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An Econometric Analysis of Foreign Direct Investment and Economic Growth of Pakistan

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Abstract
The aim of this paper is to empirically analyze the economic growth of Pakistan during time period 1960-2012. The data is taken from various sources WDI (World Development Indicators), IFS (International Financial Statistics) and Handbook of statistics on Pakistan economy-2005. The gross domestic product (GDP) is taken as dependent variable while foreign direct investment (FDI), Import (IM), Export (EX), Inflation (INF), Exchange rate (EXCR) and gross fixed capital formation (GFCF) are used as independent variables. The methodology to test relationship among these variables is co integration technique after unit root analysis. The unit root analysis show that all variables except inflation are non-stationary at level but becomes stationary at first difference. The results of co integration analysis show that all seven variables have a long run relationship. After this, least square regression was applied on first difference and found that however regression is overall significant but there is problem of multicollinearity. Therefore we don't rely on this regression for their significance and also their co efficient sign.
Keywords: GDP, FDI, EXPORTS, PAKISTAN

1. INTRODUCTION

In general, economists agree that foreign direct investment inflows (FDI) lead to an increased rate of economic growth (Blonigen, 2005). A major growth-enhancing characteristic of FDI is the advanced technology that often accompanies foreign capital investment. In addition, domestic investors can also adopt this advanced technology. In other words, FDI generates positive externalities through technology spillovers. At the same time, increased foreign capital can help to narrow the savings gap (i.e. the gap between the domestic savings ratio and the desired level of investment ratio). In short, FDI should exert positive effects on economic growth, particularly in developing countries which suffer from low productivity and capital stock deficiencies (Johnson, 2006).

It is clear that FDI not only affects economic growth, but also influences the host country's growth performance. Moreover both of these growth and FDI are tightly bound with international trade. The relationship between trade and growth is well known and economic growth, whether through exports increase or imports decrease through any strategy, can affect trade flows on large scale. On the other hand the export-led growth (ELG) hypothesis tells that expansion of exports can also promote economic growth by expanding the international market for developing countries. The link between FDI and trade has follows two media.

The present paper seeks to contribute to the empirical literature on the relationship between economic growth and FDI flows in host nations. The major focus of the paper is the role of FDI inflows in economic growth. Accordingly, FDI inflows are included as an inefficiency variable. In essence, we investigate whether FDI enhances economic efficiency and increases GDP growth rate in a host economy.

Like many other developing countries, Pakistan has thrown its doors wide open to FDI, which is expected to bring huge benefits. However, unlike China and India, Pakistan has not been successful in obtaining substantial and consistent FDI inflows. Furthermore, the

Meager inflows that the country has received have not been utilized appropriately to enhance the economic performance (Le and Ataullah 2006). FDI inflows are still too low and this might be because the economic reforms went far enough to change the character and type of FDI. The type of FDI and its structural composition matter as much for economic growth

(Chakraborty and Nunnenkamp 2008). The structure and type of FDI are hardly considered in previous studies on the FDI - growth nexus in Pakistan

The FDI inter alia was constrained by a number of factors namely, political instability, law and order, economic environment and no proper infrastructure, the instability in stock markets and regulatory regime. Nevertheless, FDI and foreign remittances provided a strong base to improve the economic situation of the country. The study envisaged a significant

addition to the empirical estimation of the impact of foreign direct investment on Pakistan economy. The objective of this paper is to analyze the impact FDI on GDP. The results of the study provide the policy makers with a firm basis to formulate appropriate programs leading to the development of the Pakistan economy.

The rest of this research paper is organized as follows: Section 2 will discuss the literature review, in section 3 data and specification of the model is described, Section 4 explains the methodology, Section 5 provides the empirical results and Section 6 gives conclusions and recommendations.

2. Literature Review

Falki (2009) conduct an exploration to break down the impact of FDI on monetary development. The information cover the period 1980—2006 on FDI, Gross domestic product, exchange, work power and capital venture uses. The conclusion is that FDI does not indicate much commitment to financial development in Pakistan for above period as contrasted and local capital and work. This study demonstrates a negative and inconsequential connection in the middle of FDI and Gross domestic product.

Wijeweera et al. (2010) researched the relationship in the middle of FDI and the rate of development of Gross domestic product utilizing a stochastic frontier model and utilizing board information covering 45 nations over the period 1997 to 2004. They found that FDI inflows applied a positive effect on financial development just in the vicinity of a very talented work power; defilement has a negative effect on monetary development; and exchange openness expanded financial development by method for productivity picks up.

Kundan et al. (2010) concentrated on to figure out the linkage between Foreign Direct Investment (FDI) and financial development as far as Total national output Development Rate (GDPGR) for Nepal over the period 1980-2006; utilizing the Granger Causality test, Unit root test and Co-integration test. The outcomes demonstrated that there leave a long haul relationship between the variable and bearing of causality runs from FDI to GDPGR.

Gudaro et al. (2010) studied the impact of FDI on economic growth for Pakistan. The data covering the period of 1981-2010. The researchers take GDP as dependent variable while FDI and CPI as independent variables. The finding is that regression model is significant overall having positive effect of FDI on economic growth and negative relationship between inflation and GDP.

Azam (2011) does the examination of the impact of fares and FDI on financial development. The information is taken for period 1980- 2009. In this study GNP is utilized as dependent variable while export and FDI as independent variables. The conclusion of this study is that exports and FDI are measurably noteworthy.

The influence of trade liberalization on economic growth for Malaysia and South Korea is analyzed by Nguyen (2011). To study the associations among economic growth, trade and FDI during 1970 to 2004 for Malaysia and 1976 to 2007 for Korea, a four variable vector autoregression (VAR) is employed. The exports are long-run source of economic growth for both Malaysia and Korea as these are the findings from the Granger causality/Block exogeneity test, impulse response functions and variance decompositions validate. The bi-way causalities between each pair among the four examined variables were found for Malaysia except for the absence of causality from gross domestic product to exports. The one-way causality from exports, imports and gross domestic product to FDI, from exports and imports to gross domestic product and from exports to imports was found. However, the other three variables do not affect the exports. The economic policies are the basis of dissimilarities in results between the two countries. Even though both countries executed policies of export-orientated progress, the Malaysia stimulated FDI as a tool of industrialization, while the Korean government made an “integrated national economy” by means of “chaebol” industrialized structures and reducing the role of foreign direct investment.

Atif (2012) analyses the effect of export, import and FDI on gross domestic product. This study has examined the determinants of economic growth for the period 1980-2009 in the case of Pakistan. As a representative of economic growth, the GDP growth rate has been used as dependent variable. The coefficients of all the other four statistically significant coefficients are positive as they were expected. The impact of Foreign direct investment on economic growth of Pakistan is less or not statistically significant. Positive and significant impact of exports on economic growth suggested that Pakistan should focus on export-led growth. The Govt. of Pakistan should take some measures to enhance the levels of foreign direct investment directly or to private sector to improve its economic growth rate.

Jayachandran (2012) investigated the relationship among Trade, Foreign Direct Investment and Gross Domestic Product for Singapore during 1970- 2010. This study commonly reveals a positive relationship among Trade, Foreign Direct Investment (FDI) and economic Growth. But according to a few studies, we can apply test of causality to the three variables only in specific conditions. The economic growth can increase trade and Foreign Direct Investment and vice versa. This analysis focused on Singapore, where growth of exports has been noteworthy from Co-integration analysis, he went for the opinion that there is a long-run consistent relationship. The Granger causality test was applied in the analysis and it manifested the causal relationship between the analyzed variables.

Naseer (2013) examines the relationship between FDI, exchange rate and economic growth of Pakistan. The study is made on time period 1980-2012. The regression is applied by taking export as dependent variable while GDP, FDI, and real exchange rate as independent variables .The unit root test, lag order selection Schwartz test, Johansen cointigration test and Granger causality test is applied. He concludes that foreign income, FDI, GDP and real effective exchange rate are significantly affect trade.

Qayyum and Mehmood (2013) tried to investigate the inter-linkage between foreign trade and Foreign Direct Investment (FDI) in Pakistan. For the period 1985–2010, annual data have been taken for eight major

trading partners like France, Canada Germany, Hong Kong, Japan, Saudi Arabia, UK and USA. They applied Johansen Fisher Panel Cointegration Test and Vector Error Correction Mechanism (VECM) to examine whether the FDI and foreign trade are complements or substitutes. From analysis, they found evidence in favour of complementarities of FDI and foreign trade. It means that FDI promotes foreign trade of Pakistan with its trading partners.

3. Data and Model specification

The main objective of this study is to empirically analyze the impact of foreign direct investment on economic growth of Pakistan during 1960-2012. For this purpose, annual time series data is collected from different sources like IFS, WDI and Hand Book of Statistics on Pakistan Economy. The dependent variable used in this study is gross domestic product growth rate as a measure of economic growth rate, while foreign direct investment net infow, exports, imports, inflation, exchange rate and capital formation are taken as independent variables.

3.1. Econometric Model

Gross domestic product = f (exports, foreign direct investment, imports, inflation, exchange rate, gross fixed capital formation)

$$GDP = \beta_0 + \beta_1 EX + \beta_2 FDI + \beta_3 IM + \beta_4 INF + \beta_5 EXCR + \beta_6 GFCF + \mu \quad (1)$$

Equation (1) can be written as:

$$LGDP = \beta 0 + \beta 1 LEX + \beta 2 FDI + \beta 3 LIM + \beta 4 INF + \beta 5 LEXCR + \beta 6 LGFCF + \varepsilon \quad (2)$$

where,

L= common logarithm, GDP = Gross domestic product, EX = Exports, FDI = Foreign direct investment, IM = Imports.

INF = inflation, EXC = exchange rate, GFCF = Gross fixed capital formation, ε = stochastic error term.

The time series data often show the property of non-stationarity in levels and the resulted estimates usually provide spurious results. Thus, the first step in any time series empirical analyses is was to test for presence of unit roots to remove the problem of inaccurate estimates. The other important step was to check the order of integration of each variable in a data series in the model to establish whether the data under hand suffer unit root and how many times it needed to be differenced to gain stationarity.

3.1.1. Test of Stationarity

Economic variables can rarely be assumed independent across time, and past events can influence the future and lags in behaviors are prevalent. Therefore, in using time series, we have to test either variables are independent of time or not. If not, then series is non- stationary. The model frequently used to test the non-stationary in time series data is as follows:

$$\Delta y_t = \alpha_0 + \alpha_1 t + \beta y_{t-1} + \sum_{j=1}^{p} \gamma_j \Delta y_{t-j} + \varepsilon_t \text{---------- (3)}$$

where

$$\Delta Y_t = Y_t - Y_{t-1}$$

p is the number of lags in the dependent variable.

ε_t is stochastic error term.

The popular method for testing a unit root in time series was developed by Dickey and Fuller (DF). The main objective is to test the null hypothesis that β=1 in equation (3): The Augmented Dickey Fuller (ADF) test uses the following hypothesis:

$$H_0: \beta = 0; \; against \; H_1: \beta < 0$$

3.1.2. Lag selection Criteria

The selection of appropriate lag length is very important as too many lags reduce the power of the test due to estimation of additional parameters, which is ultimately loss of degree of freedom. But too few lags may not capture the dynamics of the actual error correction process which results in poor estimates of coefficients and their standard errors. In this paper, we employ different criterion to choose appropriate number of lags.

3.1.3. Auto- Regressive Distributed Lag Model (ARDL)

To test the existence of long-run relationship among the variables in the model, Pesaran et al (2001) introduced Auto Regressive Distributed Lag (ARDL) model. The basis of this model is Unrestricted Error Correction Model (UECM) and after that, ordinary least square method will be used to estimate the model. Because mostly time series data is non-stationary at level, so the regression applied on this data may be spurious. Therefore the first step is to decide the order of integration whether it is I(0), I(1) or higher order. For this explanation, the Augmented Dicky- Fuller (1981) test is used to decide the order of integration.

Once to test the non-stationarity of the data, then we apply ARDL model technique to investigate the long run relationships among the model variables. In the earliest step of ARDL investigation, we examine the existence of

long-run relationships. Here, we use General to particular modeling approach. On the basis of different lag selection criterion, we use suitable number of lags of first differenced variables.

$$\Delta LGDP_t = \alpha_0 + \sum_{i=1}^{n-1} \alpha_{1i}\Delta LGDP_{t-i} + \sum_{i=0}^{n-1} \alpha_{2i}\Delta FDI_{t-i} + \sum_{i=0}^{n-1} \alpha_{3i}\Delta INF_{t-i} + \sum_{i=0}^{n-1} \alpha_{4i}\Delta LEX_{t-i} + \sum_{i=0}^{n-1} \alpha_{5i}\Delta LIM_{t-i} + \sum_{i=0}^{n-1} \alpha_{6i}\Delta LEXCR_{t-i} + \sum_{i=0}^{n-1} \alpha_{7i}\Delta LGFCF_{t-i} + \beta_1 LGDP_{t-1} + \beta_2 FDI_{t-1} + \beta_3 INF_{t-1} + \beta_4 LEX_{t-1} + \beta_5 LIM_{t-1} + \beta_6 LEXCR_{t-1} + \beta_7 LGFCF_{t-1} + \mu_t \quad (4)$$

Where, Δ represents the first difference and μ_t is error term. To test that there is no cointegration among the variables in the model, the null hypothesis and alternative hypothesis can be written as:

$$H_0;\ \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = 0$$
$$H_1;\ \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq \beta_7 \neq 0$$

If the F-statistic value is larger than the upper limit of the upper bound critical values suggested by Pesaran et al (2001), then we would be able to reject the null hypothesis that there is no cointegration among the variables in the model. On the other hand, we do not reject the null hypothesis that there is no cointegration among the variables in the model if the values of F-statistic are lower than the lower bound critical values. The analysis will be indecisive if the F-test value falls within the critical bound limits.

The ARDL bound test of cointegration has mainly following advantages in comparison with other methods of cointegration (Harris and Sollis, 2003):

1. In ARDL, it does not require that all the variables in the model has same order of integration and it is applicable when the variables under study has different order of integration.
2. Moreover, as in small samples, ARDL test is comparatively more efficient.
3. The unbiased estimates of the long-run model can be achieved by applying ARDL methodology.
4. In ARDL, at the same time, we estimate the long- run and short- run coefficient of the model.

4. Empirical Results

4.1. Unit Root Tests

It is necessary to test for stationarity of economic time series before proceeding for examining cointegration and long-run relationship. The Augmented Dickey- Fuller (ADF) is employed on the variables in level and at first differences. These results shown in Table 4.1 pointed towards the non-stationarity at level of all variables excluding inflation but become stationary at first difference. The tests suggest that all variables in this study are I (1) except inflation, which I (0).

Table 4.1: Unit Root Tests

Variable	Augmented Dickey-Fuller Test Statistics			
	Level		First Difference	
	Intercept	Trend & Intercept	Intercept	Trend & Intercept
LGDP	1.0311	−3.0726	−4.513**	−4.680**
FDI	4.2202	3.1968	−2.0584*	−4.3424*
INF	−3.3177*	−3.303*	−7.043**	−6.990**
LEX	0.248	−3.023	−6.951**	−6.885**
LIM	−0.309	−0.309	−0.309**	−6.990**
LGFCF	−0.126	−3.312	−4.771**	−4.726**
LEXCR	0.383	−3.494	−5.829**	−5.814**

* and ** show significant at 5 % and 1% respectively.

4.2 . Appropriate Lag Length

In the next step, the appropriate number of lags is chosen for the given model. For this purpose, an unrestricted VAR model is used. We take all the variables in the system as endogenous for unrestricted VAR model and then suitable lag length can be chosen by applying various criteria for lag length.

Table 4.2: **Lags under different criteria**

Lag	Selection Order Criteria				
	LR	**FPE**	**AIC**	**SC**	**HQ**
0	NA	1.42e-10	−2.806916	−2.53403	−2.70379
1	627.5924	1.72e-16	−16.45506	−14.272*	−15.6300
2	71.80068	1.71e-16	−16.58917	−12.4959	−15.042
3	95.27048	4.87e-17	−18.21175	−12.2083	−15.9430
4	83.92265*	1.03e-17*	−20.58707*	−12.6734	−17.596*

* Lag order selected by criteria

The results of selection of optimal lag length for the model are shown in above Table 4.2 Sequential Modified LR test, FPF, AIC and Hannan Quinn (HQ) suggested four lag but Schwarz Criterion suggests one lag. However, we use four lags as majority of test criterion recommend it and reducing lag till one.

4.3 . ARDL Bound Test approach for Cointegration

Now, we apply ARDL bound test approach developed by Pesaran et al. (2001) to investigate the long-run relationship among variables in the model. Here we use four lags as majority of test criterion recommend it. The results are presented in Table 4.3 below;

Table 4.3: Results of ARDL Bounds Test for Co-integration Relationship

Calculated F-value: 6.007		
Level of Significance	Critical Bounds	
	Lower bounds	Upper bounds
1%	3.15	4.43
5%	2.45	3.61
10%	2.12	3.23

Note: The Bounds test values are based on Pesaran et al. (2001), Table CI (iii) Case III:

As the calculated value of F-statistic is greater than upper bound critical values on the basis of Pesaran et al. (2001) at the 1%, 5% and 10% level of significance, therefore we conclude that there exists a long run relationship among variables in the model.

Now we check the estimated ARDL model for diagnostic test which is serial correlation test and the results are presented in Table 4.4 below:

Table 4.4: Breusch-Godfrey Serial Correlation LM Test

(Obs. R^2)	P-vaue
3.5500	0.0730

The serial correlation is tested by Breusch-Godfrey LM Test and its p-value = $0.0730 > 0.05$. Therefore, we conclude that there is no autocorrelation.

Next, to assess the parameter stability of ARDL model given by equation (9), the cumulative sum of recursive residuals (CUSUM) and the CUSUM of square (CUSUMSQ) tests (Pesaran and Pesaran (1997)) are applied to evaluate the stability of model parameters. The results are shown in figure 5.1 and figure 5.2 below:

Figure 4.1: Plot of CUSUM Test for LGDP

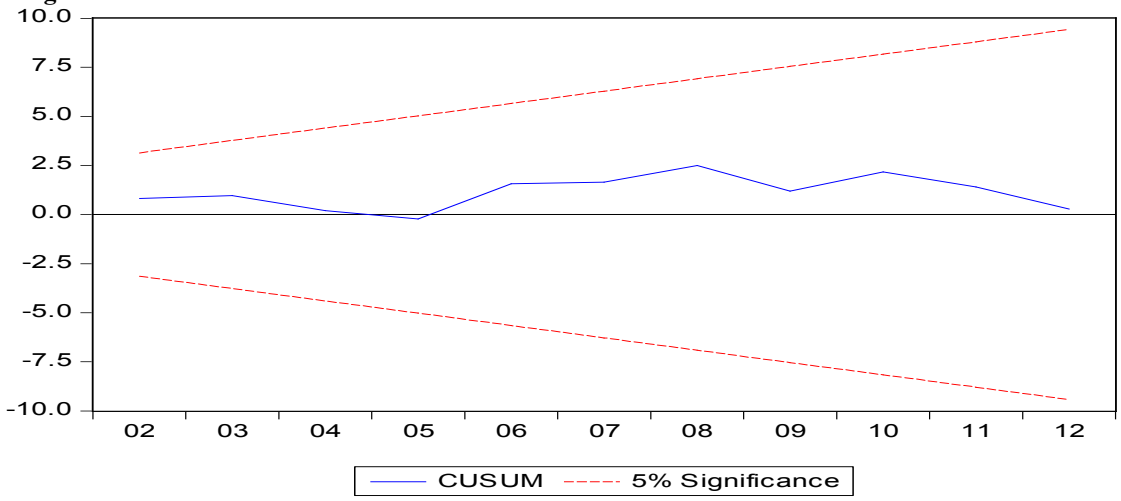
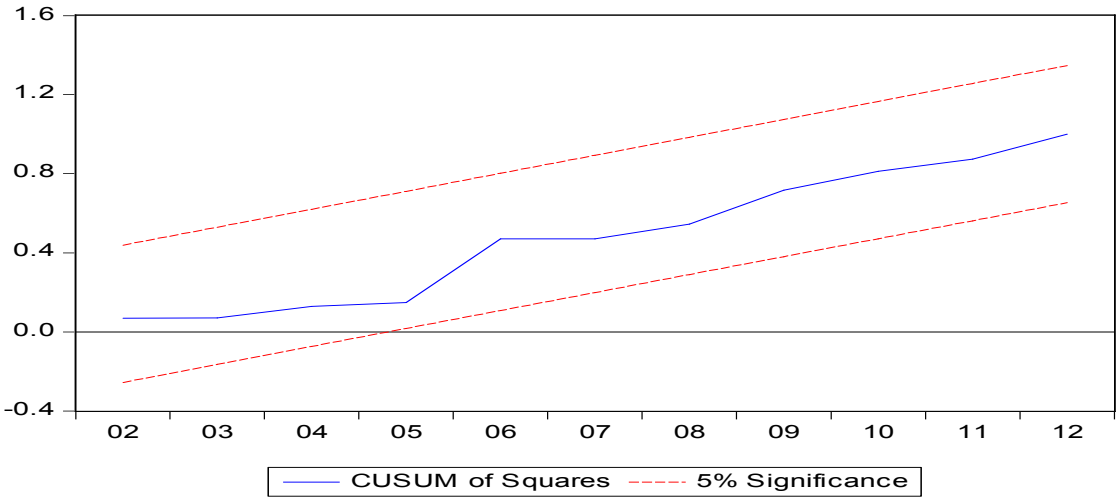


Figure 4.2: Plot of CUSUMSQ Test for LGDP



These results presented in above figures indicates that the estimated model parameters are stable as CUSUM and CUSUMSQ statistic values fall within 5% critical bound values.

Table 4.4: Pair wise Correlations at First Difference with four Lags

	D(LEXCR)	D(LEX)	D(FDI)	D(LGFC)	D(LIM)	D(INF)	D(LGDP(-1))	D(LGDP(-2))	D(LGDP)-3))	D(LGDP(-4))
D(LEXCR)	1.0000									
D(LEX)	0.0348	1.0000								
D(FDI)	-0.0267	-0.0092	1.0000							
D(LGFCF)	-0.2115	0.0920	0.368**	1.0000						
D(LIM)	-0.1043	0.4850**	0.1679	0.5015**	1.0000					
D(INF)	0.0715	0.5071**	0.1231	-0.1106	0.4364**	1.000				
D(LGDP(-1))	-0.0682	-0.0401	0.1369	0.4454**	0.1926	-0.375**	1.0000			
D(LGDP(-2))	-0.2919	-0.1528	-0.0157	0.1933	0.0282	-0.365	0.4057**	1.0000		
D(LGDP(-3))	-0.1583	-0.1704	-0.0705	-0.0495	-0.2666	-0.317**	0.1277	0.4219**	1.0000	
D(LGDP(-4))	0.0292	-0.0593	-0.0531	-0.2034	-0.0867	-0.031	0.0609	0.1209	0.444**	1.0000

* and ** show significant at 5 % and 1% respectively.

The results of the above Table indicate that there may be strong multicollineraity as most of the pair wise correlations are more than 0.5 and significant. However, to detect collinearity among explanatory variables, we also calculate Tolerance, Variance Inflation Factor (VIF) and Condition Index (CI). The results are shown in Table 4.5 below:

Table 4.5: Multicollinearity Diagnostics at First Difference with four lags

Regressor	Tolerance	VIF	Condition Index
D(FDI)	.797	1.255	2.147
D(INF)	.428	2.336	2.718
D(LEX)	.633	1.580	3.038
D(LEXCR)	.849	1.178	3.848
D(LGFCF)	.460	2.174	5.076
D(LIM)	.400	2.502	6.717
DLGDP(-1)	.587	1.704	8.022
DLGDP(-2)	.616	1.622	9.222
DLGDP(-3)	.580	1.724	11.538
DLGDP(-4)	.723	1.382	13.316

These results in above Table indicate that the Tolerance values of all ten regressors are not close to zero which is a sign of weak multicollinearity. The variance inflation factor (VIF) of all explanatory variables is less than 10, which also indicates weak multicollinearity. Now, the Condition Index of two independent variables out of ten is more than 10 which is a symptom of strong multicollinearity.

We have used four criteria to detect multicollinearity and among these, pair wise correlations and Condition Index indicate that there is strong multicollinearity. Furthermore, the all four lags of DLGDP are insignificant which may be due to multicollinearity. So we do not rely on this regression and now apply least

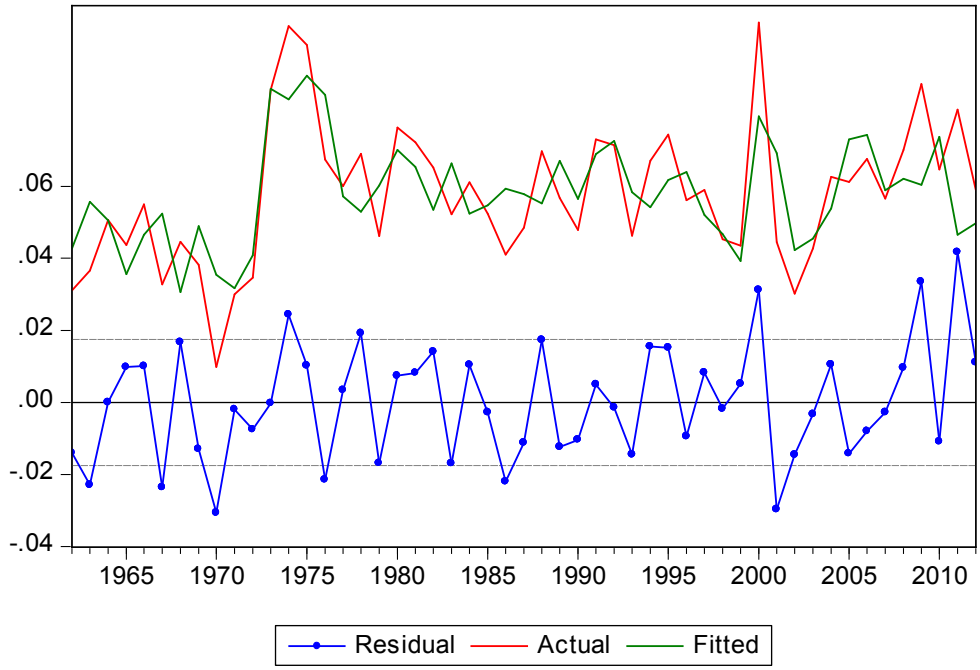
square regression by dropping the lags. Using only one lag. As the degree of freedom reduce.

Table 4.6: Least Square Regression at First Difference with one lag

Dependent variable: D(LGDP)			
variable	coefficient	t-statistic	p-values
C	0.020124	0.589473	0.5586
D(FDI)	0.001281	−1.573891	0.1228
D(INF)	0.000508	0.355680	0.7238
D(LEX)	0.112544*	2.191656	0.0339
D(LEXCR)	0.049442	0.919269	0.3631
D(LGFCF)	0.260940**	4.763082	0.0000
D(LIM)	−0.021491	−0.070259	0.9443
LGDP(-1)	0.277934**	2.789859	0.0078
adj. R^2	0.443022	-------	------
F-statistic	6.681455**		0.000023

* and ** show significant at 5 % and 1% respectively.

Figure 4.3: Residual plot of OLS Regression at first difference with one lag.



The residual plot of actual and fitted values of the response variable is presented in above figure indicates that our estimated OLS Regression is good fit as the differences between actual and fitted values is small.

Now the residual statistics of above estimated OLS regression is shown in the Table 4.7 given below;

Table 4.7: Residual Statistics of OLS Regression at first difference with one lag

Variable: Residual	**Statistic**
Mean	$-4.12e^{-18}$
Median	−0.001408
Maximum	0.041705
Minimum	−0.030656
Standard Deviation	0.016246
Skewness	0.282109
Kurtosis	2.714571

These results presented in above Table indicates that residuals mean and median is approximately zero and its skewness is very small and kurtosis is close to 3 which shows that residuals are nearly normally distributed.

After this, residual diagnostic tests were applied on this estimated least square regression and results are presented in Table 4.8 on next page:

Table 4.8: Residual Diagnostic Tests of Regression at First difference with one Lag

Test	Statistic	p-values
Normality Test (Jarque- Bera)	0.8496	0.6539
Serial Correlation LM Test Breusch-Godfrey: (Obs. R^2)	3.9942	0.1357
Heteroskedasticy Test Breusch- Pagan - Godfrey (Obs. R^2)	5.3273	0.6201
Sum squared resid	0.013196	-------
AIC	−5.108032	-------
SC	−4.805001	------

These results show that residuals are normally distributed as Jarque-Bera p-value=0.6539 > 0.05. The serial correlation is tested by Breusch-Godfrey LM Test and its p-value = 0.1357 > 0.05. Therefore, there is no autocorrelation. The Heteroskedasticy is tested by Breusch- Pagan – Godfrey Test and its p-value = 0.6201 > 0.05. This indicates that residual variances are not heteroscedastic in nature. Moreover, the sum of squared residuals has been increased from 0.012886 to 0.013196 and the values of AIC and SC has decreased as compared with regression in two lags.

The multicollinearity is examined by calculating pair wise correlations of all explanatory variables and the results of the above Table 4.12 indicate that there may be strong multicollineraity as most of correlations are significant and two of them are more than 0.5 and significant. However, to detect collinearity among explanatory variables, we calculate Tolerance, Variance Inflation Factor (VIF) and Condition Index (CI). The results are shown in Table 4.9 below:

Table 4.9: Multicollinearity Diagnostics at First Difference with one lag

Regressor	Tolerance	VIF	Condition Index
D(FDI)	.816	1.226	1.849
D(INF)	.480	2.083	2.235
D(LEX)	.662	1.510	2.491
D(LEXCR)	.920	1.086	3.694
D(LGFCF)	.524	1.907	4.496
D(LIM)	.444	2.250	5.627
LGDP(−1)	.673	1.487	8.561

These results indicate that the Tolerance value of all seven regressors is not close to zero which is a sign of weak multicollinearity. The variance inflation factor (VIF) of all explanatory variables is less than 10, which also indicates weak multicollinearity. Now, the Condition Index of two independent variables are more than 5 which is too a symptom of strong multicollinearity.

We have used four criteria to detect multicollinearity and among these, pair wise correlations and Condition Index indicate that there is strong multicollinearity. So we do not rely on this regression as in case of multicollinearity the variances are inflated and the insignificance of the variable along with their signs are doubtful.

5. Conclusions and Discussions

Many theoretical and empirical research studies were conducted at national and international level related to FDI and most of them were reviewed in the literature . This research study empirically analyzed impacts of FDI on Pakistani imports and exports. The analysis relied on annual time series data over the period of 1960 to 2012. This study applied the Unit roots

(ADF test) to check the stationarity of the data used in the analysis. Cointegration was used to analyze the long run relationship among the variables

We have applied least square regressions at first difference taking four lags and then only one lag because of degree of freedom. We have seen here that in all these regressions, most of our regressors are insignificant and their signs are not expected and according to economic theory. These all problems are due may be due to multicollinearity. More over the different diagnostics used to detect multicollinearity indicates that there is problem of multicollinearity in the explanatory variables. Therefore we don't rely on this regression in case of co efficient signs and also their significance for policy making.

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