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External Sector and Economic Growth of Pakistan: A Time Series Analysis

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Abstract

The purpose of the present study is to explore the impact of the indicators of external sector such as trade openness, foreign direct investment and external debt on economic growth of Pakistan by employing ARDL approach on time series data over the period of 1980 –2013. Some control variables i.e., education, labor force participation and physical capital have also been included in the model because they have a key role in explaining the economic growth as suggested by various growth theories. To check long run dynamics we used ARDL approach and to find out short run dynamics we used error correction model (ECM). The study concluded that there exists a long run as well short run relationship between indicators of external sector and the economic growth. Foreign direct investment and trade openness positively affect economic growth while the external debt negatively effects economic growth of Pakistan. The variable physical capital has significant positive impact on economic growth in long run and insignificant negative impact in short run, while education and labour force participation rate have significant positive association with economic growth in short as well as in long run. It is suggested that gross domestic product can be increased with the increase in education/skills, labour force participation, trade openness and foreign direct invest. External debt inhibits economic growth of Pakistan. Government and higher authorities should formulate such policies that enhance the level of openness, physical capital, foreign direct investment, education and labour force participation for sustained economic growth of Pakistan.

Keywords: External Debt, trade openness FDI, economic growth, Pakistan.

Introduction

Globalization has its fruitful impacts on the economies but its impacts on various economies are different. It depends on the degree of openness, structure and nature of an economy. It is related with the deregulation of product and labour markets, with regionalization, and with the liberalization of international trade[1]. I has been observed that all those economies which believed upon trade openness; increase their social welfare by getting specialization on the sectors in which they have comparative advantages. Those economies which believe upon export led growth policies, generally, are experiencing high growth rates. Export led policies can be applied only in the countries which have strongly believed on trade openness[2]. It is concluded that openness will positively affect the economic growth and, then, economic growth will affect the human development. If economies are following trade free policies they will not only exchange goods and services but also exchange ideas, ideology and technology. If countries will exchange technology, ideas and ideology then people of the world have the opportunities to get the better choice. These arguments show that openness has positive effects on human development.

Trade liberalization or trade openness is a tool that breaks monopoly. Mostly, empirical studies have found that economic growth increases with the increase in openness of trade. If a country believes on trade liberalization then it will follow the export led policies. It has been observed that all those firms which export their goods, they become more productive due to their foreign exposure and competitiveness.

The flow of private capital in the form of FDI was one of the remarkable features of economic globalization in 1990[3]. Economic globalization results in an increase in markets and business's interdependence and connectivity. It removes the barriers and restrictions on give-and-take of products, commodities and knowledge across the regions. Generally, it is expected by economic globalization that it reduces the poverty and make a cause of development in the economies through faster growth. It enhances the financial, cultural and trade reliance among the countries[4]. Burger and Krueger have the view that trade openness increases aggregate income and economic growth. Harrison explained that trade openness is similar to neutrality which means one can save foreign exchange's unit through import-substitution or can earn foreign exchange's unit through exports[5]. According to IMF, economic globalization enhances the mobility of the labor and technology across the boarders and also integrates the economies all over the world[6]. Globalization has widened the political, cultural and environmental dimensions.

Gigantic external debt burden is the major impediment in the way of economic growth of a developing country. It may lead to devastation as it discourages autonomy and self-reliance. Instead of development and growth of developing it has become an epidemic threat. The growth rate of physical capital of developing countries remains sluggish due to low per capita income. Human capital increases with the increase in skill, knowledge and transfer of technology and economic development enhances with increase in human capital formation. Sustainable economic growth depends upon social development which is possible by formation of human capital. The economies having just income distribution, greater budget for education observe low poverty, higher social development and economic growth as suggested by[7]Ranis and Stewart. Suri, Boozer and anis observed that human development and growth are complementary to one another[8].

Literature Review: External sector plays an important role in the development of a country. Mostly, empirical studies have found a positive impact of indicators of external sector i.e., foreign direct investment and trade openness on economic growth. A higher per capita GDP means more FDI, indicating a positive relationship[12]. Empirical literature showed a two-way relationship between openness and growth, and FDI and growth. In the following relevant literature review is presented.

Zeren and Ari found a bidirectional causality between trade openness sand economic growth[13] by using a Granger non-casualty test for heterogeneous panel data of G7 (Germany, France, Canada, Japan, Italy, United States and United Kingdom) for their research developed by Dumitrescu and Hurlin. The trade openness increases growth and growth and growth in turn increases trade openness. Kahnamoui observed the association between trade openness and economic growth, and trade restrictions and growth by analyzing a panel data of 90 non-organizations for OECD countries for three decades. He used simple ordinary least square method to get the econometric results. The study found a direct positive association between trade openness and economic growth. The study did not find the impact of any kind of change in trade barriers on economic growth due to the existence of export credits. He has the view that both countries will get benefit in this case. Manni and Afzal explored the relationship trade liberalization and economic growth in Bangladesh[14]. They used time series data from 1980-2010 and data was taken from World Development Indicator (2010). A positive relationship was found between openness and growth. According to them real exports are a function of openness, domestic real income, terms of trade and real exchange rate. They found a positive relationship among these variables. They found an inconclusive relationship between openness and rate of inflation. The study concluded that openness positively affects economics growth of Bangladesh and trade liberalization is good for the exports of the country, if the exports will increase then economic growth will be high after1990s. It was suggested that trade liberalization is good and favorable policy for the developing countries.

Asongu analyzed human development through two-stage least square (2SLS) methodology and examined the impact of trade on financial openness of 52 African countries. His time span was 1996 to 2010. He concluded that trade openness has positive association with human development and financial openness is negatively related with human development in African countries[15]. Georgios took one set of panel data containing 56 countries and time period second set containing105 countries covering the time period 1960-1997. He obtained all the data from the Penn World Table (PWT, Mark 6.0) and used the benchmark model to get the results[16]. He concluded that trade openness has significant positive impact on economic growth. He suggests that trade openness is good for the countries.

Yanikkaya explored a connection between a various openness measures and economic growth. The author explained the foremost tradeopenness measures of as the ratio of exports plus imports to GDP. He argued that both imports and exports are very important for the economic performance. He further argues that those developing countries which trade with the developed countries get more benefits than those which trade only with developing countries. For example, U.S. bilateral trade is more beneficial and good for the developing countries[17].

Reuveny and Li used GINI coefficient as an indicator of income inequality to examine the effects of openness on income inequality. They used pooled time series analysis for 69 countries and time span was 1960 to 1996. They found statistically significant results that trade openness decreases income inequality in less developed countries whereas increases income inequality in developed countries[18]. Eusufazai have analyzed the relationship between higher growth rates and higher development .He used Pearson correlation coefficients for the calculation between Dollar's Openness Index and different types of HDIs for different types of countries. He found the positive and higher correlation between openness and HDIs[19].

The present study is very important in filling the gap already present in literature by using the benefits of the recent investigations in non-stationary, heterogeneous panel data methodology, in the end basic objectives of the study is to find out economic growth.

Data Sources and Methodology

This empirical work have used time series data on trade openness, foreign direct investment, physical capital, education, labor force, debt (external) and economic growth for the span of 1980-2013. Data was taken from Annual Reports State Bank of Pakistan, Pakistan Economic Survey, United Nations Development Program and World development indicators.

Model Specification: The present econometric model is specified on the ground of past studies and personal perceptions.

A good econometric model is the one with high regression coefficient, having a single equation, free from heteroskedastic and autocorrelation, which assures model stability, one which is a good forecaster and must include correct variables. The empirical results of the model at hand met the above mentioned features of the econometric model and pointed towards the correct choice of the variables inclusion and investigation. The accurate model specification is a central assumption for the estimation and inference as investigated by various statisticians in 70's and 80's.

In the literature of economics, a large number of approaches to co integration are applied. These techniques are applied to examine and check the relationship among the variables under consideration. Among all other techniques such as Johansen, Gregory and Hansen ARDL approach to co integration, the best one is ARDL approach to co integration[20].

ARDL approach was established by the Pesaran and Shin and Pesaran et al. It is best suitable for a small sample size consisting thirty to eighty observation in the data set. In the procedure of co integration, this ARDL bound testing approach contains dummy variables as well.

ARDL has some advantages over the other standard and rationally used co integration approaches because of certain reasons. First one is that ARDL can be employed when variables are integrated at level I (0) or first difference I(1) or whether they are jointly integrated. However, before applying ARDL bound testing approach it must be ensure that among the explanatory variables, not even a single one is integrated at second difference I(2) or higher order of integration. If there exists some series which are integrated at second difference I (2) or higher order then ARDL bound testing approach will be considered inefficient and will not be applicable. Moreover, ARDL confiscates the problem of serial correlation or autocorrelation because it differentiates the variables which one is dependent and independent variable[21].

ARDL bound testing approach provides efficient and unbiased estimates. Thorough bound test we can see short run as well as long run relationship among variables, this approach estimated the co integration relationship by OLS method of lag order while other approaches Johansen and Juselius (1988) do not use this approach. Estimatedthe co integration relationship by ordinary least square when process of lag order is known. Fosu and Magnus reported that for the data analysis and estimation procedure (ARDL) approach to co integration is simple and best technique as compared to other co integration approaches, Sezgin and Yildirim explained that with the implementation of ARDL bound testing approach; ECM can also be modeled out by the data series. The error correction model drawn by it permits to inference for the estimates of long run[22].

All above described leading points of Autoregressive Distributive Lag approach to co integration over other standard co integration approaches like Johansen, Johansen-Juselius Gregory and Hansen are the rationale of implementation of this bound testing approach on this study to estimate and analysis the relationship among the variables GDP, Education, Labor force, FDI, openness and debt.

The followings models have been estimated.

$GDP = \beta_0 + \beta_1 Edu + \beta_2 Pcap + \beta_4 L.for + \beta_4 Debt + \beta_5 FDI + \beta_6 TO + \varepsilon$

Table -1
List of Variables

Dependent Variable	
GDP	Gross Domestic Product
Independent Variables	
TO	Trade Openness [(exports/ (GDP + imports)].
Edu	Education (Overall Literacy rate)
Lfor	Labour Force Participation Rate
Debt	External Debt Stock of Pakistan
P.cap	Physical Capital (Gross Fixed Capital Formation)
FDI	Foreign Direct Investment

Explanation of the variables: Variables used in the model are gross domestic product (GDP), trade openness (TO), education (Edu) labour force (Lfor), physical capital (P. cap), and foreign direct investment. (FDI) and External Debt (Debt). Model above shows that GDP is dependent variable, while trade openness (TO), Gross domestic product (GDP), education, labor, debt, and physical capital are independent variables. Economic growth of a country is measured basically by GDP.

Literature review suggested that trade openness is the key factor in the way of economic growth of a country. In this study openness to trade will be measured by trade ratio to gross domestic product. The ratio of exports to GDP and imports has been used as an indicator of trade openness.

Education is also considered as a main source of measuring economic growth for this purpose we use overall literacy rate of a country.

Stock of Physical Capital in real terms; gross fixed capital formation deflated by GDP deflator has also been used by Chaudhary, Iqbal and Gillani, Abbas and Peck and Khorasgani. Total external Debt Stock of Pakistan has also been taken as indicator of external sector of Pakistan. In this study foreign direct investment has been taken as a ratio to gross domestic product. Gross domestic product has been taken as an indicator of economic growth, the dependent variable.

With the intension of avoiding incorrect approximation and inconsistent results, time series at hand is checked for

stationarity as it ensures consistency and reliability of the data. In general stationarity, checks if the data's mean and variance are persistent over time and if data is free from fluctuations. In order to check the stationarity several tests were conducted in the past, but the most prominent are graphical analysis and the unit root test which are also used to estimate whether variable is stationary or not. Before the formal unit root test is conducted, the time series has been plotted graphically as it gives an opening clue about the nature of the series. Hendry and Juselius and Akinde, use graphical analysis for checking the stationarity. The primary and ground-breaking work on analysis of a unit root in time series is done by Dickey and Fuller followed by various other tests e.g. Phillips and Perron, KPSS unit root, ERS, DF-GLS test and Ng and Perron. The model at hand used ADF test as it created a parametric rectification for higher-order link by adding lagged values of the explained variable and it determined the essential maximum total of significant lags of explained variable. Magnus and Fosu, OzturkandKalyoncu, Gürsoy and Kalyoncu and Ray examines the empirical impact of FDI on economic factors using ADF test for stationarity. The consequences of Augmented Dickey-Fuller test show that the variables used in the model can be I(0) or I(1) integrated on trend or trend and intercept both. Following equation checks the stationarity of time series data used in the study[23]:

$$\Delta Yt = \beta 1 + \beta 2t + \delta \boldsymbol{Y}t - 1 + \sum_{i=1}^{m} ai\, \Delta \boldsymbol{Y}t - i + \boldsymbol{\varepsilon}\mathrm{t}$$

The estimated results of Augmented Ducky-fuller, unit root, ADF Philips perron and NG-perron unit root test are presented below in table-2.

Table-2
Augmented Dickey Fuller Unit Root Results

Variables	Intercept	Intercept and Trend
LGDP	-2.417364 (0.1451)	-2.274760 (0.4344)
ΔLGDP	-3.910743 (0.0054)	nil
LEdu	0.353513 (0.9770)	-2.167822 (0.4880)
ΔLEdu	-4.265693 (0.0025)	nil
LP.cap	-2.910255 (0.0552)	nil
LL.for	-4.919118 (0.0006)	nil
LDebt	-1.649843 (0.4463)	-3.903074 (0.0236)
LTO	-2.898960 (0.0566)	nil
LFDI	-3.030814 (0.1399)	-3.094066 (0.1253)
ΔLFDI	-4.370643 (0.0017)	nil

Values in parentheses are p-values.

Table-3
DF-GLS Unit Root Test Results

Variables	Intercept	Intercept and Trend
LGDP	0.370218	-1.857774
ΔLGDP	-3.495721	nil
LEdu	0.393613	-2.242428
ΔLEdu	-4.220294	nil
LP.cap	-0.849352	-5.027046
LL.for	-1.764223	nil
LDebt	-1.719944	-3.598643
LTO	-2.758715	nil
LFDI	0.151203	-3.108595

To apply Auto Regressive Distributive Lag (ARDL) approach it must be certain that none of the variables which are under consideration for the estimation purpose should be integrated at order 2, I (2) or higher order because in case of variables of higher order or I(2) the calculated value of F-Statistics will be invalid[24]. The results of table-2 and table-3 shows that no variable is on I(2) and variables are mutually integrated. In order to check the co integration status among the GDP, Education, Labor force, FDI, openness, physical capital and debt the F-test was applied. The calculated F-statistic for are presented in Table-4.

Table-4
Co-integration

F-Calculated	95% confidence interval		90% confidence interval	
5.6677	L. Limit	U. Limit	L. Limit	U. Limit
	3.4235	4.8609	2.7856	4.0625

Co-integration is established if value of F-statistics is greater than upper critical value. So the null hypothesis of no co-integration among the variable is rejected which means there exists a co integration relationship among the variables.

Table- 5
Estimated LR Coefficients using the ARDL Approach
ARDL (0, 1, 2, 0, 1, 1, 0) based on SBC.
Dependent variable is LGDP

Regressor	Coefficient	SE	T-value [Prob]
LEdu	0.19721	0.024372	8.0917[0.000]
LP.cap	0.049976	0.0069910	7.1487[0.000]
LL.for	1.4749	0.042813	34.4510[0.000]
LDebt	-0.098528	0.012249	-8.0439[0.000]
LTO	0.20674	0.048832	4.2337[0.000]
LFDI	0.020647	0.0082229	2.5110[0.021]

The results shown in table-5 indicate that there is positive and statistically significant relation among estimated co-efficient. The indicators of external sector *i.e.,* trade openness and foreign direct investment positively affect economic growth. The third indicator of external sector, the external debt negatively affects economic growth of Pakistan. Trade openness and external debt are significant at one percent level of confidence interval while foreign direct investment is significant at 5 percent level. We have use three control variables i.e., Education (Adult literacy rate), physical capital and labour force participation in our growth model as these variables as these have a key role in explaining the economic growth as suggested by various growth theories. The control variables such as education, physical capital, labour force participation rate also positively affect economic growth in long run. Education, physical capital and labour force participation are at one percent level. If we are going to invest in education that will in turn increases the gross domestic product of the country. That also shows that by increasing the physical capital GDP also increases in the country that is the source of development in the country. The results are consistent with Thomas Gerieskraft and Daniel Meierrieks, and Chaudhry and Faridi.

We have taken one lag period of the variables in order to estimate Error-Correction Model on the basis of Schwarz Criterion. The Results of ECM are given below.

Table -6
Error Correction Representation for the Selected ARDL Model ARDL (0, 1, 2, 0, 1, 1, 0) selected based on SBC
Dependent variable is dLGDP:

Regressor	Coefficient	SE	T-value [Prob]
dLEdu	0.10759	0.039714	2.7092[0.013]
dLP.cap	0.0019187	0.0042719	0.44914[0.658]
$dLP.cap_1$	-0.027913	0.0045699	-6.1081[0.000]
dLL.for	1.4749	0.042813	34.4510[0.000]
dLDebt	-0.054640	0.010903	-5.0115[0.000]
dLTO	0.12462	0.032593	3.8234[0.001]
dLFDI	0.020647	0.0082229	2.5110[0.020]
ect(-1)	-0.9834	0.1123	-8.7569 [0.000]

The indicators of external sector *i.e.,* trade openness and foreign direct investment positively affect economic growth. The external debt negatively affects economic growth of Pakistan. Trade openness and external debt are significant at one percent level of confidence interval while foreign direct investment is significant at 5 percent level in short run. The results are consistent with Zakaria and Ahmed[25].We have used three control variables i.e., Education (Adult literacy rate), physical capital and labour force participation in our growth model as these variables have a key role in explaining the economic growth as suggested by various growth theories. The control variables such as education and labour force participation rate also positively affect economic growth in short run. Education and labour force participation are significant at one percent level. The variable physical capital has unexpected negative sign and insignificant impact on economic growth in short run. If we are going to invest in education that will in turn increases the gross domestic product of the country. The results also show that physical capital is the source of increase in GDP of the country. The results are consistent with Thomas Gerieskraft and Daniel Meierrieks. The co-efficient value of Error correction term ECT(-1) is negative and statistically significant which shows that there exists a long run relationship between external sector's indicators and economic growth of Pakistan The adjustment parameter i.e., the values of coefficient of ECT(-1) is -0.983.The value of ECT shows speed of adjustment towards equilibrium which means economic growth will be corrected or adjusted by 98% each year by the change in the independent variables i.e., the indicators of external sector.

The information regarding diagnostic tests of the problem of heteroscedasticity, functional form, serial correlation, normality are presented in the table 7 below

Table -7
Diagnostic Tests

Test Statistics	LM Version	F Version
Serial Correlation	0.023730 [.878]	.013789 [.908]
Functional Form	2.0308 [.154]	1.2619 [.276]
Normality	3.0035 [.223]	Not applicable
Heteroscedasticity	2.5701 [.109]	2.6217 [.116]

The diagnostic test results indicates that there is no hetroscedasticity and no serial correlation in the model. The data is normally distributed.

Plot of CUSUM and CUSUM Square: Plot of CUSUM and plot of CUSUM Square are used to check whether the variables are stable in the model or not in the SR and in the LR. Pesaran and Pesaran (1975) presented these plots of CUSUM and plot of CUSUM Square. The estimated coefficients are considered stable if plots of CUSUM and plot of CUSUM Square be lies within 5% level of significance. Plots of CUSUM and plot of CUSUM Square stays within critical bands of 5% level of significance of parameter stability in above two figures which represents stability of themodel.

The figures depicting that, variable in the model are stable and there exists long run association among the variables of under consideration GDP, Education, Labor force, FDI, openness, physical capital and debt.

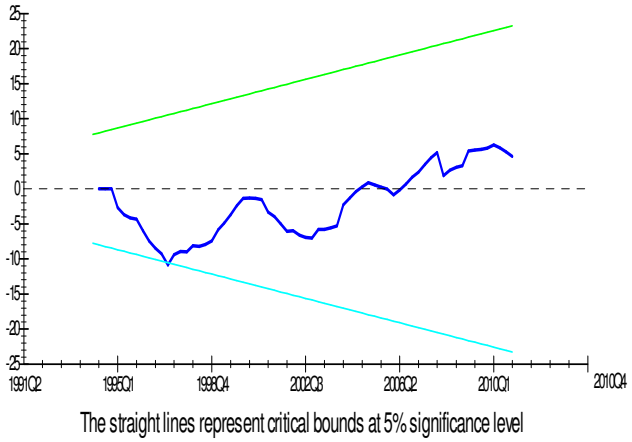

Figure-1
Plot of CUSUM

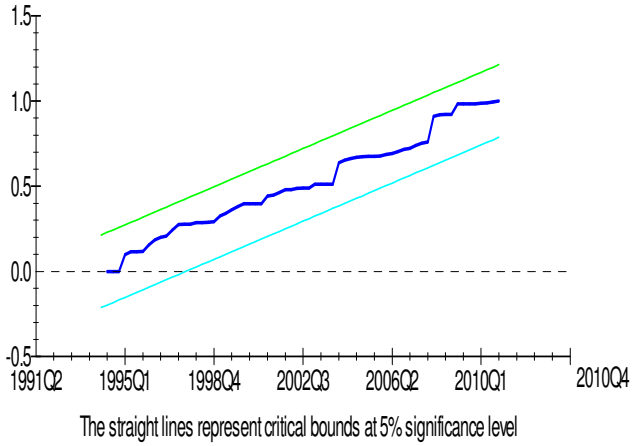

Figure-2
Plot of CUSUM Square

For the stability of the model CUSM and CUSM square curves must lie inside the critical boundaries at 5%level of significance used. The structural breaks and instability have not been found in the model.

Conclusions and Policy Implications

The study concluded that there exists long run as well as short run relationship among external sector and economic growth of Pakistan. We have included three indicators of external sector *i.e.,* trade openness, external debt and foreign direct investment in our econometric model. Two of these variable like trade openness and foreign direct investment positively affect economic growth and the third indicator of external sector, the external debt negatively affects economic growth of Pakistan. We have use three control variables i.e., education (Literacy Rate), physical capital and labour force participation in our growth model as these variables have a key role in explaining the economic growth as suggested by various growth theories. The education has significant positive association with economic growth in short run as well as in long run. The variable physical capital affects growth significantly in long run and insignificantly in short run. Labour force participation rate also positively affect economic growth in short as well as in long run. According to endogenous growth theory, trade openness have favourable impact on economic growth. The country can specialize, achieve comparative advantage and improve the market size, technological transfer and enhance human capital formation. In this way returns to these innovations may be proved helpful in enhancing the exports and ultimately economic growth[27]. Foreign (direct) investment has been found to be a complement to trade openness. The countries open for trade attract greater foreign direct investment and utilized the resources in efficient way as compared to the closed economies and enhance their economic growth[25]. The positive association of trade openness and labour force participation with economic growth indicates the soundness of New Growth Theory and exports led growth hypothesis for Pakistan[26]. External debt affects the country's capacity to take maximum advantage of enhanced opportunities of market access on account of unsatisfactory new investment and hence exports are decreased. Moreover, debt servicing may absorb foreign exchange and existing capital to recompense for imports[28]. According to debt overhang theory, if the debt burden becomes larger than the debt repayment capacity of the country then expected increase in debt servicing may dispirit foreign investment and ultimately impede the economic growth.

Policy implications: This research suggested the following policy implications

Government should give more attention to external sector to enhance economic gross domestic product. The need of the hour is trade rather than aid. Higher authorities may further liberalize the trade in order to enhance economic growth. Universally competitive industrialization is necessary for larger export diversification and irrepressible competition.

Human capital formation should be given priority in order to enhance gross domestic product. The quality and capacity of labour force may be enhance by providing incentive based literacy, technical and vocational training programs and facilities.

Pakistan should also formulate investment oriented policies that enhance the level of foreign direct investment and provide favourable conditions for physical capital formation so in turn these variables will become source of increase in economic growth of Pakistan.

Government should have grave concerns over high level of external debt. It is the source that decreases the economic growth. Government should formulate such policies that generate internal sources of revenue the so the level of debt may

decrease. All these actions may support to enhance economic growth of Pakistan.

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