



Volume and Issues Obtainable at Center for Sustainability Research and Consultancy

Review of Economics and Development Studies

ISSN:2519-9692 ISSN (E): 2519-9706

Volume 2: Issue 2 December 2016

Journal homepage: www.publishing.globalcsrc.org/reads

Trade Openness, External Debt and Growth Nexus in Pakistan: Empirical Evidence from ARDL Modeling Approach & Co-Integration Causality Analysis

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ARTICLE DETAILS**History**

Revised format: Nov 2016

Available online: Dec 2016

Keywords

External Debt,

Capital Formation,

Foreign direct

Investment, Trade

Openness, Economic

growth

JEL Classification

B26, E22, F31, F18, O4

ABSTRACT

This Empirical study Explores the Influence of trade openness and external debt on economic growth by using time series data from 1974 - 2016. Gross domestic Product (GDP) as dependent variable while Foreign Direct Investment, Inflation, External debt, Capital formation and Trade as explanatory variable are used. Unit Root Test applies to check the stationary of data in which GDP & INF are integrate at level 1(0) while the channel of variables like FDI, T, ED, CF are integrate at 1stdifference. Auto-regressive distributed lagged model (ARDL) technique applies for estimation. The study finds out the relation between channels of variable that how these variables are interrelated. The findings indicate that External debt and capital formation has Inverse influence on Economic growth while Trade Openness, Inflation, foreign Direct Investment has positive impact on economic growth.

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Recommended citation: Ali, H., Farooq, F. and Mumtaz, N. (2016). Trade Openness, External Debt and Growth Nexus in Pakistan: Empirical Evidence from ARDL Modeling Approach & Co-Integration Causality Analysis. *Review of Economics and Development Studies*, 2 (2) 93-102

DOI: <https://doi.org/10.26710/reads.v2i2.127>

1. Introduction

The external debt and trade openness has significant impact for economic growth. The trade openness leads to free exchange of goods between the regions and countries. Specialization is required to achieve economic growth and significant for developing countries. The ease of trade openness is absolute and comparative advantage in which MC will remain low and obtain maximum gains. 1950-98 the most of the countries gained that their average income increase about 1.5% more after trade liberalization. Zakria (2013); Zafar (2015); analyzed that trade openness has positive impact on economic growth. While Khan and Zahler (1985); Bertola and Forini (1991); found the mixed outcome it has positive as well as negative impact on economic growth. The developing countries initially focus on external debt for development due to the trickle down mechanism in this sense savings and capital raise that are used for purchasing more productive and advance equipments the revenue increase and economy will grow. The impact of foreign debt is to raise GDP and expected for higher returns. It has positive as well as negative impact on economic growth depending

on how debt is utilized in proper management but mostly the debt went to waste due to the lack of monitoring and corruption. Korkmaz (2015) stated that the impact of external debt on the economic growth in turkey the country has lack of recourses. The countries prefer the external debt due to the lack of internal savings. The countries should raise their savings and utilized their own recourses to attain economic growth. The Pakistan is developing country and the external debt in Pakistan raise 74638 USD Million in the third quarter of 2016 from 72978 USD Million in the second quarter of 2016. External Debt in Pakistan averaged 51034.27 USD Million from 2002 until 2016, reaching an all time high of 74638 USD Million in the third quarter of 2016 and a record low of 33172 USD Million in the third quarter of 2004. Exports in Pakistan decreased to 180899 PKR Million in December from 184497 PKR Million in November of 2016. Exports in Pakistan averaged 38619.28 PKR Million from 1957 until 2016, reaching an all time high of 275483 PKR Million in September of 2013 and a record low of 51 PKR Million in April of 1958. Imports in Pakistan increased to 470038 PKR Million in December from 442903 PKR Million in November of 2016. Imports in Pakistan averaged 67818.81 PKR Million from 1957 until 2016, reaching an all time high of 472228 PKR Million in August of 2014 and a record low of 96 PKR Million in April of 1959.

2. Literature Review

Awan et al. (2011) investigated that fiscal deficits and terms of trade had significant impact on External debt of Pakistan. This review used the annual time series data from 1974-2008 to analyzed the relationship between External debt and causative factors such as Nominal exchange rate, fiscal deficits and terms of trade. The stability test CUSUM & CUSUM of SQUARE test revealed that the model is sturdy and symbolic. In this study External debt was used as dependent while nominal exchange rate, fiscal deficit and terms of trade were used as explanatory variable. Johnson's cointegration approach was used to estimate long correlation between exchange rate and terms of trade. The evidence indicated that fiscal deficit has no impact on external debt.

Zakria (2012) suggested that the influence of trade openness on foreign debt in Pakistan. This study used Quarterly data from 1972-2010. This study emphasized the positive effects of trade openness on foreign trade. Foreign debt as a dependent and Trade openness, Terms of trade. Fiscal deficit, foreign exchange reserves, foreign direct investment, inflation rate, noise error as an independent variable. The evidence was taken from different models. GMM (generalized methods of moments) methodology used to overcome problems of model. The findings indicated that external debt, terms of trade, fiscal deficit, and inflation has positively on foreign debt while exchange reserves and foreign direct investment has inverse impact on foreign trade.

Zakria and Ahmad (2013) suggested that economic growth of Pakistan affected by various channel variables. Quarterly data from 1981/82 – 2007/08 was used. Macro-econometric analysis was followed to study trade openness growth in Pakistan. Gross Domestic Product as a dependent variable and trade openness as explanatory variable are employed. GMM and SUR techniques used for estimation. The findings indicated that Trade openness has positive effect on growth and various channels like physical capital, Human capital, foreign investment, Inflation, Real exchange Rate, foreign debt, corruption and foreign exchange market distortions also positively impact on economic growth. On the other hand, openness growth has negatively related with government consumption and democracy.

Antwi et al. (2013) investigated the significance of Foreign Direct Investment in economic growth of Ghana. The model used annual time series data from 1980-2010 to analyzed the estimation. The data is taken from International Monetary Fund statistics that was published. FDI as dependent and Gross Domestic Product, Gross Domestic product growth rate, Gross National Income, Manufacturing, value added, Inflation, consumer prices, Gross Domestic product per capita Industry, Value added as independent variable. The results indicated that government focus on development techniques such as Foreign Direct Investment that reduce the foreign debt. The

government should be stable in this sense that country could achieve the economic growth and development.

Chinaemereme and Anayochukwe (2013) analyzed the impact of external debt financing on economic development in Nigeria. This model used the time series data collected from 1969- 2010 for the estimation. This study includes Gross Domestic Product as dependent variable While Paris debt, London debt, Multia debt and promissory as independent variables. Econometric techniques such as Unit Root, co-integration applied for estimation. The evidence indicated that London debt has positive influence on economic growth of entrepreneurship development. Moreover, Paris debt, Multi debt and promissory debt has inverse effect on the entrepreneurship development in Nigeria. This study Suggested that there has no statically significant to entrepreneurship development of the economic growth.

Babu et al. (2014) analyzed the study of external debt and economic growth in east Africa community. The annual time series data from 1970-2010 was summarized for estimation. The study depended on Solow debt augmented model. The paper viewed the share of GDP and external debt. The panel fixed effect model used to estimate the effect of external debt. The LLC (levin-lin-chu) estimator used to analyze the axioms of the data the Husman specification test applied for the verification of the fixed effects model. In this paper GDP as dependent and Investment, Government expenditure, terms of trade, Trade openness as independent variable. The evidence indicated external debt had inverse effect on economic growth and GDP. The policy makers suggested that debt reduction strategies adopted by East Asia Countries to overcome the external debt.

Iqbal et al. (2015) Investigated that the debt affects in the growth of Pakistan. The concepts of imports and exports studied in this paper related to Pakistan. The time series data of debt servicing export, import, external debt and real Gross Domestic Product growth has been taken from 41 years 1972-2010. This Article used Ordinary Least Square regression Technique for the estimation. Gross Domestic Product as a dependent variable and External Debt, Debt Servicing, Exports and Imports are taken as Independent variables. The evidence indicated that external debt has absolute Impact on Economic growth. However, debt servicing has oppositely related with growth. The study was not significant impact of imports on economic growth of Pakistan.

Zafar et al. (2015) presented the concept of the impact of trade openness and external debt on economic growth. Regression analysis was used to measure this concept. The time series data from 1980-2012. GDP indicated as dependent variable and External debt and trade openness as an independent variable. URT test was used to indicate whether it is time series and cross sectional data. The findings designated the positive relationship between Trade openness and economic growth. Conversely; external debt has important and inverse effect on economic growth. They presented policy proposals' and debt policies.

Munzara (2015) investigated the impact of foreign debt on economic growth in Zimbabwe. Time series data used during the session of (1980-2013). OLS (ordinary least square) regression analysis used for estimation. GDP (gross domestic product) as a dependent variable and external debt as an independent variable. While control variables such as Labour force growth, capital investment and trade openness. External debt and trade openness has inverse act on economic growth. Conversely, capital investment and labour force growth has positive effect. He argued that country should depend on development finance such as foreign direct investment (FDI) and depend on their huge mineral recourses' that reduce the external debt because it can't afford further borrowing.

Blake (2015) investigated that the impact of public debt on economic growth in Jamaica. The quarterly data used from the period 1990-2014. The paper captured the short run as well as long run effects on economic growth. GDP as a dependent variable while Debt, investment, inflation, labour

and openness as an independent variable. ARDL (auto-regressive distributed lagged) model used for estimation. The evidence verified that public debt has a complex impact on economic growth.

Siddique et al. (2015) investigated the debt level in poor countries. The paper analyzed that how external debt burden has great impact on GDP (gross domestic product) of the country and used the panel data during the period 1970-2007. 40 HIPC (high indebted poor countries) included in this and paper. ARDL (auto-regressive model) Root test and co-integration test used for estimation. GDP as dependent variable and capital formation (CF), debt (DB), trade (TR) and population (P). The findings indicated that Capital formation has positively related to GDP in short run as well as in long run. However, debt has inverse effect on economic growth. The increment in population also has pragmatic effect on economic growth.

Jebran et al. (2016) scanned the effect of public debt on economic growth of Pakistan. Annual data during (1972-2012) summarized for this paper. The study included GDP and GNP in economic growth and studied the effects of public debt. GDP as dependent variable and external debt (ED), domestic debt (DD), inflation (INF) and trade openness as independent variable. The findings indicated that debt services have inverse effect on both GDP and GNP in short furthermore in long run. Moreover, domestic debt has no impact on GDP and GNP in short as well as in long run analysis.

3. Data and Methodology

In this segment we discuss of source data, expiation of variables, assessment process, co-integration method for the ingestion of data, ARDL procedure, Bound test show the long run association of the model. The study uses the time series data 1974 to 2016. The source of data was taken by world development indicator (WDI) and state bank of Pakistan (SBP).

Model Specification:

In this section model correlation between impact of trade openness and external debt will be estimated.

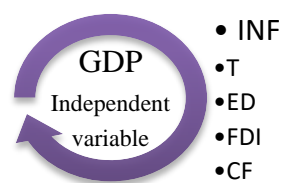


Table 1: Describe of variables

Variables	symbols	unit of Measurement	Source
Gross Domestic Product	GDP	Annual Growth of Percentage of GDP	World Development Indicator
Inflation	INF	Percentage of GDP	World Development Indicator
External Debt	ED	Percentage of GDP	State Bank Of Pakistan
Capital Formation	CF	Percentage of GDP	World Development Indicator
Trade	T	Percentage of GDP	World Development Indicator

Foreign Direct Investment	FDI	Percentage of GDP	World Development Indicator
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Description of variables

Gross Domestic Product

The term GDP that is used to measure the economy's size of output and production. GDP measured that total amount of goods and services measured by using domestic resources in different time period it may be monthly quarterly or annually. GDP enables policy makers and central bank judge whether the economy is contracting or expanding. GDP is also provide the policy implications whether it is monetary or fiscal policy.

Inflation

Inflation is the situation in which the prices of goods and services raise than value of income falls in predictable way. That leads to fall the purchasing power of consumer. The economy is affected by inflation in two ways positive and negative ways. The negative affect is that it raises the Opportunity cost. The Negative affect is that it reduces the real burden of public and private debt.

External Debt

The external debt is considered as essential tool to achieve economic growth. The external debt is used to raise the productivity in the country by utilizing time domestic resource. External debt is beneficial for both developing and developed countries with suitable terms and conditions.

Capital Formation

Capital formation is a span used to define the net capital accumulation during an accounting period for a specific country, and the period mentions to additions of capital stock, such as tools, transport, assets and electricity. It is a particular statist concept used in national accounts statistics, econometrics and macroeconomics. In that sense, it refers to measure the net additions to the capital stock of a country. It provides the clear picture of the investment and growth.

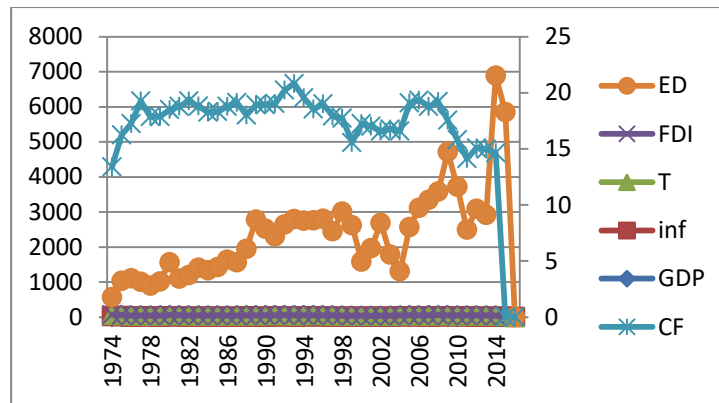
Trade

Exchange of goods and services between the countries with compensation payment paid by the seller and the buyer is a trade. The trade has advantage for both developed and under-developed countries. Trade involves the transfer of goods and/or services from one person or region to another, some cases in exchange for money. The term fair trade that promotes the use of labour, environmental and social standards for the production of goods and services.

Foreign Direct Investment

FDI means is an investment in the form of a calculate occupancy in a business in one country by an entity base in any other country. It is thus famed form foreign variety speculation by a view of direct manages. Foreign direct investments can be made in a different forms, it include the associate company in a foreign country. The main characteristics of foreign direct investment are that it is an investment that establishes the decision making of a foreign business.

Trend of Dependent & Independent Variable



Sources: Microsoft word

Stationary of Data

If in time series data the mean, variance and covariance remain unaffected over the period of time than Data is Stationary (Gujrati 1995).The stationary of data is required to check the validity.

Unit Root Test

To check the stationarity of the data the unit root test is applied. This test identifies which technique is applicable for the estimation.

Table 1: Unit Root Test

Variables	ADF				Conclusion
	Level		1 st difference		
	Intercept	Trend & intercept	Intercept	Trend & Intercept	
GDP	-4.14260*	-4.6985*	-10.166	-10.0317	I(0)
INF	-4.4689*	-4.3315*	-6.8794	-6.806	I(0)
ED	-1.530	-3.236	-7.6672*	-7.7014*	I(1)
CF	-2.7394	-3.6893	-6.4372*	-6.6074*	I(1)
T	-2.6624	-2.66278	-7.1002*	-7.0713*	I(1)
FDI	2.0365	-5.1996	-5.4802*	- 4.7059*	I(1)

Sources: Calculations are taken from the E views 9.5 (Qualitative software).

Note: *, **, *** Indicates the significance of 1%, 5% & 10% respectively.

This table shows that GDP and INF are integrated at level I (0). So it might be included that other variables such as FDI (foreign direct investment), T(trade), ED (external debt), CF (capital formation) integrated at 1st difference. SO we can apply the ARDL (Auto Regressive Distributed Lagged Model) for estimation.

Model Specification:

To examine the extensive relationship between the Trade Openness, the External debt, on Economic growth, by using the channels of variables ARDL approach is used.

ARDL (Auto-Regressive-distributed Lagged Model)

$$\Delta GDP = \alpha_0 + \alpha_1 \sum_{i=0}^{k1} (GDP)t - 1 + \alpha_2 \sum_{i=0}^{k2} (INF)t - 1 + \alpha_3 \sum_{i=0}^{k3} (ED)t - 1 + \alpha_4 \sum_{i=0}^{k4} (CF)t - 1 + \alpha_5 \sum_{i=0}^{k5} (T)t - 1 + \alpha_6 \sum_{i=0}^{k6} (FDI)t - 1 + P1(GDP) + P2(INF) + P3(ED) + P4(CF) + P5(T) + P6(FDI) + \mu$$

Where;

GDP = gross domestic product

INF = Inflation

ED = External debt

CF = Capital Formation

T = Trade

FDI = Foreign Direct Investment

Table:2 Co integration and long Run Form

Variable	coefficient	t-statistics	prob.
D(GDP(-5))	0.2220	1.8943	0.0776
D(INF)	0.11605	1.4436	0.1694
D(ED(-2))	0.00149	2.4927	0.0249
D(CF(-2))	0.3488	0.9430	0.3606
T	-0.0015	-0.2161	0.8318
D(FDI)	2.2470	3.5912	0.0027
CointEq(-1)	-1.2791	-6.4694	0.0000
R-squared	0.84018	Prob (F-stat)	0.0037
Adjusted R-squared	0.63775	Durbin Waston	1.8246
F-statistic	4.1504		

Sources: The data is taken from State bank of Pakistan & World development indicator

This table show that the coefficient of GDP is 0.220. The Coefficient value of INF, ED, CF, and FDI is 0.116, 0.110, 0.348 and 2.247. The probability of GDP is 0.07 and INF, ED, CF and FDI is 0.016, 0.02, 0.036 and 0.002. The value of Co-integration of GDP is -1.2791 and the probability is 0.000.the Findings shows that there is 84% variation between the dependent and independent variables.

Table 3: Long Run Coefficients

Variable	Coefficient	t-statistics	Prob
INF	0.28725	3.08258	0.0076
ED	-0.00284	-4.49504	0.0004
CF	-0.85273	-2.03009	0.0605
T	0.14362	0.94185	0.3612
FDI	0.12248	0.32204	0.7519
C	19.2424	3.08339	0.0076

Source: Calculation's E-views9.5

This table shows that the coefficient of INF is 0.2872 and ED is -0.00248, CF is -0.00284. Inflation, Trade, foreign direct Investment (FDI) is positive impact on the GDP. The probability is 0.007, 0.036 and 0.075. External debt and Capital Formation is negative impact of GDP. The probability is 0.06 and 0.004.

Bound Test

Bound test is used to check the long run cointegration between the variables.

Null hypothesis: $\alpha_1 = \alpha_2 = \alpha_3 = \dots = \alpha_8 = 0$ (No cointegration)

Alternative Hypothesis: $\alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \dots \neq \alpha_8 \neq 0$ (cointegration exist)

Table 4: bound test for Co-integration

T-Statistic	Value	Upper bound
F-Statistic	5.2016 2	3.38

Source: Calculation's E-views9.5

This result shows that the F-statistic value is 5.2016. F-statistic value is greater than the upper bound value. Than we accept the Alternative Hypothesis and reject the Null hypothesis. Long run association between the variables Furthermore integration exists in the model.

Test for stability

The cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum Recursive Residuals Squares (CUSUMS) are used to check the stability of the model.

Figure1 Plot CUSUM

The CUSUM (cumulative sum control chart) is the successive analysis that is used for monitoring the change deduction.

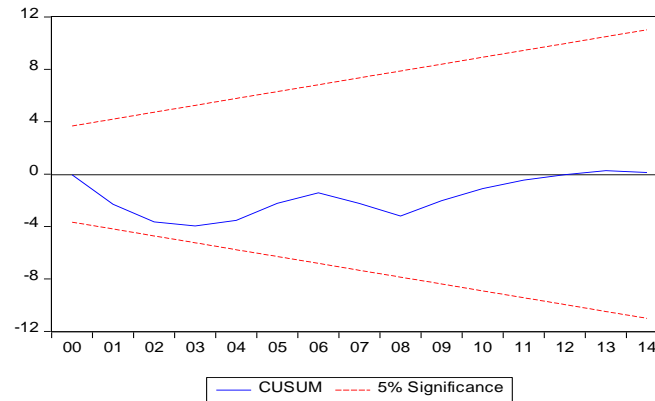
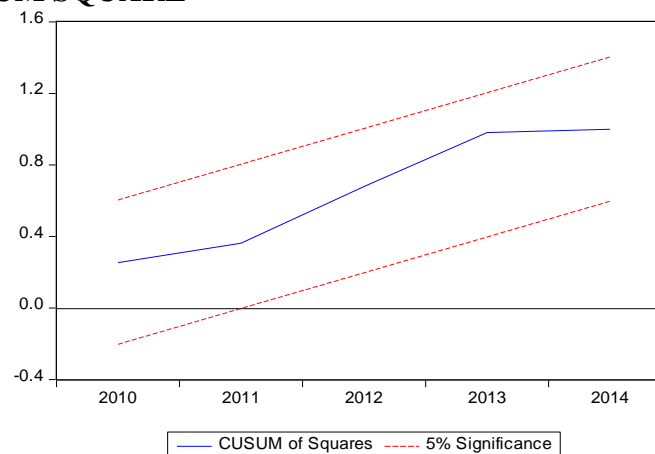


Figure 2 CUSUM SQUARE



4. Conclusion

This study concluded that trade openness and external debt has positive as well as negative impact. IMF& WTO are considered as basic tools for external debt .The external debt has inverse impact on economic growth. The summary of this paper verifies that trade openness is very important for the economic growth. The country should promote development finance like FDI in the country. Developing countries must utilize their domestic recourses. So, the trade openness, foreign Direct Investment, Inflation and external debt has basic variables for economic growth only with suitable policies.

5. Policy Recommendations

- i. We should raise the sovereign loans on the concessional term with long term maturities.
- ii. We should promote the domestic recourses of the country that leads to raise the capital formation.
- iii. The government should adopt the expansionary fiscal policy that leads to expand the Money supply to encourage the economic growth.
- iv. We must adopt the long run trade openness that reduces the poverty and unemployment in the economy.

- v. The government should specialize in those commodities which are cheaply produced in the country.

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