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Impact of Trade Openness and Foreign Direct Investment on Agriculture Sector: Evidence from Pakistan

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Abstract

This study finds the impact of trade openness and foreign direct investment on agriculture sector.The analysis based on time series data during the period 1975-2018. For the empirical investigation of model statistical and econometric techniques have been approached. Firstly, to check the stationarity of data Augmented Dickey Fuller Unit root test has been applied and the study finds the mixed results of stationarity econometric technique like auto regressive distributed lag has been approached. The data is collected from World Development Indicator (WDI).Constructed the model by using agricultural value added as dependent variable while foreign direct investment, trade openness, urban population and gross fixed capital formation worked as explanatory variables. There is positive relation of agriculture with trade Openness, foreign direct investment, but negative gross fixed capital formation. The findings of the model verify that there is a long run association between the variables. This study verifies that agriculture sector is support of Pakistan economy and a major source of employment and exports.

1. Introduction

The particular relationship between foreign direct investment (FDI), trade openness, and expansion has got taken over the commercial growth and development reading of acquiring countries within recent decades (Ali, Chaudhry, and Farooq, 2012; Sarwar, Fakher, Ali, and Mudassar, 2013). That growing interest is encouraged employing (i) the role of FDI stimulating guidelines inside the techniques of developing international locations, (ii) the requirement to greater know the programs in which FDI effect on financial growth, along with (iii) the continual diminish within standard growth aid (ODA) about bat roosting international locations (Lemi and Asefa, 2003; Asafu-Adjaye, 2005). Although a lot of empirical will work consent that the key benefits of FDI much outstrip the expenses (Musila and Sigue, 2006; Zahoor et a., 2013), numerous studies contend that enormous FDI inflows only cannot sustainab3800ly ensure a rise in a great overall economy; this can be hence simply because a myriad of components is generally important within their efficiency within adding to the growth and development of target international locations (Bhagwati, 1978; Nazar, Meo, and Ali, 2020).

As the increasing acquiring savings, Pakistan features drawn a substantial amount of investment decisions over the last couple of decades (Ali et al., 2020b). The reason why to be the interesting getaway of huge FDI is generally a lot more such as less expensive manual work, area to showcase, rising acquiring strength plus much more liberalized as well as the investor-friendly monetary environment (Ali et al., 2020a; Ali et al., 2021a). Intended for the case of Pakistan, the query takes place whether FDI and also DI help with some sort of long-run impact on monetary development? Is complete investment decision, deal as well as monetary progress display any causal regards ultimately? Resolving these types of inquiries is necessary for policy significance around Pakistan.Nevertheless, the study would not search for virtually any significant causal connection about the instances with buy and sell openness, domestic require, and also change rate (Ali et al., 2021b). The learning concludes of which Pakistan will need to create FDI-led polices to reinforce it has the exports.

In last few decades we see a rapid growth in FDI. If we take at a glance of World Bank report (World Investment Report, 2006), we find that the world GDP has been increased 5% to 11% during 1980 to 2006. Studies have proved that FDI is one of the major elementsto enhance the

GDP. In this study it is also said that FDI helps in reduction of unemployment. According to a study 82 million people got employment due to FDI during this session. Due to FDI cost of production has reduced from 10% to 20% which is a land mark.

2. Literature Review

Oscar and Montero (1999) analyzed the relationship between foreign direct investment and export. They used time-series data for the period of (1977- 1992) for the variables such as foreign direct investment and export. This study used co-integration techniques to examine the long-run relationship between these variables. Foreign direct investment has taken as a dependent variable while others have taken as an independent variable. The result revealed a positive impact of foreign direct investment into increased exports. The relationship between foreign direct investment and exports suggests that increased foreign direct investment was not compulsory .one experienced that the economy must have increased exports. Increased foreign direct investment played a big role to promote exports.

Abdur and George (2003) exclusive that the relationship between foreign direct investment and economic growth. They applied that the Toda- Yamamoto technique. The time-series data used for the period of (1969-2000) for three developing countries that is Thailand, Chile, and Malaysia. Gross domestic product was taken as a dependent variable and other as independent variables. The result revealed that Malaysia and Thailand was a piece of strong evidence and bidirectional casualty gross domestic product and foreign direct investment. The role of growth increased attention needs determinant of foreign direct investment the quality of Human capital, infrastructure, institution, governance, and tax system in host countries. There was an important challenge for future research.

Balamurali and Bogahawatte (2004) discussed the relationship between foreign direct investments, economic growth in Sri Lanka. They used time-series data for the period of (1977 – 2003) for the variables such as foreign direct investment, domestic investment, trade openness, and economic growth. They used co-integration techniques to examine the long-run relationship between these variables. Foreign direct investment has taken as an independent variable while others as a gross domestic product, exports have taken as dependent variables. The result shows that the economic reforms programs in Sri Lanka decrease the macroeconomic instability and

removed economic distortions to build up exports and improve domestic investment raised the foreign capital cost 13 percent and loss of profit 30% may have slow down foreign investment. In long rum Sri Lanka raise to human capital improve labor market technological infrastructure to lead to make a higher investment.

Fatimah and Saad (2004) analyzed that total factor productivity growth for Malaysian manufacturing industries used time-series data for the period of (1982-1997) and two sub-periods 1982-1986 and 1987-1997. They found that the rapid growth of industries during the period of 1982-1997 was mainly the growth of capital for the performance of TFP. TFP growth performances have less intensive industries such as leather, fur, and footwear. The TFP growth majority of industries for the manufacturing sector have found a negative relationship during the period (1982-1986). TFP improved the second sub-period of 1987-1997 was recorded an average growth of 4.05 percent for the manufacturing sector. The result concludes that the growth of Malaysian manufacturing industries and the overall manufacturing sector during the period of 1982-1997 was input-driven or productivity-driven. TFP performances have expected the country to move high technology and Knowledge-driven growth.

Adamopoulos et al. (2004) described that trade, foreign direct investment and economic growth in Greece used time-series data for the period of (1960-2002) for the variables such as foreign direct investment, exports, and economic growth. They used the co-integration technique to examine the long-run relationship among these variables. The result revealed that there was a casual unidirectional relationship between foreign direct investment and economic growth and exports with direction from foreign direct investment and exports.

M.feridun (2004) explains that the relationship between foreign direct investment and economic growth for Cyprus by used time-series data for the period of (1976-2002) for the variables such as economic growth gross domestic product per capita and economic growth. The methodology used vector auto regression to examine the long-run relationship between those factors. The result shows that there was a unidirectional Granger causation from foreign direct investment to economic growth. Economic development depended on country performance in foreign capital.

Abdul and Ilan (2007) analyzed the impact of foreign direct investment (FDI) on economic growth in Indonesia. They used the sectoral data for the period of (1997 - 2006) such as variable

foreign direct investment and economic growth. Foreign direct investment was observed that a positive impact on economic growth to examine a long-run relationship between these variables. The result revealed that the composition of foreign direct investment its effects on economic growth, a few sectors have a positive impact on foreign direct investment one sector harms economic growth on foreign direct investment. More research show that should pay formulate policies has increased many benefits of foreign direct investment and its appropriate sectoral composition and create the condition for beneficial foreign direct investment in sectors.

Khan (2007) described the role of foreign direct investment on economic growth in the financial development sector. They used time-series data for the period of (1972-2005) for the variables such as foreign direct investment, economic growth, and exports. They used an autoregressive distributed lag test to examine the long-run relationship between these variables. Foreign direct investment is taken as an independent variable and other variables taken as a dependent variable. The result concludes that foreign direct investment has a positive impact on economic growth through the process of technology in the long- run and short-run. Foreign direct investment played an important role in economic growth. Foreign direct investment promotes growth through the financial development sector. Domestic financial conditions not only attract foreign companies but also maximize the benefits of foreign investment.

Man et al. (2008) discuss the relationship between foreign direct investment and economic growth for Malaysia. They used time-series data for the period of (1970-2005) for the variables such as foreign direct investment, capital investment, technology, and economic growth. They used ordinary least square technique and empirical analysis is conducted used annual time data on foreign direct investment and economic growth in Malaysia. Gross domestic product used as a dependent variable while other variables used as independent variables. The result shows that there was a positive impact of foreign direct investment and economic growth. The government has found out the strong policy to know the importance of foreign direct investment and contributed to economic growth then the economy developed and more foreign direct investment and increased employment opportunity. Advanced technology and skilled labor used in production, therefore, productivity increased. There was a negative impact on the domestic producer and they lose market power monopoly occur in the market. The government applied relevant policies and there was allow the domestic producer and earn the profit.

Gabriele and Jorge (2010) discuss that the sectoral productivity and spillover effects of foreign direct investment in America by used time-series data for the period of (1998-2006). Foreign direct investment has an independent variable. The result concludes that foreign direct investment has a positive and significant impact in many sectors, but not all of them, such as gas, oil, water supply sector. In our analysis, not only find the effects of foreign direct investment in different sectors but also find the effects of productivity that this foreign direct investment has on other sectors. Foreign direct investment has very beneficial for the American economy. Sectoralproductivity effects of foreign direct investment accounting for institutional factors important for sectors, educational level, export level. Productivity arises from foreign direct investment in the transport and telecommunication sector. Finley, foreign direct investment has the biggest weaker impact on American sectoral productivity and other policy variables.

3. Data and Methodology

This section presents the methods of foreign direct investment, model specification, sources of data, description of variables, and key terms of variables relationships. Econometric techniques that are applied to check the findings will be briefly explained.

3.1 Data

In this study agricultural value-addedworked as dependent variables while independent variables are foreign direct investment, trade openness, urbanization, and gross fixed capital formation. The data is collected from World Development Indicator (WDI) for the year 1975-2018.

3.2 Methodology

Autoregressive Distributed Lag (ARDL) Cointegration Technique is used to evaluate this study.

Augmented Dickey-Fuller (ADF) Test

Named for American statisticians David Dickey and Wayne Fuller, who developed the test in 1979, the Dickey-Fuller test is used to determine whether a unit root (a feature that can cause issues in statistical inference) is present in an autoregressive model. The formula is appropriate for trending time series like asset prices. It is the simplest approach to test for a unit root, but most economic and financial times series have a more complicated and dynamic structure than

what can be captured by a simple autoregressive model, which is where the augmented Dickey-Fuller test comes into play.

Autoregressive Distributed Lag (ARDL) Cointegration Technique

Economic analysis suggests that there is a long-run relationship between variables under consideration as stipulated by theory. This means that the long-run relationship properties are intact. In other words, the means and variances are constant and not depending on time. However, most empirical researches have shown that the constancy of the means and variances are not satisfied in analyzing time series variables. In the event of resolving this problem, most co-integration techniques are wrongly applied, estimated, and interpreted. One of these techniques is the Autoregressive Distributed Lag (ARDL) cointegration technique or bound co-integration technique. Hence, this study reviews the issues surrounding the way co-integration techniques are applied, estimated, and interpreted within the context of the ARDL co-integration framework.

ARDL bounds testing approach is a method of co-integration developed by Pesaran et al. (2001). This is used to test the presence of the long-run relationship among the variables. This procedure, relatively new method, has many advantages over the classical co-integration tests. Firstly, the approach is used irrespective of whether the series is I (0) or I (1). Secondly, the unrestricted error correction model (UECM) can be derived from the ARDL bounds testing through a simple linear transformation. This model has both short and long-run dynamics. Thirdly, the empirical results show that the approach is superior and provides consistent results for small sample

Histogram Normality Test

Descriptive statistics are an important part of biomedical research which is used to describe the basic features of the data in the study. They provide simple summaries about the sample and the measures. Measures of the central tendency and dispersion are used to describe the quantitative data. For the continuous data, the test of normality is an important step for deciding the measures of central tendency and statistical methods for data analysis. When our data follow a normal distribution, parametric tests otherwise nonparametric methods are used to compare the groups. There are different methods used to test the normality of data, including numerical and visual methods, and each method has its advantages and disadvantages. In the present study, we have discussed the summary measures and methods used to test the normality of the data.

Various statistical methods used for data analysis make assumptions about normality, including correlation, regression, *t*-tests, and analysis of variance. The central limit theorem states that when sample size has 100 or more observations, violation of normality is not a major issue. Although for meaningful conclusions, the assumption of the normality should be followed irrespective of the sample size. If continuous data follow a normal distribution, then we present this data in mean value. Further, this means the value is used to compare between/among the groups to calculate the significance level (*P*-value). If our data are not normally distributed, the resultant mean is not a representative value of our data. A wrong selection of the representative value of a data set and further calculated significance level using this representative value might give a wrong interpretation. That is why first we test the normality of the data, then we decide whether meaning is applicable as the representative value of the data or not. If applicable, then means are compared using parametric test otherwise medians are used to compare the groups, using nonparametric methods.

A histogram is a graphical representation that organizes a group of data points into user-specified ranges. It is similar in appearance to a bar graph. The histogram condenses a data series into an easily interpreted visual by taking many data points and grouping them into logical ranges or bins.

Model specification

The following model has been developed for this study.

$$LNAVA_t = \alpha_0 + \alpha 1LNGFCF_t + \alpha 2LNUP_t + \alpha 3LNFDI_t + \alpha 4LNTO_t + \mu_t$$

In this model, LNAVA (log of agriculture value-added) is dependent variable. LNGFCF, LNUP, LNFDI, and LNTO is log of gross fixed capital formation, log of urban population, log of foreign direct investment, and log of trade openness are independent variables.

4. Results and Discussion

Unit root test

To check the data is stationary or not augmented dickey fuller tests are hiring.

Table 1: Augmented Dickey-Fuller Unit Root Test

	Level		**1st difference**		
Variables	**Intercept**	**Intercept &Trend**	**Intercept**	**Intercept& Trend**	**Conclusion**
AVA	-2.360226 (0.1598)	-4.721229 (0.0031)	-6.708202 (0.0000)	-5.453752 (0.0005)	I(0)
TO	1.065948 (0.9966)	-1.081021 (0.9206)	-6.675998 (0.0000)	-7.140760 (0.0000)	I(1)
FDI	-2.690872 (0.0840)	-3.380901 (0.0677)	-4.290743 (0.0015)	-4.241562 (0.0088)	I(0)
GFCF	-4.068701 (0.0032)	-4.714404 (0.0032)	-2.529564 (0.1179)	-1.748466 (0.7064)	I(0)
UP	-0.201423 (0.3998)	-1.010070 (0.9319)	-6.471862 (0.0000)	-8.56283 (0.0000)	I(1)

Source: E-Views 9 (author's calculation) carries out Estimation.

ARDL Bound Test

ARDL model applied when the series is stationary. Two phrases are involved in the execution of the ARDL approach. Firstly, the value of F-statistics is tested that applied to discover the long-run relationship these variables.

Table 2: Bound Test

F-STATISTICS	**3.637678**
K=4	
Critical Bound Test	**LCB**
LUB	
10%	2.45
3.52	
5%	2.86
4.01	
2.5%	3.25
4.49	

1%	3.74
5.06	

Source: E-Views 9 (author's calculation) carries out Estimation

Table 3:Estimates of Long–Run Coefficients of the Model.

Variable	Coefficient	Std. Error	t-statistics	Prob.
LNGFCF	-0.948	0.255	-3.704	0.000
LNUP	1.270	0.212	5.966	0.000
LNTO	0.656	0.074	8.846	0.000
LNFDI	0.085	0.047	1.801	0.080
C	8.433	3.590	2.349	0.020

Source: E-Views 9 (author's calculation) carries out Estimation.

Clarifies the coefficient validates the spank of explanatory into dependent variables. In which Trade openness has significantly and positively related to the agriculture sector. The coefficient of trade openness 0.656004 and the significant probability value is 0.0000. The coefficient of trade openness indicated that a 1% increase in trade openness that will increase AVA 0.656004. As a trade, liberalization allows different techniques and fertilizers to adopt from other countries by importing the new machinery and other chemicals to enhance agriculture growth. On the other side, if trade openness prevails in the country it boosts the number of agriculture exports. During July-March 2018, agricultural exports tend to grow at the rate of 11.6 percent, which in turn accelerate the agricultural value-added. (Economic Survey of Pakistan, 2018-2019).This study shows that the urban population is positively related to agricultural value-added. The coefficient of the urban population (UP) is 1.270024 and the significant probability value is 0.0000. The urban population indicates that a 1% rise that will rise the AVA 1.270024. Governments in areas with low population density and broad farming have considerable control over the peace of intensification of agriculture and hence labor exhaustion in rural areas. The allocation of public investment and internal terms of trade that can move intensification and

increases agricultural capacity to provide employment (Isfahan 1993). Foreign direct investment is positively related to agricultural value-added. The coefficient of foreign direct investment is 0.08585 and the probability value is 0.0808. The coefficient of foreign direct investment indicates a 1% rise in foreign direct investment that will rises AVA 0.0808. There is a positive connection between agricultural value-added and foreign direct investment which is obvious because greater the investment inflow, greater the amount of credit to be given to the agriculture sector, and through more credit, better technology and fertilizers will be applied which increase the agriculture sectoral growth and vice versa. As in 2019, the foreign direct investment tends to decrease, so the agriculture sector grew by only 0.85 percent against the target of 3.8 percent. (Economic Survey of Pakistan, 2018-2019).This shows the negative relationship between gross fixed capital formation and agricultural value-added. The coefficient of gross fixed capital formation is -0.948262 and a significant probability value is 0.0008. The coefficient of GFCF indicates that 1% increases that will increase AVA -0.948262.

Table 4:Estimates of Sort–Run Coefficients of the Model.

Variable	Coefficient	Std. Error	t-statistics	Prob.
D(LNGFCF)	-0.554	0.133	-4.153	0.002
D(LNUP)	0.742	0.176	4.149	0.000
D(LNTO)	0.382	0.075	5.062	0.000
D(LNFDI)	-0.007	0.016	-0.460	0.643
CointEq (-1)	-0.584	0.115	-5.049	0.000

Source: E-Views 9 (author's calculation) carries out Estimation.

Table 4 discusses that the short-run co-efficient assessments of the model. Coin (-1) measures the conjunctions of the model and it is negative and its value is (-0.584775), t-statistics (-5.049222) and highly significant probability value is (0.0000) that validates the long run connection from explanatory variables to dependent variables. The variables gross fixed capital formation coefficient value (-0.554520), t-statistics value is (-4.153753) and significant probability value is (0.0002).The population has a positive coefficient value is (0.742678), the t-statistics value is 4.149927 and the significant probability value is (0.0002).The positive

coefficient of trade openness is (0.383614), t-statistics is 5.063027 and the significant probability value is (0.0000).Foreign direct investment has a negative coefficient (-0.007584), t-statistics value is (-0.460339) with insignificant probability, value is (0.6483).

Table 5: Granger Causality Test.

NULL HYPOTHESIS	F-STATISTICS	PROB
To does not Granger Cause AVA	0.20159	0.8183
AVA does not Grander cause TO	2.02973	0.1457
UP does not Granger Cause AVA	91.8463	4.E-15
AVA does not Granger Cause UP	0.61469	0.5462
FDI does not Granger Cause AVA	2.73011	0.0784
AVA does not Granger cause FDI	0.34029	0.7138
GFCF does not granger Cause AVA	3.06813	0.0585
AVA does not Granger Cause GFCF	1.46419	0.2444
UP does not Granger Cause TO	1.78892	0.1813
TO does not Granger Cause UP	2.02083	0.1469
FDI does not Granger Cause TO	4.54618	0.0172
TO does not Granger Cause FDI	0.79775	0.4579
GFCFL does not Granger Cause TO	0.33928	0.7145
TO does not Granger Cause GFCF	4.00701	0.0266
GFCF does not Granger Cause UP	6.45949	0.0039
UP does not Granger Cause GFCF	0.62209	0.5423
GFCF does not Granger Cause FDI	3.34382	0.0462
FDI does not Grange Cause GFCF	8.69725	0.0008

Source: E-Views 9 (author's calculation) carries out Estimation.

Table 6:Diagnostic test.

Breusch-Godfrey Serial Correlation			
Test Statistics	**Value**	**Prob. F(2,31)**	**Decision**

F-Statistics	1.9475	0.1597	Do not reject H0
Heteroscedasticity Test: Breusch Pagan Godfrey			
Test statistics	**Value**	**Prob.F(6,33)**	**Decision**
F-Statistics	0.3324	0.9150	Do not reject H0
Normality			
Test statistics	**Value**	**Prob**	**Decision**
j.b	1.0636	0.5876	Residuals are normally distributed

Source: E-Views 9 (author's calculation) carries out Estimation.

Breusch-Godfrey serial correlation

Breusch-Godfrey's test probability value is 0.1597 calculated to be greater than 5%, shown in the table, verifying the invalidation of the null hypothesis. This concludes that there is no serial correlation in the model.

Heteroscedasticity Test

Heteroscedasticity's test probability value is 0.9150 calculated to be greater than 5%, shown in the table, verifying the invalidation of the null hypothesis. This concludes that there is no serial correlation in the model.

The J-B normality test for the Residuals

The probability value, of the J-B test, is 0.9150 calculated to be greater than 5%, shown in the table, verifying the invalidation of the null hypothesis. This concludes that the distribution of residuals is normal.

Stability Test

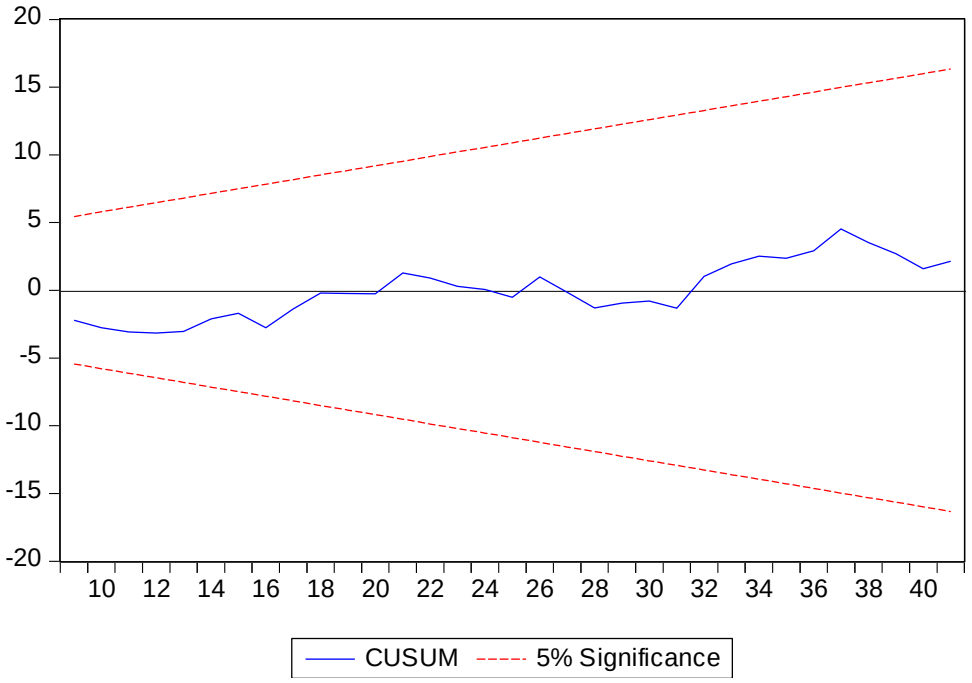
The stability of the estimated coefficient and test to the extent the appropriateness of models for policy effects. The cumulative sum of recursive residual and cumulative sum of recursive residuals of square and plotted. Upper and lower critical boundaries show by straight lines that are significant 5 percent level. Our model lies between two boundaries that are plotted lines. It

showed that deviation in CUSUM and CUSUMQ graph. Stability test central to realistic it provides support power of the model for policy implications.

CUSUM Test

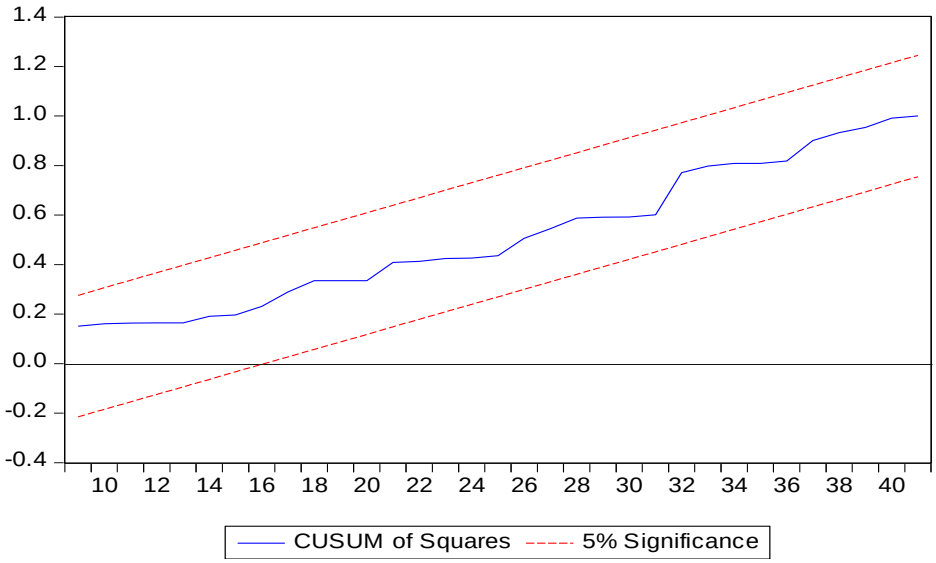
The cumulative sum of recursive residuals is useful to examine systematic fluctuations in the coefficient of variables.

The plot of the cumulative sum of Recursive Residuals



CUSUM of Square

The cumulative sum of square residuals has been realistic to check the impulsive changes in the coefficient of variables.



5. Conclusion and Policy Implications

In this research we will thoroughly explain the overall summery of the research that will provide the overview of the research. The empirical investigation of model and their findings will be briefly explained in this section and policy implications that are required to enhancement of the economy will be mentioned that will be accommodating to precede this research. the results of present study about an observed exploration of trade openness, foreign direct investment and growth in the situation of Pakistan that contains the trend analysis, statistical analysis and econometric analysis the claim of econometric techniques augmented dickey fuller unit root test to check the stationarity of data than apply the Auto Regressive Distributed Lag Model for analysis. The various diagnostic test applied to test the models is good to regress. The model restrained to examine the trade openness, foreign direct investment, and agriculture growth in Pakistan.

The conclusion shows that the government should take some necessary actions and decisions for economic growth in the field of foreign direct investment, trade openness, and population growth. Also, develop the urban population so that earn as much as can remittance. According to which the beneficial effect of FDI, in terms of enhanced economic growth, is stronger in those countries which pursue an outwardly oriented trade policy than it is in those countries adopting and inwardly oriented policy.

The key policy implications concern three hypotheses are:

i. There is disequilibrium among the variables in the short-run. The disequilibrium that occurs in the previous period is very rapidly adjusted in the current time.
ii. Improving conditions for attracting foreign direct investment could further increase economic growth in the country.
iii. The significant epitome of this study is the requirement of the policy restructuring and implications by the Government of Pakistan which can be drawn from the findings of this study.
iv. The government of Pakistan should take necessary measures based on the recommendations of this study to enhance FDI and attract more investments both national and international.
v. The investor confidence should be bolstered by improving the law and order and security situation of the country and introducing investment-friendly policies to further harness the positive impact of investment on growth.
vi. That government policymakers should bring reforms in the domestic market to attract more FDI in Pakistan.
vii. To encourage foreign and domestic investors to invest in Pakistan, it is necessary to improve the protection and insurance policies.
viii. Pakistan should increase the export of final goods through improvement in infrastructure, construction of new roads, better transport facilities, and installing advanced machinery that will reduce production costs inside the country.
ix. The corruption control policies, political stability is needed for better utilization of the FDI and other capital.
x. There is a requirement to improve the quality and quantity of human capital and skills through better education, health, and training so that FDI can be utilized in a better way while considering the trained and skilled labor force.

At the end of this chapter, the conclusion shows that the government should take some necessary actions and decisions for economic growth in the field of foreign direct investment, trade openness, and population growth. Also, develop the urban population so that earn as much as can remittance. According to which the beneficial effect of FDI, in terms of enhanced economic

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xiv. The government of Pakistan should take necessary measures based on the recommendations of this study to enhance FDI and attract more investments both national and international.

xv. The investor confidence should be bolstered by improving the law and order and security situation of the country and introducing investment-friendly policies to further harness the positive impact of investment on growth.

xvi. That government policymakers should bring reforms in the domestic market to attract more FDI in Pakistan.

xvii. To encourage foreign and domestic investors to invest in Pakistan, it is necessary to improve the protection and insurance policies.

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