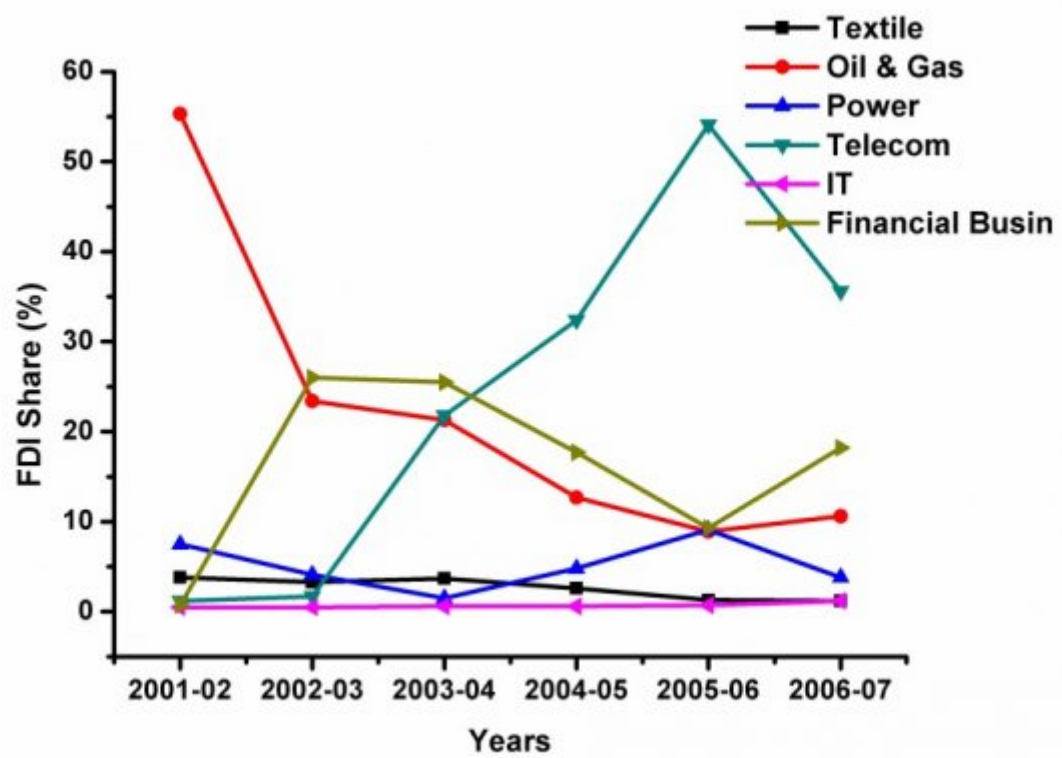
The main interest of the present work was to study how telecommunication infrastructure is playing a role in attracting Foreign Direct Investments in Pakistan. Other variables namely Market size, Trade openness and Labor force were also taken under consideration along with infrastructure. The results indicated that there is long run relationship exist between Foreign Direct investment and infrastructure. One percent increase in infrastructure increases the level of FDI by almost 57%. This confirms the importance of Infrastructure in attracting Foreign Direct Investment in Pakistan. The availability of infrastructure contributes to productivity and economic development and thereby attract higher amount of FDI. The Government of Pakistan should pay key attention to a good infrastructure by maintaining policies consistent with macroeconomic growth.

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Figure 1:



1

Figure 2: Figure 1 :

SC	AIC	HQ	Lag
26.42506	26.17636	26.23033	0
19.63311*	18.14093	18.46477	1
20.32646	17.59080*	18.18451*	2

Figure 3:

1

Telecom sector of Pakistan has attracted sizable investments after deregulation. Telecom infrastructure received more than US \$12 billion during the last seven years. During last few years, Telecommunication sector has emerged as major recipient of Foreign Direct Investment in Pakistan. FDI in telecom sector increased from US \$6.1 million in 2001-2002 to US \$1.8 billion in 2005-2006. During 2006-2010, FDI in telecommunication sector exceeded 35% of total FDI in the country. Table 1 depicts inflows of Foreign Direct Investment in different sectors of Pakistan.

[Note: Source: State bank of Pakistan]

Figure 4: Table 1 :

2

Source	Proxy	Variables
World Development Indicators	FDI (FDI in million US \$)	Dependent Variable: Foreign Direct Investment
World Development Indicators	INF (Mobile Cellular subscriptions)	Explanatory Variables: Infrastructure
State Bank of Pakistan	LF(Employed labor force)	Labor Force
World Development Indicators	MS (GDP in million US \$)	Market Size
World Development Indicators	OPEN (%age of GDP)	Trade Openness

Figure 5: Table 2 :

3

		: ADF unit root	
		test	
ADF with 1st Diff.		ADF at Level	Variables
-3.23**		-1.51	FDI
-3.65**		-0.49	INF
-4.97*		1.89	LF
-3.96*		1.00	MS
-5.45*		-2.37	OPEN
*&** Reject the null hypothesis of non-stationary at 1% & 5% level of significance respectively.			

Figure 6: Table 3

4

Figure 7: Table 4 :

5

Hypothesized no.of CE(s)	Eigenvalue	Max-Eigen statistics	0.05 Critical Value	Prob.**
None*	0.815568	35.50000	33.87687	0.0318
At most 1	0.730506	27.53537	27.58434	0.0507
At most 2	0.483891	13.89018	21.13162	0.3741
At most 3	0.408977	11.04389	14.26460	0.1520
At most 4	0.272455	6.679665	3.841466	0.0598
*denotes rejection of the hypothesis at 5% level of significance				
Results of table				

Figure 8: Table 5 :

6

Variables	Coefficient	Dependent	t-	Prob.
		vari- able: FDI		
		Std. Er- ror	statistics	
constant	22.5550	20.0633	1.1241	0.2757
INF*	0.5759	0.0852	6.7520	0.0000
LF	-	5.3405	-	0.0542
	0.0001		2.0599	
MS	-	0.8914	-	0.6411
	0.4226		0.4741	
OPEN*	0.1468	0.0252	5.8088	0.0000

R-Squared= 0.91

F-statistics= 46.06

Adjusted R-Squared= 0.89

Prob (F-stat) = 0.0000

Durbin-Watson stat= 1.96

*indicates significance at 1%

Results of table 6 present that INF which is the pivotal variable of our study is significant at 1% significance level and carry positive sign. The coefficient of INF represents that one percent increase in infrastructure increases FDI by almost 58%. Market size and

Figure 9: Table 6 :

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