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IMPACT OF EXPORT AND IMPORT ON ECONOMIC GROWTH IN INDIA

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Abstract:

In this paper we investigate the impact of exports and imports on economic growth over the period 1970-2012 in Indian economy. We try to explain how export and import leads to a higher growth in India. We know that economic growth is measured by increase in GDP. This paper tries to find out the relationship among export, import and GDP. It shows that there is a cointegrating relationship between GDP, export and imports when the real GDP is a dependent variable, total export and total import are considered as an independent variable. The main findings of this paper are that growth rate of GDP depends positively on growth of both export and import. According to the analysis, the increase in both exports and imports in India increases the country's gross domestic product (GDP). Every 1% increase in exports in the long run leads to a 0.1731% increase in gross domestic product; on the other hand every 1% increase in import in the long run leads to a 0.1504% increase in gross domestic product. The long-run effect of exports is stronger than the short-term effect. We also find that Imports have a negative impact on economic growth in the short run but have a positive effect on the long run.

Key Words: Export, Import, Co-Integration, Error Correction Model, Granger Causality, Economic Growth

Introduction:

The role of international trade is more important for economic development of many countries. These countries have a need for both export and import of all kinds of products and materials. These are needed for the development of the industrial sectors. Most of the countries in the world focus on improving their standard of living through increases in their Gross Domestic Product (GDP). Increases in GDP reflect economic growth of a nation. Before 1991, India was not an open economy. There were several restrictions on international trade. The country faced a balance of payments crisis at this time. As a result economic reforms were introduced to liberalize the economy. Economists are believed that in a developing country like India both export and Import may play an important role for economic development. The high rate of growth of GDP rates in India is a result of an increase in volume of export and imports of goods and services. According to them higher rate of growth of GDP leads to increased productivity which in turn causes growth in exports, and as export of goods and services increases, GDP will also increase. But there is a conflict. Some believes that export and import leads to economic growth by supporting Export Led Growth Hypothesis, while others says economics growth leads to growth in export and import and support Growth Led Export Hypothesis. This type of different views on the relationship between export, import and economic growth put many nations in a dilemma. They do not decide whether they open up their economies to promote trade or they should concentrate on economic activities which will promote international trade. So the aim of this paper is to find out econometrically the direct linkages among trade and economic Growth for India.

Objective of the Study:

The main objectives of the study are:

- To analyse the relationship among GDP, Export and Import.
- To analyse whether the relationships are long run or short run phenomena, or both.
- To analyse whether there is any causal relationships between Export, Import and GDP.
- To analyse the directions of the causality among GDP, Export and Import.

Sources of Data:

In this study we use secondary data cover annual time series of 1970 to 2012 in Indian economy. The data set consists of observation for GDP at factor cost (in Rs Crore), exports of goods and services (in Rs Crore), and imports of goods and services (in Rs crore). Maximum data were collected from 'Hand Book of statistics on the Indian Economy' (RBI) in the year 2007-08 and 2012-13. Apart from we use different Census book published by the Government of India.

Methodology:

We have considered three important variables which are gross domestic product at factor cost (GDP), exports of goods and service (X) and import of goods and services (M) from the year 1970 to 2012. Before analyzing the relationship among GDP, Export and Import, data has been transformed into natural logarithms. In this article the relationship among GDP, export and import is explained by using some steps.

- In section-I, we test whether the study variables contains unit roots or not. The stationary of each series is tested by using Augmented Dickey Fuller method and Phillips Perron method.
- In section-II, we conduct lag selection method. By this method we determine the number of lag appropriate to estimate the model. To estimate the model the number of lagged differences included is determined by the LR and AIC method.
- In section-III, we detect whether there is a long run relationship exists or not. This is done by using Johansen test of co-integration.
- In section-IV, we estimate the Error Correction Model, and then we explain the Granger Causality test.
- Finally In section-V, we explain residual diagnostic tests. There are different types of residual diagnostic test like the test for autocorrelation, test for normally distributed residuals, and tests for no heteroscedasticity problem.

Model Specification:

For the present study the following model has been used**.**

GDP = f (export, import)

In log linear form the model can be written as

$$\log(GDP) = \beta_0 + \beta_1 \log(export) + \beta_2 \log(import) + \epsilon_t$$

Where,
- log (GDP) = Logarithmic value of GDP.
- log (export) = Logarithmic value of export .
- log (import) = Logarithmic value of import.
- β_0 = autonomous part or constant term.
- β_1, β_3 = slope coefficients.
- ϵ_t = Random Error Term.

The slope coefficient β_1 represent how one percent change in export affects the percentage change in GDP. On the other hand the slope coefficient β_2 represent how one percent change in import affects the percentage change in GDP.

Results and Discussion:

Section I:

Trend and growth rate of GDP, Export and Import in Indian Economy:

The following figures show the trend and growth rate of GDP, Export and Import in Indian Economy.

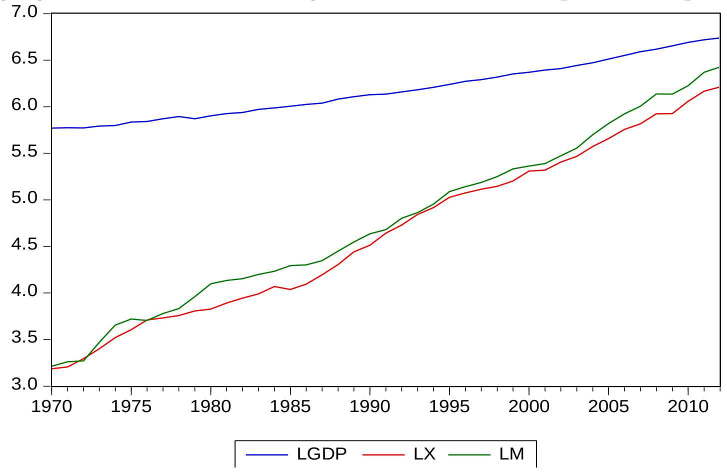

Figure 1: The trend of GDP, Export and Import in Indian Economy

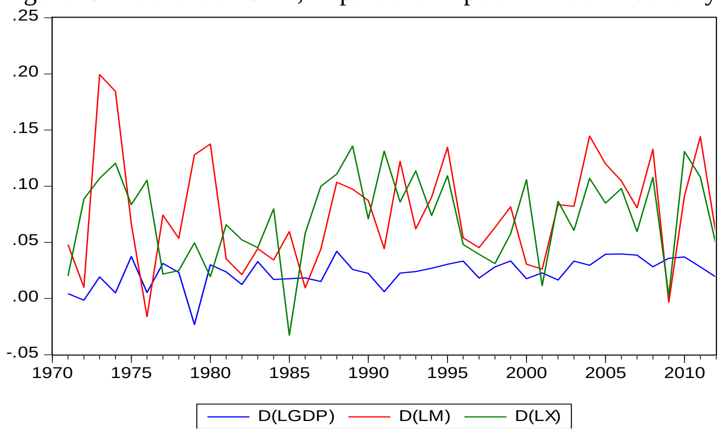

Figure 2: The trends in Growth of GDP, Export and Import in Indian Economy

Results of Unit Roots Tests:

To check the stationary of a series there are several tests. In this paper to check the stationary of the study variables we conduct Augmented Dickey Fuller test. For double checking we also perform Phillips-Perron test. In both the tests the null hypothesis is

H_0: Presence of unit root or the series is non-stationary.

Against the alternative hypothesis

H_1: Absence of unit root or the series is stationary.

Now If the value of the test statistic is less than the 5% critical value or if the p-value is greater than 5% we accept the null hypothesis that there is a unit root and the series is non-stationary, otherwise the series the stationary.

The results of unit root tests are as follows:

Augmented Dickey Fuller Test				
Variable	**Level**		**First Difference**	
	Test Statistics	**P-Value**	**Test Statistics**	**p-Value**
LGDP	3.391	1.0000	- 5.938	0.0000
LX	0.579	0.9871	- 5.985	0.0000
LM	0.407	0.9817	- 5.394	0.0000

Source: Author's computation using STATA 14 Econometric software

Phillips Perron Test				
Variable	Level		First difference	
	Test Statistics	p-value	Test statistics	p-value
LGDP	Z(rho) = 0.900 Z(t) = 4.272	1.0000	Z(rho) = - 40.169 Z(t) = - 5.963	0.0000
LX	Z(rho) = 0.159 Z(t) = 0.478	0.9842	Z(rho) = - 43.807 Z(t) = - 6.062	0.0000
LM	Z(rho) = 0.153 Z(t) = 0.451	0.9833	Z(rho) =- 30.453 Z(t) = - 5.320	0.0000

Source: Author's computation using STATA 14 Econometric software

From the table, we see that all variables are non-stationary in level but after first difference they become stationary in according to both ADF and PP tests. Therefore, it may conclude that all the variables are I(1) series. All the variables are stationary in first difference. Now the next step is to conduct co-integration test. If there is co-integration among the variables we say that the variables have long run association i.e there is a long run relationship among them.

Section II:

Results of Lag Selection Method:

Before conducting co-integration test at first we have to find out how many lag should be used for the model. Determination of lag length is an important factor because larger the Lag Intervals for the variables the more it can reflect the dynamic nature of the model. There are many methods that can determine optimal lag period for the model. The results of the lag selection method are as follows:

lag	**LL**	**LR**	**DF**	**P**	**FPE**	**AIC**	**HQIC**	**SBIC**
0	98.7896				1.5e-06	- 4.91229	- 4.86638	- 4.78432
1	269.697	341.81	9	0.000	3.7e-10	- 13.2152	- 13.0316*	- 12.7034*
2	279.357	19.32	9	0.023	3.6e-10*	- 13.2491	- 12.9277	- 12.3533
3	288.488	18.262*	9	0.032	3.6e-10	- 13.2558*	- 12.7967	- 11.9761
4	291.11	5.2445	9	0.812	5.3e-10	- 12.9287	- 12.3319	- 11.2652

Source: Author's computation using STATA 12 Econometric soft ware

LR: sequential modified LR test statistic, HQ: Hannan-Quinn information criterion, FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion

According to HQIC and SBIC method the lag should be one. On the other hand according to LR and AIC method lag should be three. But, our decision is to select lag order 3 to estimate the model. Because as lag intervals increases it can reflect the dynamic nature of the model.

Section III:

Johansen Co-integration Test:

To test whether there is a long run association or not among the study variables we conduct Johansen test of co-integration. In Johansen test there are two statistic (i) Trace Statistic and (ii) Maximum Eigen value Statistics. To test the validity of the co-integration let the null hypothesis is

H_0: There is no co-integration.

Against the alternative hypothesis

H_1: There is co-integration.

Now if the value of the test statistic (Trace Statistic or Maximum Eigen value Statistics) is greater than the critical value at 5% level of significance then we can reject the null hypothesis and conclude that there is co-integration among the study variables. The results of the Johansen co-integration test are as follows.

Max. Rank	Trace Statistic		Max Statistic	
	Value	5% Critical Value	Value	5% Critical Value
0	40.5890	29.68	25.7733	20.97
1	14.8158*	15.41	11.5368*	14.07
2	3.2789	3.76	3.2789	3.76

Source: Author's computation using STATA 12, Econometric soft ware

From the table we see that the value of trace statistic is higher than 5% critical value at rank 0 (means no co-integration). So we can reject the null hypothesis and say that there is co-integration among the variables. At rank 1 the value of the trace statistic is lower than the 5% critical value. Hence the number of cointegarating equation is equal to1.

We get the same result from the maximum Eigen value statistics. The value of the maximum Eigen value statistics at rank 1 is lower than 5% critical value so the null hypothesis can be rejected that there is no long run association among the study variables. Now regressing LGDP on LX and LM we get the following regression result

```
      Source |       SS       df       MS              Number of obs =      43
-------------+------------------------------           F(  2,    40) = 1812.48
       Model |  3.69682074     2  1.84841037           Prob > F      =  0.0000
    Residual |  .040792926    40  .001019823           R-squared     =  0.9891
-------------+------------------------------           Adj R-squared =  0.9885
       Total |  3.73761367    42  .088990802           Root MSE      =  .03193

------------------------------------------------------------------------------
        LGDP |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
          LX |     .15036   .0694619     2.16   0.036     .0099722    .2907477
          LM |   .1730805    .067967     2.55   0.015     .0357141    .3104469
       _cons |   4.654158   .0258144   180.29   0.000     4.601985    4.706331
------------------------------------------------------------------------------
```

On the basis of the above result the estimated regression equation can be written as

LGDP = 4.6542 + 0.1731 LM + 0.1504 LX

t-value	(180.29)	(2.55)	(2.16)
P-Value	(0.000)	(0.015)	(0.036)

$R^2 = 0.9891$

Section IV:

Error Correction Method:

The error correction model first coined by Sargan and later popularized by Engle and Granger. From the time series analysis we know that if the series are co-integrated, means that there is a long run equilibrium relationship between them. However, from the co-integrating equation we cannot say about short run equilibrium. So it is necessary to construct a comprehensive model which combines short run and long run behaviour of the series. We can solve the problem with the help of Error Correction Mechanism. The outcome of the error correction model can be explained with the help of the following table.

Variable affecting D_LGDP	Coefficient	p-Value
Error Correction Term	-0.1549079	0.003
First lag of LGDP	-0.1647282	0.300
Second lag of LGDP	-0.0488661	0.771
First lag of LX	0.1263326	0.035
Second lag of LX	0.0615941	0.250
First lag of LM	-0.0334519	0.476
Second lag of LM	-0.0441013	0.297
Constant	0.0369874	0.000

Source: Author's computation using STATA 14 Econometric soft ware

From the table it is evident that the above result is quite satisfactory because the error correction term is negative and also statistically significant. Here the p-value is very small (< 0.05 %). We say that there is about 0.1549 of the discrepancy between the actual and the long run value of Y. The coefficient -0.1549 is known as speed of adjustment factor towards long run equilibrium. In other words, if there were any short term disturbance from the long run stable relationship such disturbance would be corrected over time and the long run stable relationship would be restored. We can say that it is adjusting at the rate of 15.49% towards the long run equilibrium.

Here all the coefficients (except the error correction term) are short run coefficients. From the above table it is also evident that the growth of GDP significantly depends positively on the first lag of the Export. The growth of GDP also depends positively on the second lag of export. But this relationship is not significant. It is also seen that the growth of GDP depends negatively on the first and second lag of import. But the relationship is also not statistically significant.

Section V:

Residual Diagnostics Tests:

To verify that our empirical work is acceptable and that our estimate is well treated, we use a set of tests known as residual diagnostic tests. Residual diagnostic tests indicate that the overall specification adopted is satisfactory.

Test for Autocorrelation:

Since the study is dealing with time series data, so there is a possibility of high value of autocorrelation. Therefore it is needed to test the residuals for autocorrelation. To test that there is no autocorrelation problem in the model we use LM test. The LM statistic follows chi-square distribution with nine degrees of freedom.

The null hypothesis is

H_0: No autocorrelation in the VAR model

Against the alternative hypothesis

$H_{1:}$ There is a problem of autocorrelation.

The result of LM test is shown in the following table

Lag	Chi Square	DF	p-Value
1	4.8036	9	0.85108
2	5.4132	9	0.79691
3	4.6102	9	0.86688

Table 1: Results of Lagrange-Multiplier (LM) Test

From the table we see that at lag 1 the value of chi-square at 9 df is 4.8036 and corresponding p-value is 0.85108. Since the p-value is more than 5% so we can accept the null hypothesis that there is no autocorrelation problem. Again at lag 2 the value of chi-square at 9 df is 5.4132 and corresponding p-value is 0.79691. Since the p-value is more than 5% so we can accept the null hypothesis that there is no autocorrelation problem.

Test for Heteroscedasticity:

To test that the variance of the residual is constant in the model we use Breusch-Pagan Godfrey test. Here the null hypothesis is

H_0: there is no heteroscedasticity problem.

Against the alternative hypothesis

$H_{1:}$ There is a problem of heteroscedasticity

The result of Breusch-Pagan Godfrey test is shown in the following table

Chi Square	DF	p-Value
63.51205	72	0.7521

From the table we see that the value of chi-square at 72 df is 63.51205 and corresponding p-value is 0.7521. Since the p-value is more than 5% so we can accept the null hypothesis that variance of the residuals is constant in the VAR model or there is no heteroscedasticity problem.

Test for Normality of the Residuals:

To test that the residuals are normally distributed in the VAR model we can use Jarque - Bera test. The Jarque - Bera statistic follows chi-square distribution.

Here the null hypothesis is

H_0: residuals are normally distributed.

Against the alternative hypothesis

$H_{1:}$ residuals are not normally distributed.

The result of Jarque Bera test is shown in the following table

Equation	Chi Square	DF	p-Value
D_LGDP	1.240	2	0.53794
D_LX	2.490	2	0.28797
D_LM	1.631	2	0.44249
All	5.360	6	0.49848

Table 2: Results of Jarque Bera Test

From the above result we say that all the residuals are normally distributed. In all the cases the p-value is greater than 5%, so there is no reason to reject the null hypothesis and infer that the residuals are normally distributed. So, all residual diagnostic tests are satisfactory and assert that our model is acceptable and well treated.

Conclusion:

In this paper, we have examined the relationship between gross domestic product (GDP), Export and Import in India using time series data from 1970 to 2012. We want to check how growth rate of export and growth rate of import affect the growth rate of GDP in India. This study uses the ADF unit root test, Johansen test for co-integration, and ECM analysis. The stability of the model shows that in between the periods 1970 and 2012, the growth rate of GDP in India depended significantly and positively on the growth of exports. Not only had that but the growth rate of GDP in India depended significantly and positively on the growth rate of import also. ECM analysis is done on the growth levels of the three variables. According to the analysis results, the increase in both exports and imports in India increases the country's gross domestic product (GDP). Every 1% increase in exports in the long run leads to a 0.1731% increase in gross domestic product, on the other hand every 1% increase in import in the long run leads to a 0.1504% increase in gross domestic product. The long-run effect of exports is stronger than the short-term effect. We also find that Imports have a negative impact on economic growth in the short run but have a positive effect on the long run.

References:

1. Chow, PCY, 1987. Causality between Exports Growth and Industrial Development: Empirical Evidence from the NICs, J Develop Economics, 26(1), pp. 55-63.
2. Multivariate Co-Integration Analysis for India, Applied Economics, 31(4), pp. 525-530.
3. Edwards, S., 1998. Openness, productivity and Growth: What do we really know?, The Economic Journal, 108(447), pp. 383-398.
4. Arif Billah Dar Niyati Bhanja Amaresh Samantaraya, 2013, Export Led Growth or Growth Led Export Hypothesis in India.
5. Emilio J. Medina-Smith, 2001, Is the Export-Led Growth Hypothesis Valid for Developing Countries? A Case Study of Costa Rica, study series No 7.
6. Fouad Abou-Stait 2005, Are Exports the Engine of Economic Growth? Applications of Cointegration and Causality. Economic Research working Paper. No 76.
7. Gujarati D.N, Porter D.C, Gunasekar S, 2013, Basic Econometrics, fifth edition, McGraw Hill Education (India) Pvt Limited, New Delhi.
8. Gujarati Damodar, 2011, Econometrics By Example, Replika Press Pvt Ltd.