Impact of Foreign Trade on Sectoaral Components of GDP Pakistan Perspective

Muhammad Ajmair*, Ashiq Hussain**

Abstract: The basic objective of this study was to check the impact of foreign trade (Exports+Imports) on sectoral components of GDP(Agricultural Sector, Industrial Sector and Services Sector). Time series annual data from 1950 to 2010 was used and Engle Granger Cointegration(Two Step) Method was employed to get results. Augmented Dickey Fuller test was applied to check the stationarity of variable. E.Views version 8 was used to analyze the data.
All variable except foreign trade (ftrd) were stationary at first difference and foreign trade was stationary at level. Regression analysis was consisted on two steps. In first step long run relationship was checked which was positive and significant. Residuals (ect) were generated from and checked for unit root. Error correction term(ect) was stationary at level; it is the precondition of existence of long run relationship between dependent and independent variables.
In second step, error correction model was estimated to check the short run relationship. Significant relationship was found between dependent and independent variables as the coefficient of error correction term(ect) was negative. Negative coefficient is the precondition of existence of short run relationship.
Government should focus on boosting foreign trade in three sectoral components (Agricultural Sector, Industrial Sector and Services Sector) equally to have consistent long run growth in GDP of Pakistan.

Keywords: Foreign Trade, GDP, Agricultural Sector, Industrial Sector, Services Sector, Cointegration.

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1-INTRODUCTION

The economic growth in India is due to exports [1] There are two way causal relationships between Pakistan Total Exports and Pakistan Exports to OECD [2]. Economic growth causes exports of any country. [3] and [4].

There is positive relationship between trade liberalization and economic growth [5]. International trade has significant impact on economic growth [6]. According to [7] exports have positive and significant effect on economic growth in three SAARC countries except Nepal's Economy economic growth is affected negatively but insignificantly. Natural and human resources can boost up the economic and export growth [8] There is significant positive effect of exports, imports and trade openness on economic growth [11]. There is consistent association between trade openness and price-cost mark-ups, intra-plant productivity etc[9]. Energy prices have a very small but significant effect on imports [12]. International trade has positive effect on agricultural sector's growth [10].

1.1- OBJECTIVES OF THE STUDY ARE:
To check the impact of Foreign Trade on sectoral components of GDP (Agricultural Sector, Industrial Sector and Services Sector)

1.2- JUSTIFICATION OF STUDY:
We include volume of external trade to see whether increased openness of the economy to external trade has resulted in higher growth for services, industry and agriculture as well.

2- LITERATURE REVIEW
2.1- FOREIGN TRADE AND ECONOMIC GROWTH:

[5] divided the total time period into two sub periods of before trade liberalization i.e. (1960 to 1976) and after trade liberalization i.e. (1977 to 2007).They applied Chow test to test the structural changes of the country and concluded that there is positive relationship between trade liberalization and economic growth in Sri Lanka.

[6]Both econometric and non-parametric approaches were applied based on a 6-year balanced panel data of 31 provinces of China from 2002 to 2007 was used to conclude that High –tech exports have positive effects on China's regional productivity which implies that international trade has significant impact on economic growth in China.

[8] concluded that exports growth is necessary for Kosovo, the natural and human resources are available in Kosovo to boost up the economic and export growth.

[11] used time series data from 2000 to 2012 to apply Ordinary Least Square(OLS) estimation technique and suggested that there is significant positive effect of exports, imports and trade openness on economic growth in Nigeria.

2.2- FOREIGN TRADE AND INDUSTRIAL SECTOR

In reference [9], autors applied a computable industrial evolution model found a consistent association between trade openness and price-cost mark-ups, intra-plant productivity etc.

[12]used a panel for period 1996-2011 of 42 countries and 62 sectors to estimate short run effects of sector-level energy prices on trade. They concluded that energy prices affect significantly but have very small impact on imports.

2.3- FOREIGN TRADE AND AGRICULTURAL SECTOR

[10] used scientific methods like desk research, descriptive methods, methods of analysis and synthesis, methods of induction and deduction as well as a comparative analysis method for period 2005-2011 and said that the international trade of agricultural sector has positive effect on

*PhD student, Department of Economics, University of Gujrat, Pakistan;
** Director, Mian Muhammad Bukhash Public Library,Mirpur AJK

agricultural sector growth in Bosnia and Herzegovina.

2.4- EXPORTS AND GDP GROWTH

[1]used data during period 1980-2009 and employed Ordinary Least Square method to check the relationship between GDP, total exports, manufactured exports and investment in India. Conclusion is that the economic growth in India is due to exports

[4]employed Granger Causality Test to check the relationship between economic growth and exports during time span 2000-2012 for Jordan. Here in case of Jordan economic growth is the benchmark to increase exports.

[2]used data during period 1975-2012 to check the relationship among Pakistan Exports to OECD, Pakistan Total Exports and GDP . He employed Johansen's Co-integration and Granger causality tests while using software SPSS-16 and E.Views-7 for data analysis. Conclusion is that there are two way causal relationships between Pakistan Total Exports and Pakistan Exports to OECD.

[7] applied estimation techniques :Johanson Cointegration and Granger Causality to check the relationship between export instability and economic growth for SAARC countries((Pakistan, India, Sri-Lanka and Nepal). Exports have positive and significant effect on economic growth in three SAARC countries except Nepal's Economy economic growth is affected negatively but insignificantly.

[3]used annual data for period 1960-2009 and employed estimation, technique Granger Causality to chrck the relationship between exports and GDP of Pakistan. They concluded that GDP is the cause of exports in Pakistan

2.5- RESEARCH GAP:

In above mentioned literature review there are many studies which show the relationship of GDP with Foreign Foreign Trade, Agricultural Sector with Foreign Trade, Industrial Sector with Foreign Trade But there was no single study found that showed the relationship of Foreign Trade with Sectoral Components of GDP (Agricultural Sector, Industrial Sector and Services Sector).

3- METHODOLOGY AND DATA

This section discusses the methodologies that are employed to meet the objectives of the study. The variables used in this study include lftrd stands for log of foreign trade, lgdp stands for log of gross domestic product, lagr stands for log of agricultural sector, lind stands for log of industrial sector and lser stands for log of services sector. The secondary annual data (1950-2010) is taken from the website of State Bank of Pakistan.

3.1- UNIT ROOT TEST

The most rigorous way is to use the Augmented Dickey Fuller (ADF) to check the stationarity of data which is the wider version of the standard Dickey Fuller (DF). This test is employed to verify the presence of unit root in the data series. If at least two variables are stationary at first difference and no variable is stationary at second difference , Engle Granger co integration model can be used for

data analysis. ADF test results are in table 4.1 in results section.

3.2- MODEL SPECIFICATION:-

Linear regression is an approach to modeling the relationship between a dependent variable and one or more explanatory variables denoted X. The case of one explanatory variable is called simple linear regression. The model stipulates the impact of foreign trade on sectoral components of GDP. The sequence is as follows:

I used Engle Granger Co integration method that has two steps.

3.2.1- STEP:1:- TESTING FOR COINTEGRATION

In first step long run relationship is checked when at least two variables are stationary at first difference, remaining variables should be stationary at level and no one should be stationary at second difference. Model equation is as under.

lgdpi t   =C+β1 lftrdt +εt   -----1

l= log of data series

i = various components of gross domestic product (Agricultural Sector(lagr), IndustrialSector (lind) and Services Sector (lser))

t=1950-2010

β1 = coefficients of independent variable to show the relationship whether it is positive or negative.

εi=N(0,σ2)

where : lgdp is log of gross domestic product, lser log of services sector, lind is log of industrial sector , lagr is log of agricultural sector and lftrd stands for log of foreign trade.

3.2.2- STEP: 2:- ESTIMATING ERROR CORRECTION MODEL

Second step deals with the short run relationship between dependent and independent variables. Following shape of model is used to find short run relationship.

dlgdpi t   =c+β1 dlftrdt + β2 ect(-1)+εt

dlftrd: difference of current and previous value of log of foreign trade data series

dlgdpi: difference of current and previous value of log of gdp, agricultural sector, industrial sector and services sector.

ect(-1): first lag of residuals.

β1 and β2 are coefficients which show trend of independent variables.

ε: Error term

c: constant or intercept

4- RESULTS:-

4.1- ADF TEST RESULTS

In table 4.1 the ADF test results of unit root test of all the variables are presented that were calculated while using E.Views 8. At 1st difference all variables are stationary except lftrd.

*PhD student, Department of Economics, University of Gujrat, Pakistan;
** Director, Mian Muhammad Bukhash Public Library,Mirpur AJK

Table: 4.1

Variable	ADF test			
	Level		1st Difference	
	intercept	Intercept & Trend	intercept	Intercept & Trend
lftrd	-0.49*** (-2.59)	-3.81** (-3.48)	-7.03* (-3.55)	-7.00* (-4.12)
lgdp	0.28*** (-2.59)	-2.50*** (-3.17)	-7.81* (-3.55)	-7.86* (-4.12)
lagr	0.17*** (-2.59)	-2.50*** (-3.17)	-7.91* (-3.55)	-7.97* (-4.92)
lind	0.06 (-2.59)	-2.63*** (-3.17)	-7.77* (-3.55)	-7.74* (-4.12)
lser	0.23*** (-2.59)	-2.51*** (-3.17)	-7.81* (-3.55)	-7.84* (-4.12)

Note: * denotes the rejection of the null hypothesis at 1% level of significance, **denotes the rejection of the null hypothesis at 5 percent level of significance and *** denotes the rejection of the null hypothesis at 10% level of significance and Values in the parenthesis are MacKinnon critical values for rejection of hypothesis of a unit root. Legend:- lftrd stands for log of foreign trade(export+import), lgdp stands for log of gross domestic product, lagr stands for log of agricultural sector, lind stands for log of industrial sector, and lser stands for log of services sector.

4.2- REGRESSION RESULTS

4.2.1- STEP: 1:-TESTING FOR LONG RUN RELATIONSHIP

Table: 4.2

Variables	Constant	lftrd
lgdp	0.09 (0.42)	1.38 (25.84)
P. Values	0.6715	0.0000
R2	0.92	
Variables	Constant	lftrd
lagr	0.29 (1.43)	1.19 (22.05)
P. Values	0.1594	0.0000
R2	0.89	
Variables	Constant	lftrd
lind	-1.13 (-6.21)	1.53 (31.41)
P. Values	0.0000	0.0000
R2	0.94	
Variables	Constant	lftrd
lser	-0.56 (-2.74)	1.46 (26.88)
P. Values	0.0082	0.0000
R2	0.92	

Regression results of four different linear relationships are as under in table 4.2 which show that foreign trade (exports+imports) affects the growth of GDP, growth of Agricultural Sectoral, growth of Industrial Sector and growth of Services Sector positively and significantly. It is shown by positive values of coefficients and T.values in bracket. P.values (0.0000) is less than 0.05 that means there is significant relationship. Average value of R2 is 0.92 that shows 92 % variation in sectoral components of GDP(Agricultural(lagr), Industrial(lind) and Services(lser) Sectors) is due to foreign trade.

The residuals from eq.1 were tested for stationarity and the results are as follows in table 4.3. The residual series is stationary at level or series is I(0) that means series is stationary at level. Condition of stationarity is that ADF t-statistic value (7.86) should be greater in absolute terms than critical value at 1% level of significance. It implies that there is long run relationship between foreign trade

Table: 4.3

Variables	ADF test	
	Level	P-value
ect	-7.86* (-3.55)	0.0000

and sectoral components of GDP. As it is the precondition of long run relationship that residual series should be stationary at level.

4.2.2- STEP: 2:- ESTIMATING ERROR CORRECTION MODEL FOR SHORT RUN RELATIONSHIP

Results of second step of Engle Granger Cointegration method to check the short run relationship are as under in the table 4.4. Precondition of second step is that the coefficient of residuals should be negative which is fulfilling in each equation results. It means there is short run relationship between foreign trade and sectoral components of GDP. Overall we can say that cointegration exists between foreign trade and sectoral components of GDP.

Table: 4.4

Variables	dlftrd	Ect(-1)
dlgdp	0.01 (2.84)	-0.04 (-0.32)
P. Values	0.0061	0.7542
Variables	dlftrd	Ect(-1)
dlagr	0.01 (2.38)	-0.06 (-0.40)
P. Values	0.0209	0.6876
Variables	dlftrd	Ect(-1)
dlind	0.01 (3.47)	-0.04 (-0.30)
P. Values	0..0010	0.6773
Variables	dlftrd	Ect(-1)
dlagr	0.01 (2.89)	-0.04 (-0.29)
P. Values	0.0055	0.7783

5-CONCLUSION AND RECOMMENDATIONS

The basic objective of this study was to check the impact of foreign trade (Exports+Imports) on sectoral components of GDP(Agricultural Sector, Industrial Sector and Services Sector). Time series annual data from 1950 to 2010 was used and Engle Granger Cointegration(Two Step) Method was employed to get results. Augmented Dickey Fuller test was applied to check the stationarity of

*PhD student, Department of Economics, University of Gujrat, Pakistan;
** Director, Mian Muhammad Bukhash Public Library,Mirpur AJK

variable. E.Views version 8 was used to analyze the data.

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In second step, error correction model was estimated to check the short run relationship. Significant relationship was found between dependent and independent variables as the coefficient of error correction term(ect) was negative. Negative coefficient is the precondition of existence of short run relationship.

Government should focus on boosting foreign trade in three sectoral components (Agricultural Sector, Industrial Sector and Services Sector) equally to have consistent long run growth in GDP of Pakistan.

A comprehensive study can be prepared while analyzing the impact of trade components (exports and imports) separately. Results will declare the importance of either more exports and less import or less export and more imports.

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*PhD student, Department of Economics, University of Gujrat, Pakistan;
** Director, Mian Muhammad Bukhash Public Library,Mirpur AJK