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Foreign Direct Investment (FDI), Agriculture Rate (AGRI), Energy Consumption (EC) and Trade Openness (TO) Impact on Economic Growth of Pakistan: A Case Study of China Pakistan Economic Corridor (CPEC)

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Abstract

This research evaluates the determinants of economic growth for Pakistan. The research tries to analyze the nature of causality among economic growth (GDP), foreign direct investment (FDI), Agriculture Rate (AGRI), energy consumption (EC) and trade openness (TO) in Pakistan. It covers the period from 1976-2013. The ADF unit root test is used to determine the order of integration of variables. While Johansen (1988) and Johansen and Juselius (1990) maximum likelihood estimation approach is applied to check the co-integration and finally VECM is used to check the short run correlations. Diagnostic test, impulse response function, variance decomposition and granger causality is also used to check autocorrelation and causality among those variables.

Key Words: *FDI, AGRI, EC, GDP, TO.*

Introduction

FDI is a major sector for improvement of GDP of any country. FDI is usually realized, by a lot of worldwide organizations, politicians and economists, as a feature which improves host country financial growth, additionally the decision to the financial crisis of developing countries (Mencinger, 2003). Bibi, Ahmad & Rashid, (2014). Observed the outcome of TO and FDI on economic growth in Pak. They used time series data from 1980 to 2011 and they applied for data analysis ADF & PP to check stationary of these variables. However to check the LR and also check the SR Co-integration and DOLS. Results showed

that TO has a unconstructive impact on GDP and FDI have noteworthy impact on GDP. Moreover TO and FDI, both are considered very important factors for accelerate of GDP. Wang, 2009. Observed that FDI is only one sector which can promote economic growth of developed countries. FDI is the only one factor for economic growth which is very important factor that developed especially less developed countries according to the report of OECD. Thus many govt provide particular dealing with foreign assets generally in less developed countries (Carkovic and Levine, 2002). Khan (2007) analyzed that FDI is a very important sector for the development of GDP in less developed countires. However for the development of FDI that has FDI has raised a great business deal for less developed countries during the period of 1985–2000. According to the report of World develop, 2002 & Perkins, 2001. Many researchers observed that FDI is positively linked with GDP throughout investment growth and a source of good organization (Falki*et al*, 2008, Fitzgerald, 2006, and McKinnon, 1990**)**. According both verification of hypothetical and numerically proposed that FDI supports GDP of any country. FDI assumes a significant part in the financial advancement of a nation, FDI can be separated into two principal parts: FDI and collection assets. Falik, (2009) observed the effect of FDI on GDP in Pak. He used annual base data from 1980 to 2006 and used OLS to check the estimation of results between these variables. Results showed insignificant impact of FDI on GDP in Pakistan. Zeb et al. (2013) analyzed FDI and GDP in developing countries like Pak. They used data from 1972-2012 and OLS applied for data analysis. Results showed FDI has affirmative and significant effect on GDP of Pak. Hultman, 1967. Evaluated that TO as an important part of monetary development. In fact less developed countries of the world applied limited trade methodologies yet after spend a long time period and modernization of all those countries which easily understand there is very necessary to the extent that TO for the change of economies. TO is major sector of any country for the change of country's industrialization and economy. Khan & Sattar (2010) analyzed the relation of TO and GDP on Pak. They used annual base data from 1973-2009 and applied Granger causality and ECM model for data analysis. Results showed that TO be important factor towards GDP in Pakistan, it represents affirmative and significant effect of trade openness on GDP in Pakistan. Researchers suggested that govt should focus on trade.

Energy consumption assumes a significant part in the monetary improvement of a nation. It improves the benefit of components of creation and expands living determines. It is broadly perceived that financial advancement and energy utilization are subordinate. The power crisis of the 1970s and high power costs, especially oil costs, have a critical effect related to financial action of creating financial system. However, monetary development promotes energy utilization or whether Energy utilization promotes Economic growth. Therefore fundamental relationship among EC and GDP has been generally considered throughout the most recent 3 decades, the experimental proof is not without argument. Many researchers investigated that there was a solid relationship among monetary improvement & Energy utilization in India {Pachauri (1977) and Tyner (1978)}.

Choudhry et al (2012).observed the impact of EC and GDP for Pakistan. They used time series data from 1972-2012. They applied OLS for regression check and Granger Causality for show the causality between these variables. Results showed that consumption of electricity is significantly and also effecting GDP (economic growth). Researchers suggested that high EC. (Busari, 1996 and Iyoha, 2002), development procedure particularly for developing countries is well documented in the literature (ADB, 1996; Iwayemi, 1983, 1993, 1998; Orubu, 2004; Omotor, 2007 and Sambo, 2008). Energy consumption market structure like demand, supply and market pricing have positive effect on economic growth, standard of living and the other main quality of life of human beings (Iwayemi, 1998).

Agriculture is very important sector of Pakistan‘s economy for employment, poverty reduction, economic growth and food productivity. Pakistan is an agriculturist country there is almost 60 to 70 % people depends upon this sector, so that’s why there is a big need to raise agriculture productivity. Growth rate of agriculture more than 5 % is necessary for the achievement of of growth of national income, provide

employment for labour force, and reduce poverty and unemployment in Pak (Iqbal et al., 2003; Economy survey Government of Pakistan, 2011). The agriculture sector provides raw material for industrial sectors. Therefore demand and supply depend upon industrial sectors, which is major source of contribution in financial development in the country (Subramaniam & Reed, 2009). Amjad, 2009 observed that the improvement of AGRI sector is not necessary for the food production but it is also very important for GDP growth and also development of any less developed country. Govt should implement for the improvement of agriculture sector and introduce modernization technique for the improvement of this sector like farming of crops, hybrid seeds, and new fertilizer system can help to increase the production of agriculture sector.

Focus of the Study

The fundamental motivation behind this exploration is to watch the effect of farming, TO, EC, & FDI asset on the Pakistan economy. The examination of farming, TO, EC, & & FDI effect on financial development and which area is more feasible for monetary development in Pakistan. Amid study about this argument basically specialist did research on this point, however a couple of scientists demonstrate the examination of these divisions. Data used from 1976 to 2013. The decision of this research has relied on the accessibility of data.

This research suggested to investigate the real factors of financial matters, development, including agrarian, TO, EC & FDI in Pakistan. Different forecasters are to concentrate on the determinants of farming, EC, TO & FDI. It has awesome significance to realize what element is real donor in expanding the Gross domestic product and livelihood.

The determinants of Agriculture, EC, TO and FDI impacts the work, agriculturist, manufacturing plant proprietor and inflation. In the event that the items will be all the more then will decrease the unemployment, inflation and will fulfill the area proprietors, agriculturists and production line proprietors. There will be changes in sexual orientation, capability, married status, identity, pay, advancement opportunities, acknowledgment & rewards, association with the land owner, boss & land proprietor, incidental advantages, working circumstances, the effort itself and residency. This is a blend of demographic and managerial factors. It will likewise assist them to develop the approaches that will build the yield of farming, EC, a TO & FDI division. At the point when the surrender of these divisions will be built then the development of Gross domestic product will likewise raise.

Problem Statement

The purpose of this study is to examine the effect of AGRI, TO, EC, & FDI asset on the Pakistan economy. Data will be used for period of 1976 to 2015. The decision of this research has relied on the accessibility of data. This research also suggested investigating the real factors of financial matters, development, including agrarian, TO, EC & FDI in Pakistan. Different forecasters are to concentrate on the determinants of AGRI, EC, TO & FDI. It is a matter of great importance to determine what sector is really contributing in the expansions of Gross domestic product and livelihood.

Research Objectives

In light of the exploration issue and the reasons of the examination the resulting exploration inquiries are framed, so that the information important to the exploration destinations can be gotten.

1) To find out the effect of agriculture, FDI asset, TO and EC on Pakistan's economy.
2) To investigate linkage between these sectors and Gross domestic product in Pakistan.
3) To examine the impact of these sectors on Gross domestic product in Pakistan

4) To give strategy proposal to improve financial development in Pakistan.
5) To explore the purposes behind moderate development of Agriculture, TO, and EC & FDI segment.

Literature Review

FDI and GDP

Falki (2009) analyzed the impacts of FDI on monetary development in Pak. He used annual base data from 1980–2006. OLS (Ordinary Least Square strategy) was utilized. He presumed that the effect of FDI has a pessimistic and insignificant association among monetary development. Research observed the effect of FDI alongside local assets, overseas personal assets and work constrain on financial development of PAK. They used time series data from 1970–2001. The outcomes discovered that FDI is more noteworthy under fare advancement exchange administration as differentiation to import substitute exchange organization Atique et al. (2004). Khan et al. (2011) explored the consequence of FDI on monetary development of Pakistan. They used GC and Co-integration methodology for the data analysis. They used time series data from 1981–2010. The outcome showed that these variables i.e. FDI, settlement and outside obligation are having affirmative association with financial development. Outcomes revealed that FDI advance yield in urgent and administrations areas while FDI participated little in created. Study investigated the impact of FDI on money related advancement of Pak Aurangzeb et al. (2011). GC and Co-integration test used for this data. FDI, settlement and outside commitment are include affirmative and foremost association with money related development. The outcomes discovered that FDI is more noteworthy under fare advancement exchange administration as differentiation to import substitute exchange organization. Louzi et al. (2011) researched the consequences of FDI on Jordanian GDP. The Granger Causality and Co-integration methodology was used. Outcomes demonstrated that FDI have not effect on monetary development in this country whereas residential venture and TO have constructive outcome on financial development rate.

Hypothesis 1

H0 = There exist no association among FDI and GDP in Pakistan.
H1 = There exist affirmative association among FDI and GDP in Pakistan.
Literature review that FDI effects GDP positively. It means higher FDI to raise in GDP of Pakistan.

Trade Openness and Economic growth:

Krugman (1990) observed the reasons why TO be useful for development in creating nations. First of all, creating nations have creation designs that are leaned towards work rised administration, farming and industrialized. Public have less per capita pay and markets are generally little. Khan and Qayyum (2007) evaluated the effect of TO and monetary approaches and genuine investment rate on financial development. The outcomes demonstrated that TO, budgetary improvement and genuine interest rate applied affirmative effect on monetary development. The study likewise discovered an affirmative effect of TO on development both in the LR and in the SR. Ferrantino et al (1997) investigated to recognize the association among TO and GDP. However there are civil argument among scholar that related time period slack that require for complete influence of TO. Though trial writing explored that there is a solid affirmative association among TO and financial development especially in the rapidly developing nations. Mattoo, et. al. (2001) evaluated the effect of administration part TO on monetary development. OLS methodology used for data analysis. Finally results demonstrated that administrations division TO likewise have affirmative effect on GDP development. Khan. (2007), investigated the influence of TO on monetary development of Bangladesh. The outcomes demonstrated that physical assets and genuine investment rate have affirmative effect on LR monetary development while TO pessimistic influenced the development.

Yasmeen (2009), assessed part of human assets and compensate circulation in the TO lead in Pakistan. GC methodology is utilized for data analysis. Outcomes show that sex space and learning ability are most essential factors of salary. TO does not outcome in any danger to the horrible market and does not expanded work profit on account of Pakistan.

Hypothesis 2

H0 = There exist no association among TO and GDP.
H1 = There exist affirmative association among TO and GDP in Pakistan.
Literature review presumes that TO effects GDP affirmatively. It means higher TO to increase in GDP of Pakistan.

EC and GDP

Energy consumption is very important sector which is major contribution in economic growth of any country. This sector is considered to be instrument of socioeconomic development. Paul and Bhattacharya, (2004) investigated the SR and LR causality among EC and monetary development in India. They used integration and GC test and data utilizing annually base data for the time of 1950-1996. The general outcomes show the presence of bi-directional causality among EC & GDP. Outcomes demonstrated that comparative proof on the energy utilization setback for India. Yoo, (2005) researched the distinctive bearing of causality between power utilization and monetary development. He used cointegratin and Granger causality test for data analysis and data used from 1970 – 2002 annually of Korea. They discovered confirmation of bi-directional causality among EC and GDP. This study show & discovers an increment in power utilization impacts financial development and development of extra power utilization. The paper by Nawas et al. (2012) analyzed the believable impact of energy utilization at totals & sectoral level and development relationship in Pakistan. He used time series data from 1977-2010. This study likewise discovers LR & SR relationship among monetary development and EC. Their discoveries confirmed the incident of a LR association among EC & GDP. The GC technique outcomes demonstrated that both EC and monetary development in the business and administration separation additionally discovers confirmation of a LR association and bidirectional causality among EC & GDP.

Hypothesis 3

H0 = There exist no association among EC and GDP.
H1 = EC of a country effect GDP absolutely
Literature review that EC effects GDP positive it means affirmative EC to raise in GDP of Pakistan.

Agriculture and Economic Growth

Agricultures generally assume an essential part in the financial system of each country that survives. Not just for the cause that it has a tendency to maintain the whole populace of a nation additionally in the admiration that AGRI growth rate associates and cooperates with all the related commercial ventures of that nation. A nation is generally understanding to be a public and politically established country if it has a exceptionally stable undeveloped premise. Irregularity is a problem in attaining supported financial development whereas is a very significant purpose of any economy. The design of financial changeability in Pak will be difficult and there is no sufficient writing survives to research the agribusiness instability. In terms GDP the most unstable divisions are agrarian, mechanical and administration; while the minimum impulsive are conveyance, transportation, and interchanges. Ghosh, Nilabja et al (2009) recognized the primary factors of development instability of India. ARCH & GARCH techniques were used to check data analysis. Study used time series data from 1975-76 to 2005-06 to estimate the impact of

TO on value delicacy. Their outcomes demonstrate that the TO `develop in the shakiness of creation in the instances of fiber & groundnut though the 2nd nourishment granule yields got to be more built. Fiaschi, Davide et al (2005) inspected the fundamental sectors of development precariousness of a nation. They connected nonparametric strategy for investigation. They prescribed a model to illuminate the development rate precariousness along with structural change and the economy size. Their discoveries demonstrate that development unsteadiness is no critical identified with aggregate financial development, when there is monetary fuse on the planet markets and in isolation its effect is hazy. Additionally, development insecurity is no huge identified with the offer of farming on monetary development.

Hypothesis 4

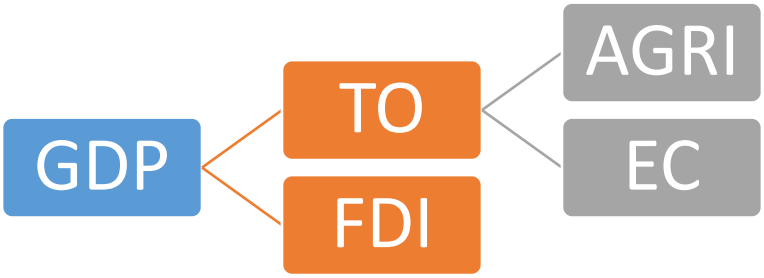
H0 = There exist no association among AGRI Growth Rate and GDP.
H1 = AGRI Growth Rate of a country affect GDP positively.
Literature review that AGRI growth Rate affects GDP affirmative. It means positive AGRI growth Rate affects increase in GDP of Pakistan.

Research Methodology

Theoretical Framework

Hypothetical system will be based upon Romer Endogenous or New development hypothesis model presented by them. Speculative framework can't avoid being based upon Romer Endogenous or New improvement speculation model exhibited . It illuminated that TO leads towards budgetary through diverse channels. TO extends capital inflow which takes a couple of structures like FDI which is an basic source of assets inflow which fulfills the wander fissure in the economy Romer (1986) and Lucas (1988). Further augmentation in progress method like farming advancement and vitality use will bring about development in job level which lessen dejection. It gives making new mechanical progression of made countries. It gives both buyer and manufacturer basic admittance to a greater markets so they can get the advantages o f economies of level. A substitute basic influence of TO lives up to expectations through data and development transmission. There can't avoid being strong verification that TO, AGRI Growth Rate, FDI and EC redesign the capability and profit through data and development flood. Impact of TO AGRI Growth Rate , FDI and EC AGRI Growth Rate on monetary improvement moreover give another channel to increase the GDP.

The purpose of our examination paper is to inspect the association among FDI, GDP, TO, EC and AGRI Growth Rate in Pak. Annual base data used has traversed the time of 1976 - 2013. There is five variables in our model, Growth Domestic Product (GDP), Foreign Direct Investment (FDI), trade openness (TO), Energy Consumption (EC) and Agriculture (AGRI).



Sources of Data

Study used time series data from 1976 to 2016 to analyze the determinants of economic growth in Pakistan. The data were obtained from World Development Indicators (WDI). Five variables were used in study to find out the determinants of economic growth. Determinants of economic growth in case of Pakistan.

Variables	Proxy	Data Source
Dependent Variable:		
Economic Growth	Natural log of GDP	WDI
Explanatory Variables:		
Foreign Direct Investment	Natural log of FDI	WDI
Trade Openness	Natural log TO	WDI
Energy Consumption	Natural log EC	WDI
Agriculture	Natural log AGRI	WDI

Model Specification

In order to examine the factors of GDP the model is formulated as:

Given the above discussion, the functional relationship between FDI, EC, TO, AGRI and GDP economic growth of Pakistan are expressed in the following way:

In order to examine the factors of GDP the model is formulated as:

$GDPt = f(AGRI, TO, FDI, EC)$ (i)

Where GDP represents economic growth (GDP), and AGRI, EC, FDI, and TO, represents agriculture, energy consumption, foreign direct investment, and trade openness respectively. By taking log we get. Equation-1 can only be estimated in its econometric form which is stated as follows:

$LGDPt = \beta 0+\beta 1LAGRI+\beta 2LEC+\beta 3LFDI +\beta 4LTO+\mu t$ (ii)

β 0denotes the constant term, $\beta 1$, β 2, $\beta 3$ and $\beta 4$ are slope coefficients representing parameters to be estimated and μt is the disturbance term assumed to be purely random.

Data & Methodology

The study plans to estimate the relationship among economic growth and other explanatory variables including agriculture, foreign direct investment, energy consumption and Trade Openness. Time series data is used from the year 1976 through the year 2013. The data is taken from the World Development indicators of Pakistan and all the variables are in log form.

Augmented Dickey Fuller (ADF) unit root test is used to determine the order of integration of the variables. While Johansen (1988) and Johansen and Juselius (1990) maximum likelihood estimation approach is used to test the co- integration and finally vector error correction models (VECM) is estimated to study the short run relationship.

Unit Root Test

In regression analysis data is assumed to be stationary i.e. shocks are temporary and overtime their effects will be eliminated in long run.[1] But in practice economic time series data are non-stationary i.e. the effect of shocks are permanent in long run. To diagnose stationary of the variables in our study ADF (Augmented Dickey-Fuller) test is used. ADF test is generally applied to the following type of models.

$$\Delta Y_1 = \beta_1 + \beta_2 \mathrm{t} + \alpha Y_{t-1} + \sum_{t=1}^{m} \rho_i \Delta Y_{t-i} + \mathrm{u}_t$$

Where ΔY_{t-i} is a lag difference term, β_1 Is a constant term and t shows time trend. The main point is to include enough lag difference terms so that the error term u_t becomes serially independent.

$\mathrm{H}_0: \alpha = 0$ (Unit Root)

$\mathrm{H}_1: \alpha \neq 0$

The test statistics has the null hypothesis of a unit root against the alternative hypothesis that the series is stationary. Large negative values are required to reject the null hypothesis of a unit root.

Co-Integration

Co-integration of two or more than two time series variable suggests that there is a long run or equilibrium, relationship between them.

The two main methods for testing for co integration are;

1. The Engle- Granger two- step method.
2. The Johansen and Juselius, Johansson (1998) procedure.

The study plans to use Johansen (1988) and Johansen and Joselius (1990) maximum likelihood estimation to test the co-integration which requires that the all the variables should be integrated of same order i.e. I (1). Once variables are found to be co-integrated, there always exists a corresponding error correction representation that implies that changes in the dependent variable are a function of the level of disequilibrium in the co-integrating relationship (captured by the error-correction term) as well as changes in other explanatory variable(s).

Error Correction Models

If long run relationship amongst the variables of concerned exists then error correction mechanism can be applied for short run association among the series. Sargan (1964) introduced ECM which was then modified by Engle and Granger in (1987).

At last we also use Granger causality test to analyze the causality between variables (Granger 1969). In case both variables can't avoid being composed demand one, I(1), and there can't avoid being a combination relationship between them, Granger causality test could be in perspective of the going hand in hand with Vector Error Correction Models (VECMs).

$$\Delta GDP_t = \alpha_1 + \sum_{i=1}^{l} \beta_{1i} \Delta FDI_{t-1} + \sum_{i=1}^{m} \gamma_{1i} \Delta GDPU_{t-1} + \sum_{i=1}^{n} \delta_{1i} \Delta TO_{t-1} + \sum_{i=1}^{q} \rho_{1i} \Delta EC_{t-1} + \sum_{i=1}^{r} \rho_{1i} \Delta AGRI_{t-1} + \varepsilon_{1i} ECT_{rt-1} + \mu_{1t} \ldots\ldots\ldots(I)$$

$$\Delta FDI_t = \alpha_1 + \sum_{i=1}^{l} \beta_{1i} \Delta FDI_{t-1} + \sum_{i=1}^{m} \gamma_{1i} \Delta GDPU_{t-1} + \sum_{i=1}^{n} \delta_{1i} \Delta TO_{t-1} + \sum_{i=1}^{q} \rho_{1i} \Delta EC_{t-1} + \sum_{i=1}^{r} \rho_{1i} \Delta AGRI_{t-1} + \varepsilon_{1i} ECT_{rt-1} + \mu_{1t} \ldots\ldots\ldots(II)$$

$$\Delta TO_t = \alpha_1 + \sum_{i=1}^{l} \beta_{1i} \Delta FDI_{t-1} + \sum_{i=1}^{m} \gamma_{1i} \Delta GDPU_{t-1} + \sum_{i=1}^{n} \delta_{1i} \Delta TO_{t-1} + \sum_{i=1}^{q} \rho_{1i} \Delta EC_{t-1} + \sum_{i=1}^{r} \rho_{1i} \Delta AGRI_{t-1} + \varepsilon_{1i} ECT_{rt-1} + \mu_{1t} \ldots\ldots\ldots(III)$$

$$\Delta EC_t = \alpha_1 + \sum_{i=1}^{l} \beta_{1i} \Delta FDI_{t-1} + \sum_{i=1}^{m} \gamma_{1i} \Delta GDPU_{t-1} + \sum_{i=1}^{n} \delta_{1i} \Delta TO_{t-1} + \sum_{i=1}^{q} \rho_{1i} \Delta EC_{t-1} + \sum_{i=1}^{r} \rho_{1i} \Delta AGRI_{t-1} + \varepsilon_{1i} ECT_{rt-1} + \mu_{1t} \ldots\ldots\ldots(IV)$$

$$\Delta AGRI_t = \alpha_1 + \sum_{i=1}^{l} \beta_{1i} \Delta FDI_{t-1} + \sum_{i=1}^{m} \gamma_{1i} \Delta GDPU_{t-1} + \sum_{i=1}^{n} \delta_{1i} \Delta TO_{t-1} + \sum_{i=1}^{q} \rho_{1i} \Delta EC_{t-1} + \sum_{i=1}^{r} \rho_{1i} \Delta AGRI_{t-1} + \varepsilon_{1i} ECT_{rt-1} + \mu_{1t} \ldots\ldots\ldots(V)$$

Where [*GDP*, *FDI*, *TO*, *EC*, *AGR*] economic growth, agriculture, foreign direct investment, energy consumption and Trade Openness rate are respectively. While Δ is the difference operator, *ECT* refers to the error-correction term(s) derived from the LR co-integrating association via the Johansen maximum likelihood procedure, and *ui's* are serially uncorrelated random error terms with mean zero. Vector Error Correction Mechanism (VECM) is then used for estimation of SR adjustment of the variables toward their LR association.

Diagnostic Test:

Stability and diagnostic test are used to consider the difficulty of autocorrelation, its normality and problem of Hetroscedasticity.

Granger Causality:

The playing purpose of using Toda and Yamamoto's system for testing for GC has some exceptional advantage. Toda and Yamamoto (1995) proposed a clear framework obliging the assessment of VAR, the Wald statics is considerable despite whether a period course of action is cointegrated or not. There is multivariate GC test (block exogeneity test) is conducted through the VAR technique.

Impulse Response & Variance Decomposition:

The vector autoregressive (VAR) (Impulse reaction capacities and Variance Decompositions) is likewise utilized. This is on account of the fundamental data contain in co integration variables is made clearer through variance decomposition and impulse response analysis.

Empirical Estimation and Results

The aim of the study is to find out relationship between GDP, Agriculture, FDI,TO and EC and to find the impact of these variables on GDP.

Statistical Analysis

Table 1.Statistical Analysis

	GDP	Agriculture	FDI	Energy Consumption	Trade Liberalization
Mean	2.281510	26.48025	0.860008	52978.76	33.75053
Median	2.075721	26.01724	0.590509	52398.80	33.85413
Maximum	6.602479	32.33369	3.668323	84844.56	38.90949
Minimum	-1.642417	21.46540	0.061630	20588.62	27.71982
Std. Dev.	1.933430	2.874709	0.850208	21924.37	2.855521
Skewness	0.220373	0.455725	1.997245	0.075109	-0.250325
Kurtosis	2.476089	2.366478	6.485393	1.639489	2.563718
Jarque-Bera	0.742170	1.950810	44.49786	2.966465	0.698238
Probability	0.689985	0.377040	0.000000	0.226903	0.705309
Sum	86.69737	1006.250	32.68029	2013193.	1282.520
Sum Sq. Dev.	138.3116	305.7662	26.74556	1.78E+10	301.6979
Observations	38	38	38	38	38

Before heading off to the time arrangement econometric examination, a statistical investigation is done. Our complete information set comprises of thirty eight years of yearly perceptions from 1976 to 2013. The illustrative measurements are demonstrated in table 1 and shows that the GDP item development is 2.28 with standard deviation of 1.93. The average for TO is 33.75 with standard deviation of 2.86, the average for AGRI is 26.48 with the standard deviation of 2.87, the average for EC is 52978.76 with standard deviation of 21924.37, the FDI is 0.86 with standard deviation of 0.85.

All the variables are correct skewed with the exception of TO which are adversely skewed. Kurtosis measurement of the variables demonstrates that just FDI is leptokurtic (since a long time ago tailed or higher crest) and all different variables are platykurtic (short tailed or lower top) A Jarque–Bera test demonstrates that the residuals of FDI is not regularly appropriated while all different variables are ordinarily dissemina.

Correlation relationship:-

Correlation Analysis:

Table 2: Results of Correlation Matrix

	GDP	AGRI	EC	FDI	TO
GDP	1.000				
AGRI	0.09268	1.000			
EC	0.4491	-0.3335	1.000		
FDI	0.1319	-0.0461	0.3701	1.000	
TO	-0.7125	0.1046	-0.3974	-0.2614	1.000

Correlation network demonstrates the quality of the relationship of variables. Table 2 demonstrates that a few variables are absolutely associated and some are adversely related with one another. The variable financial development rate (GDP) is decidedly positively related with all variables except from exchange openness (TO). Energy consumption (EC) and FDI are contrarily connected with TO and AGRI is adversely associated with EC and FDI. It is likewise watched that GDP is additionally profoundly and absolutely related with the utilization of Energy, FDI and Agriculture.

Time Series Analysis

Firstly there is data aanlysis based on stationary procedure of five variables (FDI, TO, EG , AGRI & GDP). The Phillips-perron and Augmented dickey-fuller tests are used to check the results that whether the data series are stationary-non stationary.

Phillips Perron Test

The results are following: Table 3: showing the results of Phillips perron test at level and Ist difference form.

Variables	Level		Ist Difference	
	Test Statistics	Probability	Test Statistics	Probability
LGDP	-3.988695	0.0038*	-22.63530	0.0001*
LFDI	-2.636614	0.0949 *	-5.069878	0.0002*
LTO	-3.052863	0.0392*	-17.12108	0.0000*
LEC	-3.820267	0.0060*	-3.49719	0.0138*
LAGRI	-1.751145	0.3981	-6.3619	0.0000*

Interpretations:-

The above table shows that GDP,FDI, TO and EC are stationary at the significant level of 0.05% so in this case the H0 is rejected and the H1 is accepted which are stationary at significant level but AGRI is non significant at level. However at Ist difference to checking the stationarity, it is clear that all the variables are stationary at Ist difference 0.05% level through PP unit root test.

Augmented Dickey – Fuller Test

Table 4, showing the result of Augmented Dickey Fuller test at level Ist difference form

Variables	Level		Ist Difference	
	Test Statistics	Probability	Test Statistics	Probability
LGDP	-3.988695	0.0038 *	-5.660348	0.0000*
LFDI	-2.627603	0.0966 *	-5.074919	0.0002 *
LTO	-3.211204	0.0272 *	-9.455809	0.0000 *
LEC	-4.228652	0.0020 *	-3.451830	0.0155 *
LAGRI	-1.770587	0.3887	-6.03302	0.0000 *

Interpretations:-

The above table shows that GDP,FDI, TO and EC are stationary at the significant level of 0.05% so in this case the H0 is rejected and the H1 is accepted which are stationary at significant level but AGRI is non significant at level. However at Ist difference to checking the stationarity, it is clear that all the variables are stationary at Ist difference 0.05% level through ADF unit root test.

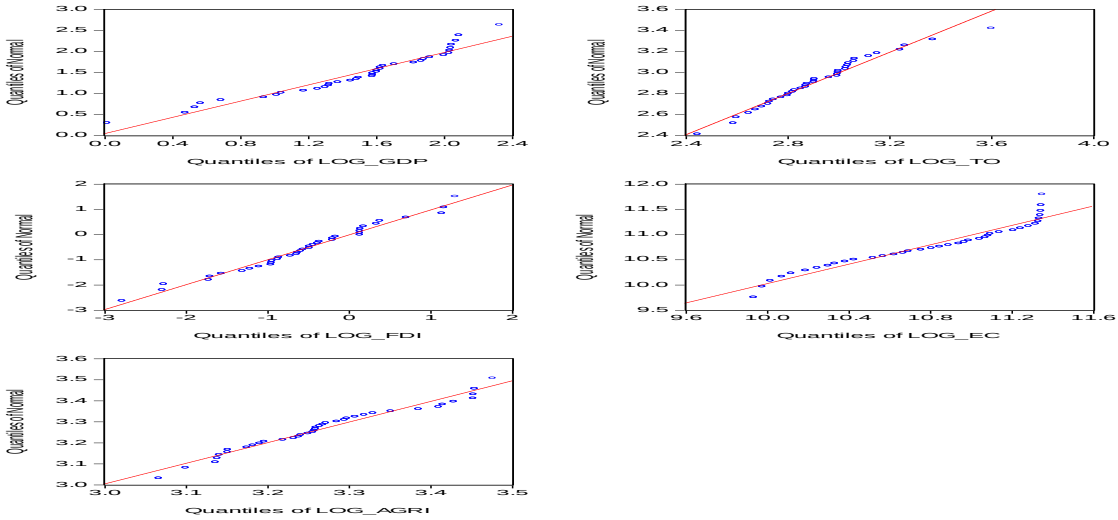


Figure 1 Quartile Diagram showing GDP, FDI ,Trade Openness, Energy Consumption and Agriculture

Interpretation:-

The output displays the perfect normal distribution, the red line, and the actual observations, the blue dots, within each group. As we can see there exists only minor deviations from the red line and therefore we conclude that the assumption concerning normal distributed errors is satisfied.

Co-integration test between GDP , FDI , Trade Openness, Energy Consumption, & Agriculture Rate

Table 5, showing the result of Johansen co-integration test

Panel A		**Trace Test**		
Hypothesized		**Trace**	**95%**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.**
None *	0.937748	219.7567	76.97277*	0.0000**
At most 1 *	0.856603	128.1298	54.07904*	0.0000**
At most 2 *	0.762459	64.03928	35.19275*	0.0000**
At most 3	0.311843	16.60462	20.26184	0.1480
At most 4	0.121405	4.271232	9.164546	0.3732
Panel B	**Maximum Eigenvalue**			
Hypothesized		**Max-Eigen**	**95%**	
No. of CE(s)	**Eigenvalue**	**Statistic**	**Critical Value**	**Prob.**
None *	0.937748	91.62687	34.80587*	0.0000**
At most 1 *	0.856603	64.09054	28.58808*	0.0000**
At most 2 *	0.762459	47.43466	22.29962*	0.0000**
At most 3	0.311843	12.33338	15.89210	0.1675
At most 4	0.121405	4.271232	9.164546	0.3732

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Panel C. Normalized cointegrating coefficients
LGDP = 0.209827LFDI + 0.518762LEC + 2.980961LAGRI + 1.173466LTO

(0.07719)	(0.18578)	(0.50359)	(0.7606)
[2.71831]*	[2.79234]*	[5.91942]*	[15.42816]*

Note:* indicates rejection of the null hypothesis at 5% significance level. Standard errors are in brackets and t values are in parentheses.

In Table – 5 there is conduct cointegration technique to check the results of long run relationship between FDI, TO, EC, AGRI Growth and GDP.This result exposes nullhypothesis of no-cointegration technique technique between theses variables are rejected at the 5% point of implication The trace test statistically demonstrate that there are 3 cointegrating associations. The maximal eigenvalue statistics expose 3 cointegrating associations along with real GDP and FDI, TO, EC, Agriculture components. The finale drawn from this consequence is that there subsists a exclusive LR association among GDP , EC, TO, FDI and Agri. An economic interpretation of the LR function can be obtained by normalizing the estimates of the unconstrained cointegrating vector on the GDP. The estimated results of the cointegrating for the LR equation are represented in panel-C of Table-5. The outcomes in panel-C of Table-5 show a affirmative and significant association among GDP and TO, EC, Agri , FDI. This is consistent with economic theories.
In long run trade openness totally impact the human capital game plan in the economy by giving business opportunities and by data and inventive change Aurangzeb and Malik et al. 2010. The study of Khan et al (2011). Aurangzaib et al (2011) and Yousaf et al.(2008) also found positive impact of foreign direct investment on economic growth in long run. However, the study of Masih & Masih(1996), Khan & Ahmad(2009) and Rufael(2010) also found positive impact energy consumption on economic growth in long run and short run. In previous study of Anthony(2010), Awokuse(2009) and Akram Waqar et al.(2006) also show positive impact of agriculture on economic growth in long run.

Error Correction Model

For short run analysis the study uses the Vector Error Correction Mechanism. It measures the speed of adjustment to restore equilibrium. The ECM is found to be working and the adjustment process is statistically significant. Details of the adjustment process are given in Table 6. The ECM shows the expected pattern of changes for agriculture, TO, EC and FDI in response to dis-balance forces. If the worth of VECM is pessimistic it means the model is convergent in the direction of equilibrium. If the value of VECM is affirmative it means in SR the model moves away from the equilibrium.

Table-6: Estimates of the Vector Error-Correction Model

Error Correction:		D(LOG_GDP)	D(LOG_FDI)	D(LOG_TO)	D(LOG_EC)	D(LOG_AGRI)
CointEq1	Coefficient	0.115465	-0.084342	0.05226	0.000229	0.016033
	Standard Error	(0.07289)	(0.05292)	(0.02339)	(0.00226)	(0.00374)
	t-Stat	[1.58407]	[-1.59374]	[2.23432]	[0.10172]	[4.29193]
D(LOG_GDP(-1))	Coefficient	-0.612821	0.351154	0.148147	0.012548	-0.026693
	Standard Error	(0.44373)	(0.32215)	(0.14238)	(0.01373)	(0.02274)
	t-Stat	[-1.38108]	[1.09002]	[1.04047]	[0.91368]	[-1.17384]

D(LOG_GDP(-2))	Coefficient	-0.246977	0.238004	0.034513	0.020904	-0.00216
	Standard Error	(0.43638)	(0.31682)	(0.14003)	(0.01351)	(0.02236)
	t-Stat	[-0.56596]	[0.75122]	[0.24647]	[1.54769]	[-0.09658]
D(LOG_FDI(-1))	Coefficient	-0.345103	0.084987	0.158303	-0.004835	-0.003732
	Standard Error	(0.31043)	(0.22538)	(0.09961)	(0.00961)	(0.01591)
	t-Stat	[-1.11170]	[0.37709]	[1.58920]	[-0.50324]	[-0.23458]
D(LOG_FDI(-2))	Coefficient	-0.23678	0.015705	0.172008	0.014752	-0.013177
	Standard Error	(0.24796)	(0.18002)	(0.07957)	(0.00767)	(0.01271)
	t-Stat	[-0.95490]	[0.08724]	[2.16181]	[1.92216]	[-1.03698]
D(LOG_TO(-1))	Coefficient	-1.462488	1.382758	0.444392	0.006198	-0.201734
	Standard Error	(1.66942)	(1.21203)	(0.53569)	(0.05167)	(0.08555)
	t-Stat	[-0.87605]	[1.14086]	[0.82957]	[0.11995]	[-2.35797]
D(LOG_TO(-2))	Coefficient	-0.916048	1.172623	0.316424	0.045885	-0.040589
	Standard Error	(1.40865)	(1.02271)	(0.45201)	(0.04360)	(0.07219)
	t-Stat	[-0.65030]	[1.14659]	[0.70003]	[1.05243]	[-0.56225]
D(LOG_EC(-1))	Coefficient	-1.225015	-1.617743	-0.243563	-0.041031	0.268072
	Standard Error	(7.10066)	(5.15521)	(2.27849)	(0.21977)	(0.36389)
	t-Stat	[-0.17252]	[-0.31381]	[-0.10690]	[-0.18670]	[0.73668]
D(LOG_EC(-2))	Coefficient	-2.078863	0.002753	-1.721264	0.026783	0.951769
	Standard Error	(6.31694)	(4.58621)	(2.02700)	(0.19551)	(0.32373)
	t-Stat	[-0.32909]	[0.00060]	[-0.84917]	[0.13699]	[2.94001]
D(LOG_AGRI(-1))	Coefficient	-4.256503	-3.974157	0.574333	-0.017458	-0.399284
	Standard Error	(3.50945)	(2.54793)	(1.12613)	(0.10862)	(0.17985)
	t-Stat	[-1.21287]	[-1.55976]	[0.51001]	[-0.16072]	[-2.22007]
D(LOG_AGRI(-2))	Coefficient	-6.20023	0.050333	2.552346	-0.104214	-0.297207
	Standard Error	(3.76491)	(2.73340)	(1.20810)	(0.11653)	(0.19294)
	t-Stat	[-1.64684]	[0.01841]	[2.11269]	[-0.89433]	[-1.54038]
R-squared		0.419099	0.447929	0.536589	0.642236	0.660250
Adj. R-squared		0.102243	0.146799	0.283819	0.447092	0.474931
F-statistic		1.322681	1.487494	2.122837	3.291085	3.562787

Diagnostic Statistics:

BG=0.81926(0.075), ARCH(1)=0.1577(0.6937), RESET=1.261960(0.2696),

JB [$\chi 2$ (2)]=0.3093(0.8567), Hetroscedasticity White=0.79985(0.6612)

Note: ARCH: Engle's test for conditional heteroskedasticity; BG: Breusch-Godfrey LM (4) test for serial correlation;

Hetroscedasticity White JB:Jarque-Bera test for normality of residuals Based on test of Skewness and Kurtosis of residuals;RESET: Ramsey's test for specification error. [Probability values are in the squared brackets].

The consequences of VECM ahort run and many diagnosotic tests are presented in Table – 6. Due to change in results of ECM for GDP is superior significant at on 1%.

This involves that a GC runs from AGRI, EC, FDI and TO to GDP in Pak. The outcome demonstrates that there is a affirmative effect of AGRI, EC and TO on GDP in SR respectively.

Since FDI has pessimistic impact on GDP in SR. The pessimistic sign demonstrates that the model is convergent in the direction of balance and the value shows the speed of modification of the model. It means that adjustment speed of previous year disequilibrium to current year is 8 % of FDI.

Diagnostic tests of Model

Diagnostic test is conducted to observe the issues of serial correlation and Hetroscedasticity. The value of DW-Statistics is 2.051056 therefore it is concluded that there is no problem of autocorrelation. The Diagnostic test clearly demonstrate no problem of serial correlation, Hetroscedasticity, Lagrange Multiplier (LM), Normality and Ramsey Reset Test.

The diagnostic tests reported in Table-6 show that there is no evidence of diagnostic problem with the model. Looking at the probability value of the Jarque-Bera (JB), which is given in the bracket, the null hypothesis of normally distributed residuals cannot be rejected.

The Lagrange Multiplier (LM) test of no error autocorrelation suggests that the residuals are not serially correlated. The Autoregressive Conditional Heteoskedasticity test reveals that the disturbance term in the equation is homoskedastic.

The Ramsey RESET test result shows that the calculated F-value is less than the critical value at the five percent level of significance. This is an indication that there is no specification error.

Impulse Response Analysis

The impulse response function is presented in Figure-1.

Figure-3 represents that the result of S.D of all variables. According to the results impulse responses do appear very responsive. However, results show positive impact of other four variables on GDP.

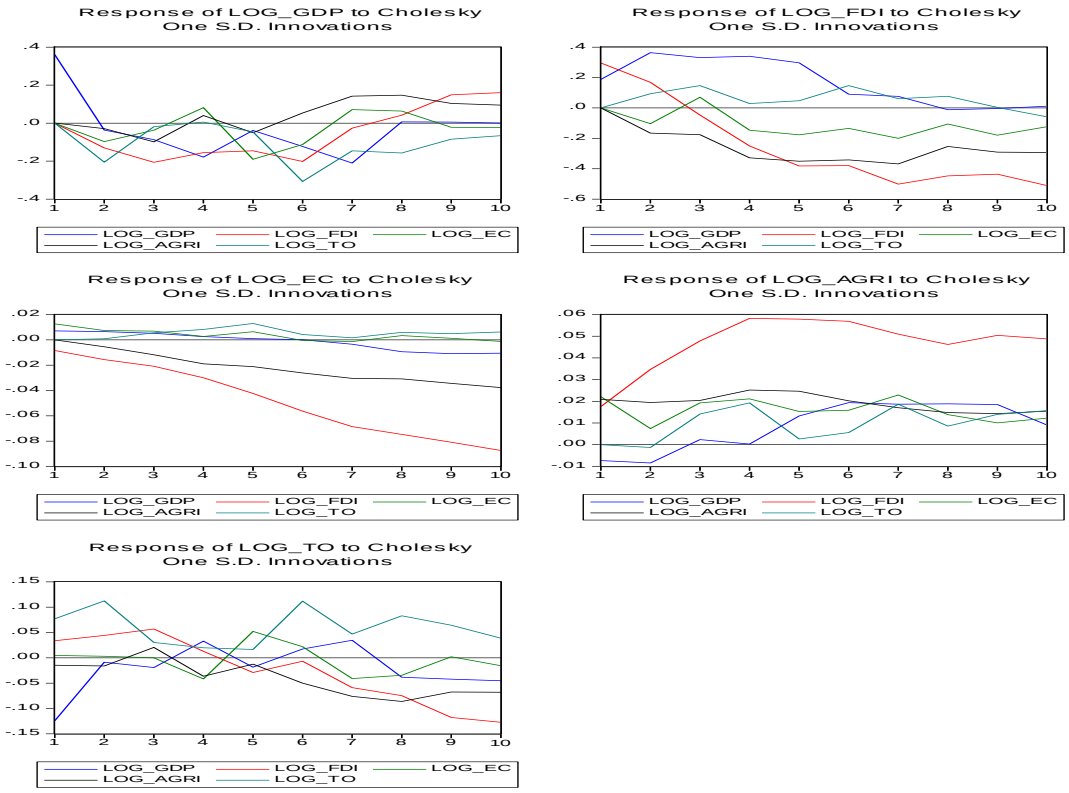


Figure- 3:Impulse Response Function

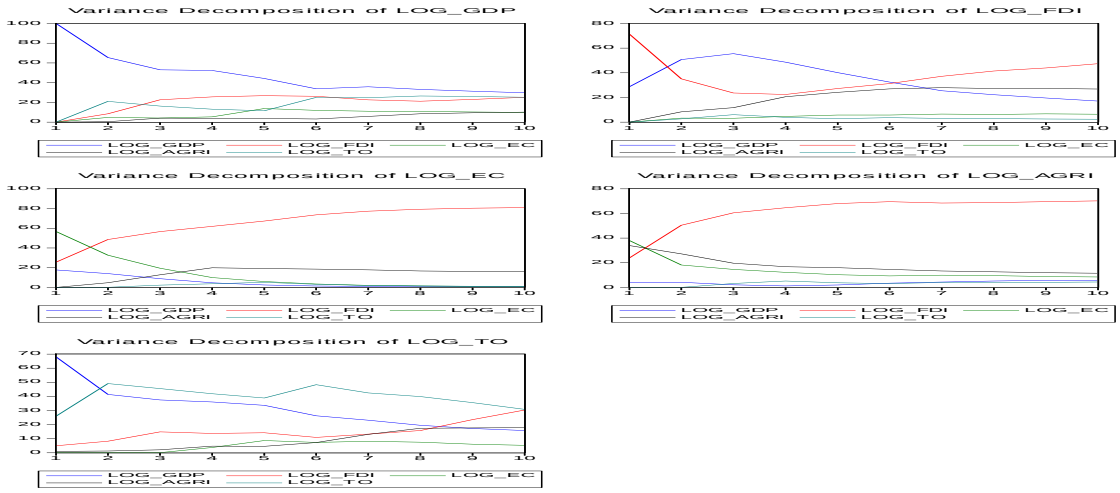
Decomposition of Variance Analysis

Variance Decomposition

Table-7:Variance Decomposition of GDP(Economic Growth)

Period	S.E.	LOG_GDP	LOG_FDI	LOG_TO	LOG_EC	LOG_AGRI
1	0.360969	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.448555	65.42459	8.434748	21.00929	4.706354	0.425014
3	0.512624	52.99946	22.61700	16.22008	4.136084	4.027371
4	0.572006	52.34178	25.54938	13.03515	5.345648	3.728040
5	0.625303	44.18112	26.81235	11.45855	13.77351	3.774466
6	0.746054	33.75110	26.14383	25.00734	11.94081	3.156917
7	0.804967	35.80716	22.56767	24.76658	11.03590	5.822696
8	0.836733	33.14605	21.13732	26.45923	10.78498	8.472415
9	0.860665	31.33259	22.97222	25.97539	10.26071	9.459092
10	0.883357	29.74351	25.10274	25.21429	9.813296	10.12616

Table-7 gives the portion of the gauge blunder difference for every variable that is credited to its own particular advancement and to developments in an alternate variable. The own stuns of the GDP (financial development) constitute a huge wellspring of variety in development figure blunder in the time skyline, running from 100% to 29%. Ten years after, variety in development are accounted by TO (25%), AGRI (10%) and FDI (25%) stun while that of EC (9%) is moderately little in Pakistan. The remarkable peculiarity of this is that the prevalent wellsprings of variety in development are Trade Openness and FDI. Comparative classifications hold for the varieties in development is the other figure periods. This demonstrates that the Granger causality runs from Agriculture, Energy Consumption (EC), Trade Openness (TO) and Foreign Direct Investment (FDI) to GDP (monetary development).



Variance Decomposition through Figure 4

Block Exogeneity Tests

Block exogeneity tests are used to determine how the variables enter the model. It is a multivariate generalization of Granger causality tests.

Table 8 :VAR Granger Causality/Block Exogeneity Wald Tests

Dependent variable: D(LOG_GDP)			
Excluded	**Chi-sq**	**df**	**Prob.**
D(LOG_TO)	0.412654	2	0.8136
D(LOG_FDI)	2.391500	2	0.3025
D(LOG_EC)	5.048189	2	0.0801
D(LOG_AGRI)	9.470196	2	0.04795
All	8.425072	8	0.03931

The block of exogeneity tests in Table-8 reveal that AGRI growth rate and EC should enter the model at two lags. This demonstrates that the GC runs from AGRI & EC to GDP (economic growth), which opposes theory and experimental researchin terms of FDI and TO. Only agriculture and EC are significant in the model.

Conclusion

This study is designed to check the relationship among foreign direct investment (FDI), energy utilization (EC), Trade Openness(TO), Agriculture and monetary development (GDP) and also the effect of these variables on financial development in Pak. A causality investigation of the FDI, EC, TO, AGRI and GDP were attempted keeping in mind the end goal to check the importance of the monetary development theory in the Pak economy.

The study used technique to check the data analysis and LR Co integration relationship among agriculture, TO, EC, FDI and GDP for Pak using Johansen multivariate Co-integration technique. The basic objective of our research is to investigate the determinants of GDP. For this purpose time series data were used from 1976-2013. GDP is the dependant variable and agriculture, TO, EC, FDI, is used in the analysis as explanatory variable.

The results explained that all the four explanatory variables are significant in LR. In LR there is positive impact of agriculture, TO, EC, FDI and GDP on economic growth, although there is positive for short run as shown by VECM except foreign direct investment because FDI is negative impact on GDP for short run as shown by VECM. The outcomes show that in case of Pakistan, agriculture, TO, EC, FDI and GDP are major determinants of GDP to country.

However, the block of Exogeneity tests shows that the Granger causality runs from agriculture, Trade Openness, Energy Consumption and Foreign direct investment on economic growth . Only agriculture and energy consumption are significant.

However, the result of the error correction model shows that there is a positive, negative, positive and negative effect of agriculture, Trade Openness, Energy Consumption and Foreign direct investment on GDP respectively.

Policy Recommendations

On the basis of results the study has some policy suggestions as mentioned below.

1) Government should focus on these policies that increment in export and decrease in import, more concentrate on the production of agriculture sector, education sector and industrial sector.
2) It is prescribed that the policy producers and governments should to concentrate on enhancing framework, settle political environment, and build human assets to increment monetary development of Pakistan.
3) Nowadays, Government is spending excessively on offices specifically occupied with battling terrorist exercises, generally on safeguard and country security. The administration must give careful consideration to separate the products of financial development on equivalent premise to control terrorism.
4) Government should to concentrate on preparing of the farmers and teaching them properly to change their mentality and training them to take up new exercises or embrace foreign innovation is most extreme essential to increment financial development in Pakistan.
5) Encouraging and inviting environment should to be given to the foreign financial specialists with a specific end goal to pull in more FDI into the economy.
6) Government should to enhances the foundation and sponsorships provincial and agrarian power, it would fundamentally improve agricultural share of GDP.

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