Impact of FDI, Workers' Remittances and Export on GDP

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Abstract
This study examines the effects of FDI (foreign direct investment) on export performance for a single country Pakistan, using 30 years data from a period 1981 to 2010. The ordinary least square estimation results indicate significant positive effect of terms of trade on economic growth. Furthermore, volatility of terms of trade has significant positive effect on economic growth. To test the robustness of initial results, sensitivity analysis has been performed using different additional variables, sample size and various proxies of volatility variable. The initial results were found robust despite the inclusion of various variables in the basic model and use of various proxies for volatility of terms of trade.

Keywords: *FDI, GDP, Workers' Remittances, and Export Performance*

1. Introduction

Trade surplus is considered to be a good economic indicator as it notifies health of other factors of economic growth. Beside other important factors, for a better economic growth, government policies are focused on Foreign Direct Investment (hereafter; FDI) for a number of reasons, like it stimulates: (1) domestic investment, (2) transfer of technology, (3) development of business skills (trade, marketing, finance, distribution channels, production, etc.), and (4) reduction in unemployment, etc. FDI is expected to be either 'export-oriented' or 'import-reducing'. Not only 3rd world nations look at FDI with many hopes but economist in developing and even developed countries give due attention to FDI. Many studies have been focusing on impact of FDI on export performance, few of which are time series whereas, some are cross sectional studies. Zhang and Song (2000) confirmed positive effect of FDI on export performance.

FDI inflows impact on 'export performance' was recorded significantly positive by Prasanna (2010), similarly Tabassum, Nazeer and Siddiqui (2012) also found a positive relation between FDI and real export in the long run but absence of existence of causality between both. Samsu, Derus, Qoi & Ghazali (2008) are among the scholars who established a long term relation between FDI and export. Martínez-Martín (2010) conclude a positive causality relationship runs from FDI to export of goods (stronger) and to services (weaker) in the long run but in short run export of goods affected (positively) by FDI. Contrary to this Yousaf, Hussain& Ahmed (2008) explored negative relation with real export in short run and a positive one in the long

run. Outcome from the study conducted by Ahmed, Alam and Butt (2003) supported the exported-led hypothesis but also the existence of FDI–Growth nexus thereby meaning that FDI–led export growth linkage is not found. Ahmedi and GhanbarZadeh (2011) tested mutual relation in GDP, exports and FDI and found a bilateral causality relation among all. Graham (2004) determined export processing zone (EPZ) to be FDI attracting. Analysis of last thirty (30) years data of Pakistan shows no significant relation between FDI and export performance (Figure 1.1). Same relation is observed in case of China (Figure 1.2) and in case of India (Figure 1.3).

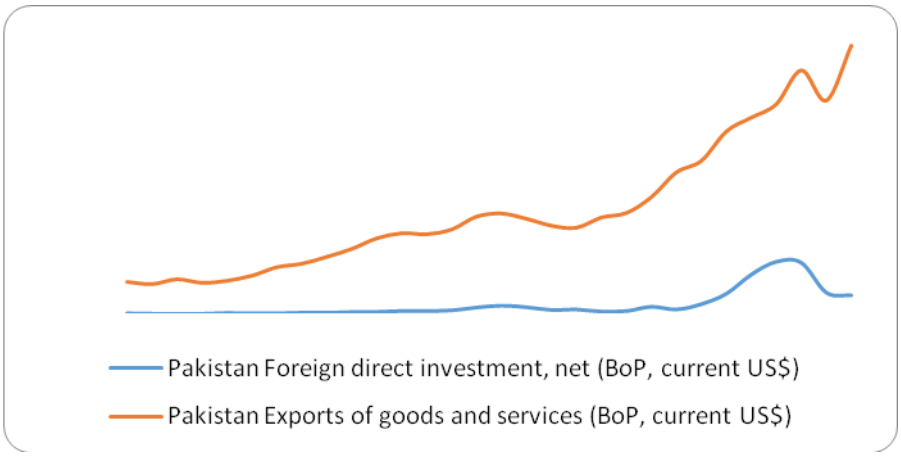


Figure 1.1: FDI and Export Performance - Pakistan

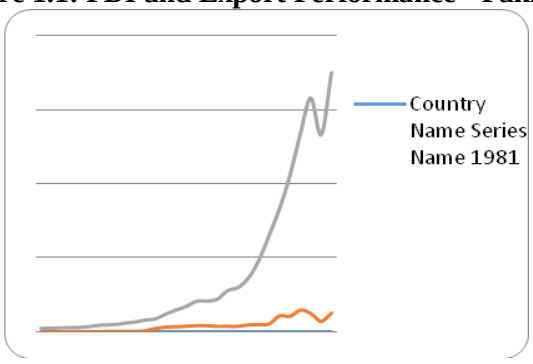


Figure 1.2: China

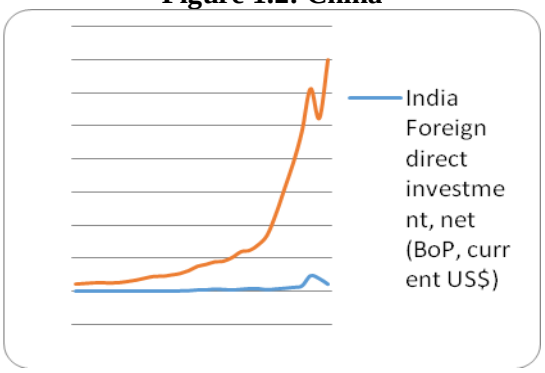


Figure 1.3: India

When data of all three countries was gathered, it showed an scattered trend (Figure 1.4).

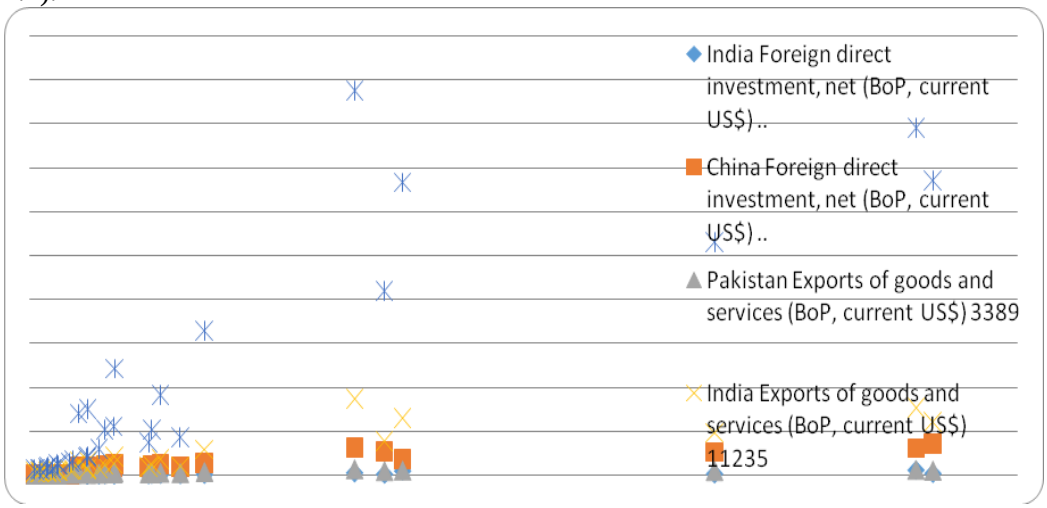


Figure 1.4: FDI and Export Performance – Pakistan-China-India

From above scatter diagram analysis and the review of previous studies, no concrete conclusions are reached, about the effects of FDI on export performance. However, the relation needs to be re-examined and in addition to this, relationship between FDI and growth needs to be analyzed. Thus, this study intends to re-examine the effects of FDI on export performance and FDI–growth relationship, using a new set of data on developed and developing countries, and applying more rigorous econometric techniques to ascertain our results. The rest of the paper is organized as:(1) literature on FDI, export performance and economic growth, (2) theoretical background, (3)empirical strategy and modelling framework, (4) estimation and results, followed by (5) concluding remarks and implications(provide some policy implications and set directions for further research).

2. Literature on GDP Growth, FDI, Workers' Remittances and Export Performance

Kakar and Khilji (2011) worked on role of trade openness and FDI in relation to economic growth for Pakistan and Malaysia by using annual time series data from 1980 to 2012, variable GDP growth rate, real exchange rate, trade openness and FDI inflow have been analyzed. Johansen co-integration test and Granger causality test are applied. Results indicate that in the long run, trade openness positively affects the economic growth in both the countries. Trade openness stimulates economic growth in Pakistan with no significant causal impact from other variables on GDP growth. Recommend to use trade openness as key determent of economic growth.

Atique, Ahmed and Azhar (2004), analyze the effects of trade policy regime on the contribution of FDI-growth relationship by using secondary data from 1970 to 2011 Cobb-Douglas production fume framework has been applied. Results exhibit that Growth impact of FDI tends to be growth under export promotion (EP) trade regime compared to on import. Substitution regime and supported Bhagwatti hypothesis. FDI stimulates HRD through investment in education & training. Waheed and Jawaid (2010), explored the impact of inward FDI on aggregate imports in Pakistan by using secondary Data from 1981 to 2007. Variables inward FDI and aggregate imports have been considered. Annual

time series data causality analysis and co-integration techniques have been used. Results suggest existence of a unique significant positive long-run relationship between inward FDI and aggregate imports in Pakistan whereas, causality analysis resulted into a un-directional causality running from inward FDI to aggregate imports. Recommendation to economic policy makes is that to limit the negative impacts of inward FDI, as a policy, only those FDIs be attracted which entails a smaller import component in the production.

Kim (2004) conducted a comparative study to establish a relation between FDI and trade by using comparative analysis of one decade (90, to 2000), variables considered are FDI and trade. Results show a positive relate between FDI and trade. Jawaid, and Waheed (2011) examined the effects of terms of trade and its volatility on economic growth by using data of 4 countries from 2004 to 2008 (developed and developing counties). Variables term of trade, volatility and economic growth have been considered. Least square estimation and sensitivity analysis are carried out. Results testified signification positive effect of term of trade on economic growth and volatility of terms of trade has significant positive effects on economic growth.

WU, Nemoto and Kinoshita (2004) worked on determining effects of international trade, FDI and environmental regulation on sustainable development. Variable taken into considerate were trade, FDI, environmental policy and sustainable development. Simulation scenario for macro-econometric model framework has been worked upon. Results prove that FDI and depreciation of local currency has positive effect on economy but negative effect on carbon emission control. Khan (1997) attempted to find the reasons why Pakistan could not attract sufficiently large FDI despite liberalization measures. Data from last decade was analyzed. Variables likes political instability, unsatisfactory law & order situation, inconsistent economic policies and bureaucratic processes have been taken care off. Results show that there are multiple factors involved in worsening up.

Turkcan, Duman and Yetkiner (2008) tested endogenous relationship between FDI and economic Growth using a panel dataset of 23 OECD countries for the period 1975-2004. Variable used were FDI and economic growth. Generalized methods of moments (GMM) was used for OECD case. Both FDI and growth were found to be determinants for each other and export growth rate is statistically significant of FDI andeconomic growth. Ellahi and Ahmad (2011) worked to determine joint effect of foreign aid and FDI on overtime economic growth. Time serves data over the period 1975-2010 has been analyzed. Variable like labor force & investments alongwithtarget indicators were considered in empirical relationship assessment. ARDL estimation is used for analysis. Result proved that magnitude of foreign aid impact was considerably low against FDI.

2.1 Theoretical Background

Several related studies consider FDI as a key element in the internationalization strategy of MNCs. However, the relationship between exports and investment flows remains unclear.On the exports side, the relationship is quite ambiguous: firstly, investments abroad may represent a mean of directly accessing markets previously supplied by exports, and this may have a negative impact on the latter. However, it is equally possible that MNCs invest in those markets that offer them cost or location advantages, in an attempt to use them as export-platforms to third countries. In this case, exports and foreign investment undoubtedly present a positive relation.

From a traditional perspective, the relationship between exports and FDI has been questioned. Foreign investment and trade in goods and services are considered perfect substitutes, while FDI is considered in terms of capital mobility. In this sense, factor mobility, induced by differences in factor prices between regions, would eliminate price differentials in both goods and factor markets, thus removing the basis for trade. In turn, these trade impediments would enhance factor movements and so, conversely, exports and FDI would represent alternative ways of becoming involved in foreign markets. However, this result is clearly, highly dependent on the specific assumptions that are made. Thus, according to the literature, foreign investment represents the international activity of multinational firms. Such investment, in addition to the location advantages stressed in the traditional approach, tends to be relevant in industries characterized by scale economies and/or imperfect competition. From this perspective, international investment flows might also be seen as a way of expanding a domestic firm's control over other markets, improving access and enhancing their sales facilities. Consequently, outward FDI may eventually result in a higher level of exports from the home to the host country.In recent years more and more companies have started to trade on international markets. In so doing, they can choose between two main strategies for serving foreign markets and participating in the global economy. The most traditional mode is to ship (export) their production to foreign markets; the other strategy is to engage in horizontal FDI and to duplicate an existing production facility in a foreign country and, thus, serve foreign demand locally. Earlier research has found some evidence for a substitution relationship, although equally evidence has been presented in support of a complementary relationship between exports and foreign production.

3. Modeling Framework

The models, found in literature, for estimation of growth of GDP include number of variables but here effect of FDI, workers remittances and export performance have been considered. Relationship is defined as follows.

$$\mathbf{GDP = \alpha + \beta 1\ (FDI) + \beta 2\ (WR) + \beta 3\ (Exports) + e}$$

Where GDP represents growth of Gross Domestic Product, Foreign Direct Investment is represented by FDI, Worker Remittances by WR and Exports represents total export of goods & services. The eis the error term. In the above equation the coefficient of FDI is likely to be positive in normal circumstances however de-investment can also be seen in exceptional circumstances like: (1) change of government policies to worst, (2) terrorism, (3) end of tax holiday in a region, (4) bankruptcy of a firm, etc. WRs and Exports are also likely to be positive. The model is estimated by using 30 years' data of Pakistan for the period 1981 – 2010. The data for this analysis is obtained from World Bank.

4. Estimation and Results

To the extent of preliminary stationary analyses, the integration properties of the data are checked by using unit root tests. Because of the likely structural breaks in the series, unit roots were performed using the Augmented Dickey Fuller (ADF) statistic. In the model there is a chance of trend (non-stationary) which may be arising from Unit root tests for stationary were performed on both levels and second differences for all variablesare used in the model. As apparent from the Table 4.1, the test results confirm the acceptance of the null hypothesis of unit root (whether or not trend is included in the regression), at level for each variable on the basis of the ADF test. First differencing of all the variables again yields acceptance of null hypothesis

thus Second differencing of all variables yields rejection of the null hypothesis on unit root (whether or not trend is included in the regression) for each variable.

Table 1: Stationary Test Results

Variables	ADF Test Statistics		
	***I* (0)**	***I* (1)**	***I* (2)**
GDP	3.663	-1.958	-8.713
FDI	-2.217	-4.287	-5.174
WR	3.125	-2.907	-7.103
Exports	2.644.	-2.163	-6.252

Based on these test results, it is, therefore, concluded that all series are second difference stationary [i.e. *I (2)*].After doing stationary test we run the OLS by using the variables of FDI, WRs and Exports at the second level, shown in the table 4.2.

Table 2: Long Run Determinants of GDP (At Second Level)

Variable	Coefficient	t-Statistic	Prob
C	169.1778	0.173511	0.8637
FDI	1.595806	1.045666	0.3061
WR	-3.491552	-2.212358	0.0367
EXPORTS	1.615156	2.636702	0.0145
R-squared	0.591163		
Adjusted R-squared	0.540058	**Durbin-Watson stat**	2.857350
F-statistic	11.56769		
Prob(F-statistic)	0.000069		

To determine the relationship of considered variables, regression technique is applied. Results of the test are shown in Table 4.2. It is clear that there is a significant impact of FDI and WRs on GDP. The result of Adj. R^2 indicates that the model is capturing 54 % variation and the value of D.W stat is 2.8574,so there was a chance of autocorrelation and we can check this through Breusch-Godfrey Serial Correlation LM Test and after this test we can remove the problem of autocorrelation through GLS Cochrane-Orcutt 1949 model. After applying this model we again did the Breusch-Godfrey Serial Correlation LM Test and accepted our null hypothesis that is there is no autocorrelation present in our model.The combination of one or more of these series may exhibit a long run relationship. We confirm this through co-integration test. While the Engle-Granger single equation based co-integration test have been used frequently in the literature, it has its shortcomings. The most important is that when there are more than two variables in the model, there can be more than one co-integrating vector. The approach developed by Johansen (1988, 1991) and extended by Johansen and Juselius (1990) is considered superior to the Engle-Granger method. This approach provides a multivariate framework and allows for more than one co-integrating vectors. Johansen and Juselius (1990) have derived two tests for co-integration, namely, the Trace test and the Maximum Eigen value test. The computed Trace and Maximum Eigen value test statistics vis-à-vis their corresponding critical values are presented in Table 4.3.

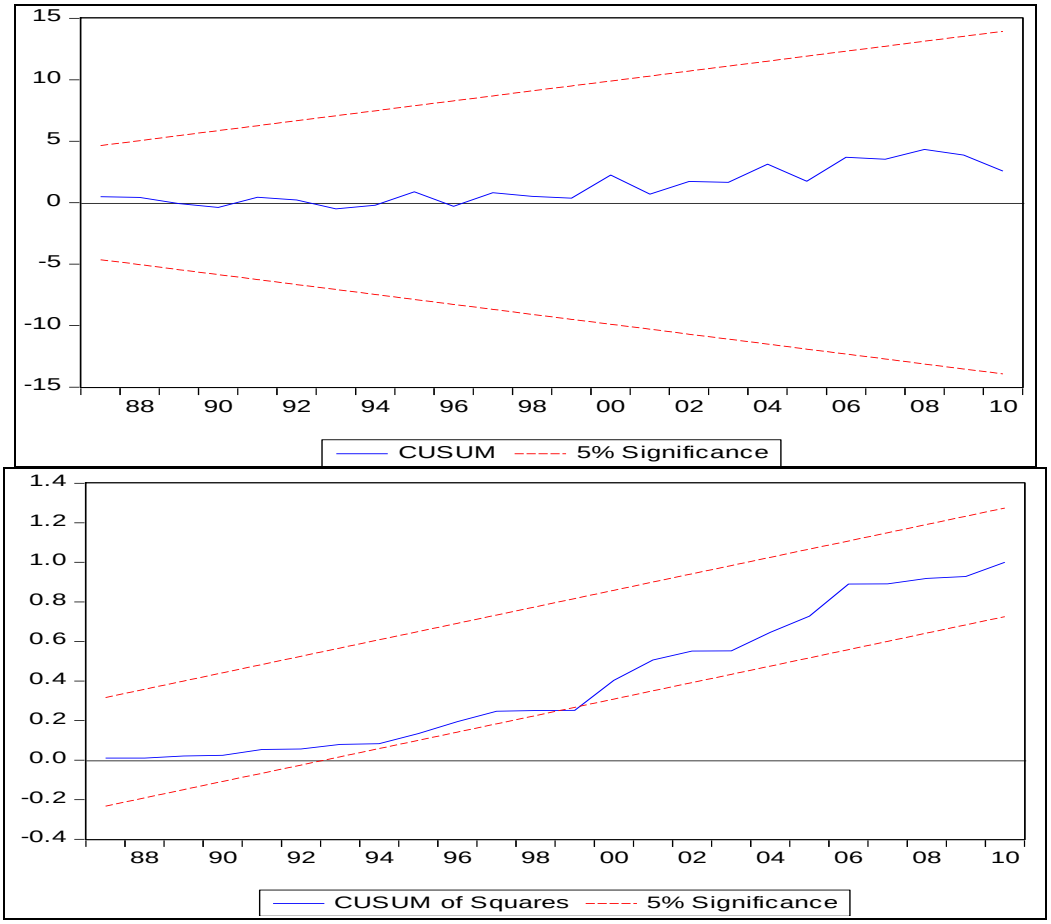
Starting with the null hypothesis of no co-integration among the variables, trace statistics is above the 5 percent critical value. Hence it rejects the null hypothesis of no co-integration, in favor of general alternatives one, co-integrating vector. Turning to the Maximum Eigen value test, the null hypothesis of no co-integration is rejected at 5 percent level of significance in favor of specific alternative, that there is one co-integrating vector.

Table 3: Co-integration Test Results

Hypothesized	Trace Statistic	0.05 Critical Value	Max-Eigen Statistic	0.05 Critical Value
None *	89.41485	47.85613	40.37223	27.58434
At most 1 *	49.04262	29.79707	28.86764	21.13162
At most 2 *	20.17498	15.49471	19.43553	14.26460
At most 3	0.739452	3.841466	0.739452	3.841466

We can check consistency of data through CUSUM and CUSUM of Squares test as shown in the graph 4.4.

Graph 4: CUSUM and CUSUM of Squares Test



In CUSUM test the results within 2 standard deviations but CUSUM of Squares test shows fluctuation in 1993 till 2000 and outsides the 2 standard deviation, so we can confirm this through chow breakpoint test as shown in the table 4.5.

Table 5: Chow Breakpoint

Chow breakpoint		Dummy Variable	
Prob.F(4,20)	0.6103	Prob	0.4398
F-statistics	0.685608	Coefficient	1679.750
Variable		Centered VIF	

FDI	2.031298
WR	1.087246
Exports	2.106891

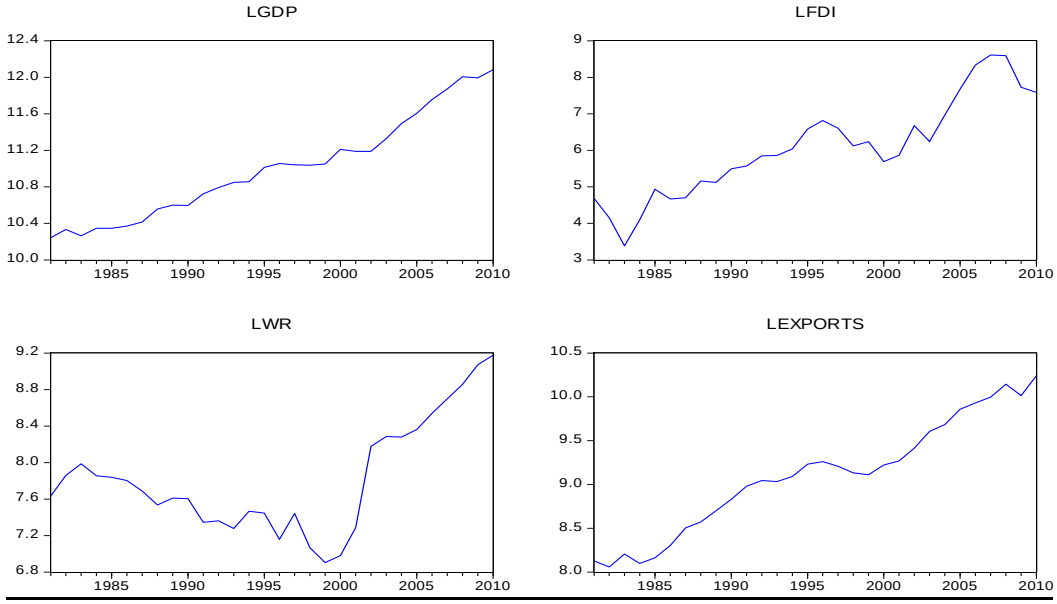
In table 5 we can check the consistency of beta through Chow breakpoint test by taking the year 1993 and the prob value that is more than 0.1 which means that there is no change in coefficient before and after 1993 and we can accept our hypothesis. After inserting effect of change of government in 1993 as a dummy variable the coefficient shows the positive relationship with the GDP and in table 4.5 prob value is insignificant. In regression this is imp that there is a minimum correlation between the variables. By running variance inflation factor we find that in our model the problem of multi-co-linearity does not exist because, in the table 4.5 centered VIF column all values have less than 10.First we take log of all variable then run regression results shows following values which can be estimated in terms of percentage are shown in the table 4.6.

The table 6 shows that there is a significant impact of log of WR and Exports on log of GDP whereas log of FDI has insignificant impact on log of GDP. Log of FDI,WR and Exports shows the positive relationship and log of GDP, R^2 value predicts the 97% variation in the model.

Table 6: OLS Test of Log Variables

Variables	Coefficient	t-Statistic	Prob
C	3.381787	5.712558	0.0000
LFDI	0.036675	0.838835	0.4092
LWR	0.113219	3.092700	0.0047
LExports	0.716159	7.862565	0.0000
Prob.F(4,20)	0.6103	R^2	0.970767

The graphical representation of L (GDP), L (FDI), L (WR), and L (Exports) is shown below



With the help of descriptive statistics we can easily identify the mean, median, maximum and minimum of data as shown in the table 7.

Table 7: Descriptive Statistics

	GDP	FDI	WR	EXPORTS
Mean	70845.96	1013.096	3039.875	10936.49
Median	61414.02	386.0300	2123.820	9150.000
Maximum	176869.6	5492.000	9667.000	28062.00
Minimum	28100.61	29.46000	996.0000	3154.730

In the table 4.7 GDP has highest mean and median which shows the center of data location. As well as, GDP also has highest maximum and minimum value, so with the help of this, we can easily identify the highest value and the lowest value in our data for the GDP, Exports, WRs and FDI variables, respectively.

5. Conclusion and Implications

In contemporary literature, the impact of FDI on export performance has extensively been argued. The channelization of FDI to enhance export performance is the main objective of FDI or atleast import reduction should be attained. Investments by MNCs is often focused on import reduction and rarely guided by export enhancing. Developed as well as developing economies, grade FDI as an important instrument of growth and GDP increase. Looking FDI as an agitator of economic activity is not an option for developing nations but adoption of a policy of channelizing FDI to desired sectors of economy is mandatory. This study endeavored to empirically test the effect of FDI on export performance using data of Pakistan.

There is need for more time series studies on the subject using long time series data. This will clear the relationship further and may also help policy makers to formulate a more objective and dynamic approach to such inflows for maximization of benefits of FDI to the economic growth. More variables may be analyzed to fill in missing links in results of present study.

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