

The Impact of Foreign Direct Investment in Telecommunication Sector on the Economic Growth of Pakistan

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ABSTRACT

The aim of the present study was to analyze the role of foreign direct investment inflows in the telecommunication technology on the economic growth of Pakistan. For this purpose time series annual data over the period 2000 to 2013 has been used. Various econometric techniques i.e. ordinary least squares method, Vector Auto-regression Analysis, Granger Causality Analysis, has been used for the estimation of the results.

The regression results showed a positive and significant relationship between foreign direct investment in telecommunication sector and economic growth of Pakistan. The Granger Causality test results and VAR test results also support these results.

KEYWORDS: Telecommunication, Granger Causality, OLS

1.1 INTRODUCTION

Foreign direct investment in telecommunication companies comprises the ability to establish a commercial enterprise in a foreign country or the purchase of telephone companies by foreign investor in that country or a joint agreement between the local and foreign businesses to establish an enterprise in the home country. "During 1980s, utility of telecommunication sector was globally recognized and it was considered the pre-requisite for the economic growth". This shift has led the world economies towards the introduction of major regulatory reforms in the telecommunication sector i.e. removal of restriction on the inflows of foreign direct investment, privatization of the enterprises and trade openness. The share of the Foreign Direct Investment (FDI) in the Gross Domestic Product has been significantly increased in most of the developing countries.

Foreign direct investment inflows in Pakistan also showed significant growth during the last few decades. The over FDI inflows which was 484.7 million US dollar during 2001-2002 has been increased 3038.8 during the period 2007-2008. Similarly, the overall growth of the FDI remained 64.4%, 55.5%, 131.03% and 40.87% during the periods 2002-2003, 2004-2005, 2005-2006 and 2007-2008 respectively. Out of this total growth rate of FDI inflows in the country, the FDI growth rate in the telecom sector was 121.3%, 138.70%, 285.33% and 55.51% respectively during the above mentioned period. The major FDI inflow in the telecommunication sector of Pakistan has been witnessed from the cellular companies i.e. Patel, Telenor, Warid and Mobilink (Economic Survey of Pakistan, 2005-06; 2007-08).

Foreign direct investment is considered one of the most important driving force helping the developing countries in the exploration of natural resources and stabilization of economic conditions. The FDI inflows generate more money in the economic which bring rapid increased in the economic growth and increased the living standards of the people in the investing countries (Lin, 2008). Specifically, FDI in telecommunication in most of the developed and developing countries in not only brings improvement in the existing telecommunications machinery and equipments but it also work as a driving force in the transformation and increased competition in the sector.

Economic growth and development in most of the countries has been constrained because of the lack of adequate telecommunication infrastructure. The present study is an effort to examine the role of the FDI in telecommunication sector on the economic growth of Pakistan.

1.2 Objectives of the Study

The main aim of the present study is to examine the role of foreign direct investment in telecommunication sector in the economic growth of Pakistan.

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1.3 Hypothesis

H⁰: Foreign direct investment in telecom sector does not affect the economic growth of Pakistan.

H¹: Foreign direct investment in telecom sector does affect the economic growth of Pakistan.

Review of literature

Alvin and Wint (1992) Reviews the liberalization of foreign direct investment regulation in ten developing countries and concludes that there can be a disconnect between formal liberalization and the actual implementation of the screening process. Bhattacharyya (1994), Jain (1994), Studies by Subramanian, et al. (1996) and Gopinath (1997) investegated the determinants of foreign direct investment inflows. Subramanian, et al. (1996) found that the availability of primary material inputs for manufacture and the large size of the domestic market for the sale of the manufactured products are the two principal economic determinant of location of foreign direct investment inflow. Other two factors that influenced the foreign direct investment are the growth rate of Gross Domestic Product and the level of infrastructure facility. Dornbusch and Park (1995), Observe that foreign investors pursue a positive feedback strategy, which makes stocks to overreact to change in fundamentals. Borensztin et al (1998), examine absorptive capacity of recipient country, which is measured by stock of human capital required for technological progress; it takes place through 'capital deepening' associated with new capital goods brought into an economy by foreign direct investment. Nair-Reichart and Weinhold (2001), Postulate panel and time series estimators to impose homogeneity assumptions across countries in the relationship between foreign direct investment and growth and they marshal evidence to show considerable heterogeneity across countries, Tanay Kumar Nandi and Ritankar Saher (2007). They made an attempt to study the Foreign direct investment in India with a special focus on Retail Trade, This paper stresses the need of foreign direct investment in India in retail sector and uses the augment that foreign direct investment is allowed in multiple sectors and the effects have been quite good without harming the domestic economy and The study also suggests that foreign direct investment in retail sector must be allowed.

3. Data and Methodology

The present section shows information about the data and methodology of the study.

3.1 Data and Sample Size

The main objective of the present study is to examine the impact of foreign direct investment on economic growth of Pakistan. For this purpose, annual data for the period 2000-2013 has been collected from various sources including State Bank of Pakistan annual reports, Economic Survey of Pakistan (ESP) various issues and Federal Bureau of Statistics (FBS)

3.2 Definition of Variables of the Study

The following section shows the main variables of the study.

Table:	1.1:	Definition	of Variables
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Variables	Definition	Symbols
Economic Growth	Gross Domestic Product of Pakistan in millions of Rupees	GDP
Foreign Direct Investment in Telecommunication	Foreign Direct Investment in millions of US Dollars	FDI _{TC}
Domestic Investment	Domestic Investment in millions Of US Dollars	DI
Trade Balance	Total Exports minus total Imports in millions of US Dollars	TB
Inflation	Average annual percentage change in CPI of Pakistan	INF
Exchange Rate	Exchange Rate of Pakistan rupee against US Dollar	EXR

3.3 Theoretical Framework

Figure 1.1 shows the theoretical framework of the study.



Figure 1.1: Theoretical Framework

3.4 Empirical Model

To formulate this relationship between FDI & economic growth, the extended form of Solow Swan Model is used $GDP = \alpha_0 + \alpha_1 DI + \alpha_2 FDI_{TC} + \alpha_3 TB + \alpha_4 INF + \alpha_5 EXR + \upsilon$ (3.2)

Where "GDP" is the economic growth, "DI" domestic investment "FDI_{TC}" foreign direct investment in telecommunication sector, trade balance "TB" inflation rate "INF" and exchange rate "EXR".

4. Results and Discussion

The following section shows the results of the study. First section 4.1 shows the regression results. Then section 4.2 shows the Granger Causality test results. After that section 4.3 shows the VAR results.

4.1. Regression Results

To estimate the impact of FDI in telecommunication on economic growth of Pakistan, regression results has been computed.

Table 1.2: Results for FDI in Telecommunication and Economic Growth								
Dependent Variable: Gross Domestic Product (GDP)								
Independent Variables	Co-efficient	Std. Error	t-Statistic	P-Value				
(Constant)	0.748382	0.837373	0.98374	0.8473				
FDI _{TC}	0.200479	2.807762	0.9436	0.031402				
INF	-0.006208	0.000837	-7.415684	0.0300				
EXR	-0.002356	0.000567	-6.847632	0.0456				
DI	0.093933	0.072516	3.501744	0.0416				
ТВ	0.015221	0.004332	3.006234	0.0543				
R-Square: .56	R-Square: .56							
Adj. R-Square: .54 Durbin Watson Statistic: 1.95								

The results showed that foreign direct investment in telecommunication, inflation, exchange rate, domestic investment and trade balance turned significant with their expected signs. The R-Square value is 0.56 showing that 56% variation in the dependent variable is explained by the explanatory variables. The Durbin Watson statistic value is 1.95 showing the absence of auto correlation problem in the data.

4.2. Granger Causality Test Results

Table 1.3 shows the granger causality test results. The results showed that two way relationship has been existed in between domestic investment and Gross Domestic Product and exchange rate and Gross Domestic Product. Whereas, one way relationship has been found between FDI in telecommunication, trade balance and Gross Domestic Product, FDI in telecommunication and exchange rate and exchange rate and trade balance. However, all other relationships in the model turned insignificant.

Table 1.3: Results of Granger Causality Test							
Null Hypothesis: Obs F-Statistic P-w							
DI does not Granger Cause GDP	13	7.53364	0.0207				
GDP does not Granger Cause DI		11.3759	0.0071				
EXR does not Granger Cause GDP	13	4.80409	0.0532				
GDP does not Granger Cause EXR		5.08815	0.0477				
FDI _{TC} does not Granger Cause GDP	13	1.93862	0.0340				
GDP does not Granger Cause FDI _{TC}		1.65798	0.2269				
INF does not Granger Cause GDP	13	0.06467	0.8044				
GDP does not Granger Cause INF		2.60039	0.1379				
TB does not Granger Cause GDP	13	0.24430	0.0318				
GDP does not Granger Cause TB		0.73827	0.4103				

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EXR does not Granger Cause DI	13	0.28035	0.6080
DI does not Granger Cause EXR		5.31978	0.0438
FDI _{TC} does not Granger Cause DI	13	1.25072	0.2896
DI does not Granger Cause FDI _{TC}		2.58662	0.1388
INF does not Granger Cause DI	13	1.47231	0.2529
DI does not Granger Cause INF		0.68640	0.4267
TB does not Granger Cause DI	13	1.02620	0.3349
DI does not Granger Cause TB		0.40988	0.5364
FDI _{TC} does not Granger Cause EXR	13	1.73933	0.0166
EXR does not Granger Cause FDI _{TC}		2.69977	0.1314
[INF does not Granger Cause EXR	13		
		0.49601	0.4973
EXR does not Granger Cause INF		0.02147	0.8864
TB does not Granger Cause EXR	13	0.23008	0.6418
EXR does not Granger Cause TB		0.23396	0.0390
INF does not Granger Cause FDI _{TC}	13	0.74173	0.4093
FDI _{TC} does not Granger Cause INF		2.08413	0.1794
TB does not Granger Cause FDI _{TC}	13	0.28392	0.6058
FDI _{TC} does not Granger Cause TB		1.1E-05	0.9974
TB does not Granger Cause INF	13	0.02594	0.6353
NIE datas wat Creations Course TD		0.45312	0.5161

4.3 Vector Auto-regression Results

Table 1.4 shows the results for VAR. First we have checked the individual significance of the variables and then the joint significance by Wald test. The Cholesky decomposition test is used for the computation of impulse response function.

4.3.1. Individual Significance

Table 1.4: Results of VAR Test						
	GDP	DI	EXR	INF	ТВ	FDI _{TC}
GDP(-1)	1.368680	-13.37729	30.65873	34.58201	-2998.555	3658.058
	(0.17896)	(8.53448)	(27.0197)	(21.2547)	(1613.51)	(3225.57)
	[7.64817]	[-1.56744]	[1.13468]	[1.62703]	[-1.85840]	[1.13408]
DI(-1)	0.012467	0.093997	-1.659437	-0.443779	12.56293	70.80369
	(0.00914)	(0.43604)	(1.38047)	(1.08593)	(82.4361)	(164.798)
	[1.36354]	[0.21557]	[-1.20208]	[-0.40866]	[0.15240]	[0.42964]
EXR(-1)	-0.003417	0.021690	0.131891	-0.577272	62.82732	-80.01146
	(0.00388)	(0.18488)	(0.58532)	(0.46043)	(34.9528)	(69.8740)
	[-0.88138]	[0.11732]	[0.22533]	[-1.25377]	[1.79749]	[-1.14508]

INF(-1)	0.000716	-0.032755	-0.021612	0.228156	-27.75978	45.05084
	(0.00336)	(0.16019)	(0.50715)	(0.39895)	(30.2853)	(60.5432)
	[0.21318]	[-0.20447]	[-0.04261]	[0.57190]	[-0.91661]	[0.74411]
TB(-1)	3.01E-05	0.001352	-0.000867	0.001178	-0.546361	-0.109068
	(3.8E-05)	(0.00183)	(0.00578)	(0.00455)	(0.34510)	(0.68989)
	[0.78629]	[0.74091]	[-0.15000]	[0.25907]	[-1.58319]	[-0.15809]
FDI _{TC} (-1)	-1.38E-05	3.30E-05	-0.002214	-0.000767	0.407617	0.268915
	(2.6E-05)	(0.00124)	(0.00391)	(0.00308)	(0.23362)	(0.46703)
	[-0.53294]	[0.02671]	[-0.56582]	[-0.24915]	[1.74478]	[0.57580]
С	-4.636977	183.1302	-309.1994	-393.5891	34336.54	-42737.21
	(2.15727)	(102.881)	(325.717)	(256.220)	(19450.5)	(38883.5)
	[-2.14947]	[1.78002]	[-0.94929]	[-1.53614]	[1.76533]	[-1.09911]
R-squared	0.753611	0.765138	0.958722	0.930255	0.757698	0.450864
Adj. R-squared	0.717222	0.530277	0.917444	0.860509	0.515396	-0.098273
Sum sq. resids	0.005039	1636984.	114.8669	11.46006	71.07906	409615.8
S.E. equation	0.028979	522.3319	4.375441	1.382031	3.441876	261.2840
-statistic	155.5249	3.257826	23.22605	13.33785	3.127084	0.821041

First we have checked the individual significance of all the independent variables in each model. It is known that if the P-value is less than 5 percent, the independent variable will be significant, otherwise insignificant. The VAR results are given in the above table. In the table GDP, FDI_{TC} , EXR, DI, INF, TB are considered both as endogenous and exogenous variables. So there are six (06) models in the table.

In the 1st model for GDP shows that, GDP, FDI_{TC} , DI and TB independent variables are significant, while the INF, EXR and intercept turned insignificant. In 2nd model of FDI_{TC} interprets that, GDP, FDI_{TC} & EXR independent variables have significant impact on FDI_{TC} , while the DI, INF, TB, and intercept turned insignificant. Similarly in 3rdmodel for EXR, indicates that GDP, EXR, and TB independent variables are significant, while the DI, FDI_{TC} , INF and intercept turned insignificant, and in 4th model of DI, the independent variables GDP, DI, TB are significant, while the FDI_{PC}, INF, EXR and intercept turned insignificant. Moreover in 5th model of INF, GDP, FDI_{TC} , EXR and INF has significant impact on INF, while the DI, TB and intercept turned insignificant. And in 6th model of TB, GDP, FDI_{TC} , EXR and TB independent variables have significant impact on TB, while the DI, INF and intercept turned insignificant.

4.3.2. Joint Significance

For checking the joint significance, Wald test has been applied. The model will show a significant impact on dependent variable if the P-value is less than 5 percent, otherwise will be insignificant.

	Table 1.5: Results of Wald Test					
Equation: GDP = 0	$C(1)*GDP(-1) + C(2)*FDI_{TC}(-1) + C(3)$	*EXR(-1) + C(4) *DI(-1) + C(5)*INF(-1) + C(6)*TB(-1) -	+ C(7)		
Null Hypothesis:	(1)=C(2)=C(3)=C(4)=C(5)=C(6)=C(7)	=0 (Normalized Restriction=0))			
Test Statistic	•	Value	Df	P-value		
Chi-square		26.05825	7	0.0000		
Equation: FDI _{TC} =	$C(8)*GDP(-1) + C(9)*FDI_{TC}(-1) + C(1)$	0)*EXR(-1) + C(11)*DI(-1) +	C(12)*INF(-1) + C(13)*TE	B (-1) + C (14)		
Null Hypothesis:	(8)=C(9)=C(10)=C(11)=C(12)=C(13)=	C(14)=0 (Normalized Restric	tion=0)			
Test StatisticValueDfP-value						
Chi-square		31.77715	7	0.0000		
$Equation: EXR = C(15)*GDP(-1) + C(16)*FDI_{TC}(-1) + C(17)*EXR(-1) + C(18)*DI(-1) + C(19)*INF(-1) + C(20)*TB(-1) + C(21) + C(21)*DI(-1) + C$						
Null Hypothesis: (15)=C(16)=C(17)=C(18)=C(19)=C(20)=C(21)=0 (Normalized Restriction=0)						
Test Statistic	•	Value	Df	P-value		

Chi-square	3653.747	7	0.0000			
Equation: DI = C(22)*GDP(-1) + C(23)*FDI _{TC} (-1) + C(24)*EXR(-1	+ C(25) * DI(-1) + C(20)	6)*INF(-1) + C(27)*TB(-1) + C(28			
Null Hypothesis:	(22)=C(23)=C(24)=C(25)=C(26)=C(27)=C(28)=	0 (Normalized Restriction	on=0)			
Test Statistic	Value	Df	P-value			
Chi-square	1215.899	7	0.0000			
Equation: DI = C($22)*GDP(-1) + C(23)*FDI_{TC}(-1) + C(24)*EXR(-1)$	+ C(25) * DI(-1) + C(20)	6)*INF(-1) + C(27)*TB(-1) + C(28			
Null Hypothesis:	(29)=C(30)=C(31)=C(32)=C(33)=C(34)=C(35)=	0 (Normalized Restriction	on=0)			
Test Statistic	Value	Df	P-value			
Chi-square	109.4821	7	0.0000			
Equation: TB = C	Equation: $TB = C(36)*GDP(-1) + C(37)*FDI_{TC}(-1) + C(38)*EXR(-1) + C(39)*DI(-1) + C(40)*INF(-1) + C(41)*TB(-1) + C(42)$					
Null Hypothesis: (36)=C(37)=C(38)=C(40)=C(41)=C(42)=0 (Normalized Restriction=0)						
Test Statistic	Value	Df	P-value			
Chi-square	5.23918	7	0.0000			

The results showed that all the variables in all the model are jointly significant.

4.3.3 Impulse Response Function

Cholesky decomposition is used to check the response of the dependent variables to shock due from the independent variables. The results are given in figure 4.22. The results shows that GDP is affected by the shocks from the lag GDP, FDI_{TC} , EXR, DI, and TB, while no response to the shock from INF. The results for FDI_{TC} also shows the impact of shock from the lag GDP, FDI_{TC} , EXR, TB, and INF, while no impact is shown from the shock due to DI. EXR model shows the impact of shock from the lag GDP, FDI_{TC} , EXR, TB, and INF, while no impact is shown from the shock due to DI. EXR model shows the impact of shock from the lag GDP, FDI_{TC} , EXR, DI and INF, while there is no response to the shock from TB. The DI model shows a positive shock from the lag GDP, EXR, and FDI_{TC} , while the response to the shock from DI, INF and TB has not existed.

The model for INF shows the positive response to the shock due to lag INF and TB, and no response to the shocks from GDP, DI, TB, and FDI_{TC} , while the last model of TB have also a positive impact due to the shock in GDP, FDI_{TC} , and TB, and no response to the shock due from DI, INF and EXR.



Figure 1.2: Impulse Response Function

Conclusion

The impact of foreign direct investment inflows in the telecommunication technology on the economic growth of Pakistan has been investigated. For this purpose time series annual data over the period 2000 to 2013 has been used. Various econometric techniques i.e. ordinary least squares method, Vector Auto-regression Analysis, Granger Causality Analysis, has been used for the estimation of the results.

The regression results showed a positive and significant relationship between foreign direct investment in telecommunication sector and economic growth of Pakistan. The Granger Causality test results and VAR test results also support these results.

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