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TRADE LIBERALISATION AND SUSTAINABLE ECONOMIC GROWTH IN INDIA

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ABSTRACT

Economic Growth is the pillar that most groups focus on when attempting to attain more sustainable efforts and development. In trying to build their economies, many countries focus their efforts on resource extraction, which leads to unsustainable efforts for environmental protection as well as economic growth sustainability. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. A large proportion of the income measured by GDP is earned by exploiting and mining natural resources and the environment or involves damage to the environment. This paper examine relationship between economic growth ,trade openness and CO_2 environmental indicator. In this paper we have apply the simple regression model, unit root test to make the data in form of stationarity and granger causality test for casual relation between CO_2 ,trade openness and GDP.

KEYWORDS: *Economic Growth, Sustainable Development, Environmental Protection, Capital Assets.*

INTRODUCTION

The relationship between environmental protection and economic development has long been a controversial issue. In the early 1970's, the perspective of "growth limit" was put forward by "Rome Club" which argued that economic growth is not sustainable subjected to natural resources condition and we should lower the economic growth rate for environmental protection. Economist has used the term Sustainable development in an attempt to clarify

the balance between economic growth on one hand and conservation and protection of environment on the other. Sustainable development refer to "meeting the needs of the present generation without compromising the need of future generation". Thus economic growth will be sustainable if the stock of capital assets including land remain constant or increase over time.

OBJECTIVES OF THE STUDY

1. To analyse the impact of trade openness on CO_2
2. To analyse the impact of GDP on CO_2
3. To estimate the casual relationship between trade openness and CO_2 by granger causality test.
4. To estimate the casual relationship between GDP and CO_2 by granger causality test.

METHODOLOGY

This model analyzes the Trade intensity or 'openness' which is considered to be equal to imports plus exports in year t divided by GDP in year t thus: (IMt + EXt) / GDPt = Trade intensity specified as:

Model: 1 $AP = \beta + \beta 1\ TO + \mu$

Model: 2 $AP = \alpha + \alpha 1\ GDP + \mu$

Model: 3 $AP = b + b1\ TO + b2\ GDP + \mu$

TO=(Import+Export ratio to GDP) *[Economics openness or Trade intensity]*

GDP=Gross domestic product

AP=(CO_2 (carbon dioxide emissions (kt)) *[proxy for Air Pollution]*

Above two models consist three variables; the models examine impact of economics openness or trade intensity (To), GDP on Air population (AP). All the data were obtained from World Development Series and Economic Survey of India.

The nature of the data distribution of each variable is examined by descriptive statistics. To examine the time series property of each variable, Augmented Dickey-Fuller Test has been applied. To find the long run casual relationship among the variable, this study has applied the Grangar causality test.The impact of globalization (through trade liberalization) and GDP on environmental degradation is examined in the paper.

UNIT ROOT TEST

The Test of stationary that has recently become popular is known as the unit root test. This test is to consider the following model –

$$Y_t = Y_{t-1} + u_t$$

Where Y_t is independent and Y_{t-1} is independent and u_t is the stochastic error term that follows the classical assumptions, namely, it has zero mean, constant variance and is non-auto-correlated. Now if the coefficient of yt-1 is in fact equal to 1 we face what is known as the unit root problem.

The hypothesis is:

Null Hypothesis H_o: = 0
(Unit Root Problem)

Alternative Hypothesis H_1: ≠ 0
(No Unit Root Problem)

Unit Root Problem means non stationary series and No Unit Root Problem means stationary series:

(AUGMENTED DICKEY FULLER TEST): If the error term u_t is auto correlated then we use this equation. This is called ADF test.

y_t = a + T + y_{-1} + $_i$ y_{-I} + ct

If Durbin-Watson Statistics is not significant to reject the autocorrelation so we still cannot rely on the simple Dickey fuller (DF) Test. To remove the autocorrelation problem we adopted the Augmented Dickey Fuller (ADF) Test.

The Granger causality test is used to further test for the direction of causality.

If you have two variables, Y and X, and you want to see if X Granger causes Y, you would

do a regression of Yt on lagged values of Y and lagged values of X and then test whether the coefficients on the lagged X values are jointly equal to zero. If you reject this null hypothesis, then the conclusion is that X Granger causes Y.

If the coefficient Bt-1 is significantly different from zero, the implication is that X Granger causes Y. The model might also include additional lagged terms. You can also reverse this to test whether Y Granger causes X. In case you're wondering, it can be the case that Y Granger causes X and that X also Granger causes Y.

MODEL-II

$$Y_t = a + \sum_{n=1}^{p} A_n X_{(t-p)} + \sum_{n=1}^{p} B_n Y_{(t-p)} + E_t$$

.....(3)

$$X_t = b + \sum_{n=1}^{p} A_n' Y_{(t-p)}' + \sum_{n=1}^{p} B_n' X_{(t-p)}' + E_t'$$

.....(4)

Granger causality test: Yt is CO_2 and Xt is trade openness in fact, both are interlinked and co-related through various channel. There is no theoretical or empirical evidence that could conclusively indicate sequencing from either direction. For this reason, the Granger Causality test was carried out.

Table-1.1(A) Results of Linear Regression Equation

$CO_2 = \beta 0 + \beta 1\ TO + ui$ showing the Impact of Trade Openness on CO_2 : 1960-2010.

Time Period	Bo	B_{1TO}	R2	Adj R^2	F Value
1960-2010	-62169.85 (-0.726677)	41378.43 (10.03618)*	0.67	0.66	100.72*

t *- Statistically significant at 5% Level of significance

F* - Statistically significant at 5% Level of significance.

Table-1.1(B) Results of Linear Regression Equation

$CO_2 = \beta 0 + \beta 1\ GDP + ui$ Showing the Impact of GDP ON CO_2 : 1960-2010.

Time Period	Bo	B_{1GDP}	R2	adjR^2	F Value
1960-2010	354870.3 (11.25964)*	0.295025 (18.76891)*	.877	.875	352.2*

t *- Statistically significant at 5% Level of significance

F* - Statistically significant at 5% Level of significance.

Table-1.1(C) Results of Linear Regression Equation

$CO_2 = \beta 0 + \beta 1\ TO + \beta 2\ GDP + ui$ showing the Impact of GDP Trade Openness on CO_2 : 1960-2010.

Time Period	Bo	$B_{1\ TO}$	$B_{2\ GDP}$	R2	adjR^2	F Value
1960-2010	209775.3 (3.822)*	11544.52 (3.115)*	0.238852 (10.327)*	.89	.89	212.28*

t *- Statistically significant at 5% Level of significance

F* - Statistically significant at 5% Level of significance.

We have also analyzed the relationship between CO_2 and trade openness or GDP. The analysis has been made by applying the linear regression equation. The results are presented in table 1.1(A), 1.1(B) to 1.1(C) in this section.

The table 1.1(A) We have analyzed the impact of trade openness on CO_2. Empirical result have been obtained by using regression equation " $CO_2 = \beta 0 + \beta 1\ TO + ui$"

The results of the Ordinary Least Squares Regression are summarized in the Table 1.1.A.The above regression analysis clearly Indicates that CO_2 is dependent variable and TO is independent variable. The result shows that TO is positively related to CO_2; and has a significant Impact On CO_2 in whole Period under study 1960 to 2010. The value of R^2 is high.

The table 1.1(B) We have analyzed the impact of GDP on CO_2. Empirical result have been obtained by using regression equation

" $CO_2 = \beta 0 + \beta 1GDP + ui$ "

The above regression analysis clearly Indicates that GDP is also positively related to CO_2; and has significant Impact on CO_2 in whole Period under study 1960 to 2010.

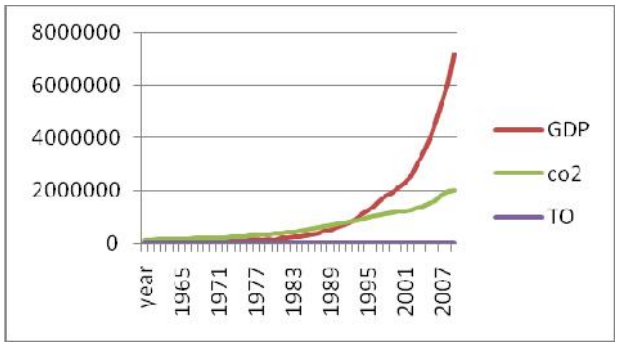
The table 1.1(C) We have analyzed the impact of TO and GDP on CO_2. Empirical result have been obtained by using regression equation

" $CO_2 = \beta 0 + \beta 1TO + \beta 1GDP + ui$ "

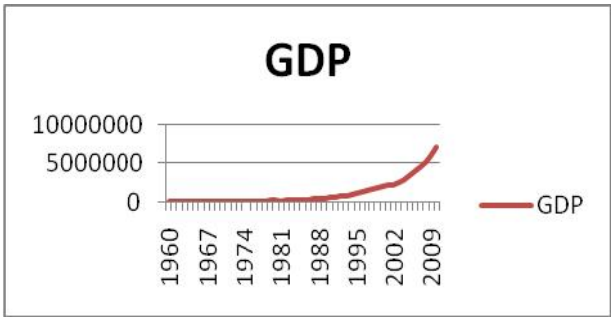
The above regression analysis clearly Indicates that OT and GDP are also positively related to CO_2; and has significant Impact on CO_2 in whole Period under study 1960 to 2010.

FIGURE: 2.1.

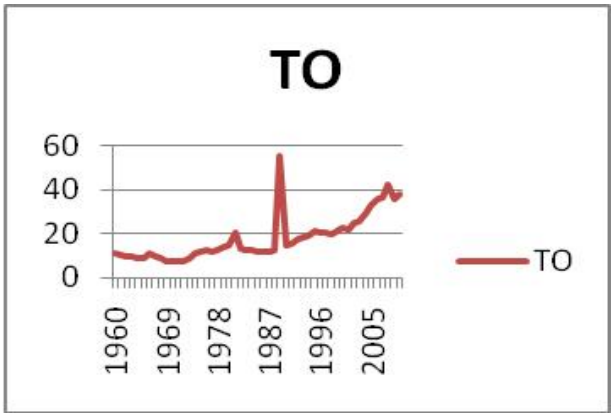
(A)



(B)



(C)



(D)

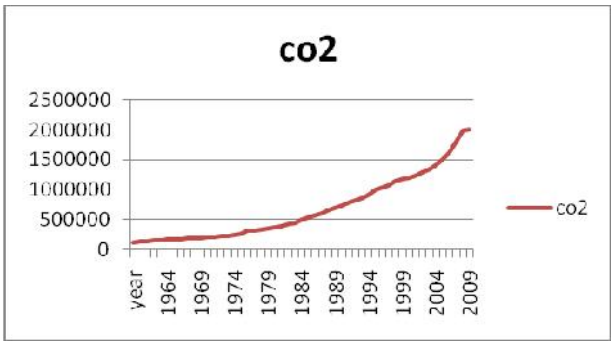


Figure 2.1 explain about the trend of CO_2, GDP and Trade openness. CO_2 and GDP show the increasing trend but TO show the mixer trend . For this we remove the trend by apply unit root test to make the data stationary.

Table: 1.2

Test of the Unit Root Hypothesis

	Level ADF	First Difference ADF
Variables	t-stat	t-stat
TO	-5.903071**	---
GDP	3.553516	4.346572
CO_2	1.139594	- 4.999489**

*And ** indicate significance at the 5% and 1% levels, respectively.*

***NOTE**: The t-statistic reported is the t-ratio in the following regression*

Test criticalvalues:

1% level	-4
5% level	-3.502373

Table 1.2 shows that unit Root Test is used for check the stationary. In unit Root test, the augmented Dickey Fuller Test is applied. Augmented Dickey Fuller (ADF) is carried out on the time series levels and difference forms. The results are given in table the variables GDP and CO_2 have a unit root in their levels but CO_2 are stationary in their first difference. Thus all variable (OT) are integrated of order I(0) and CO_2 are integrated of order one I(1).

Table: 1.3(A) Pairwise Granger Causality Tests

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
TO does not Granger Cause CO_2	49	0.63367	0.5354
CO_2 does not Granger Cause TO		9.98867*	0.0003
GDP does not Granger Cause CO_2	49	2.22551	0.1200
CO_2 does not Granger Cause GDP		3.38222*	0.0430

Table:1.3(B) Pairwise Granger Causality Tests

Sample: 1960- 2010

Lags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.
TO does not Granger Cause CO_2	47	0.73220	0.5757
CO_2 does not Granger Cause TO		3.17756*	0.0240
GDP does not Granger Cause CO_2	47	5.28773*	0.0017
CO_2 does not Granger Cause GDP		1.59288	0.1961

In table-1.3(A) under the null hypothesis show that TO does not Granger-cause CO_2 and CO_2 does not granger cause TO but after apply the test we reject the null hypothesis to claim that CO_2 is significant causes of TO with time lag (2). GDP does not Granger-cause CO_2 and CO_2 does not granger cause GDP but after apply the test we reject the null hypothesis to claim that CO_2 is significant causes of GDP with time lag (2).

In table-1.3(b) under the null hypothesis OT does not Granger-cause CO_2 and it is explained by with time lags(4).Therefore I should be able to accept the null hypothesis to claim that it is not significant and does not causes of CO_2. GDP does not Granger-cause CO_2 and CO_2 does not granger cause GDP but after apply the test we reject the null hypothesis to claim that GDP is significant causes of CO_2 with time lag (4).

CONCLUSION

This paper examines relationship between economic growth and CO_2 environmental indicator. In this paper we have apply the simple regression model, unit root test for make the data in stationarity and we have applied granger causality technique for casual relationship among the variables by using the time series data for Indian economy, over the period of 1960-2010. The paper finds the existence relationship among the trade liberalization or growth rate and environmental indicators. This finding suggests that trade liberalization causes to increasing air pollution. Moreover, there is a significant effect. The results supports that trade liberalization have a positive impact on environmental indicators. The emission of greenhouse gases are increasing with alarming rates, particularly carbon dioxide that is the cause of many diseases and adversely affecting the health of poor peoples. It is highly desirable to introduce environment friendly innovations,

which will contribute in our sustainable development. International emission standards must be followed to protect the domestic environment and poor segments of society.

REFERENCES

1. *Antweiler W, et al. (1998) Is free trade good for the environment. NBER working paper; p. 6707.*
2. *Beak, J. and Koo, W.W. (2009) "A dynamic approach to FDI-environment nexus: The case of China and India. Journal of International Economic Studies, 13: 1598-2769.*
3. *Carson R. et al. (1997) The relationship between air pollution emissions and income: US data. Environment and Development Economics; (2): p. 433-450.*
4. *Chai J. (2002) "Trade and environment: evidence from China's manufacturing sector", Sustainable Development; (100): p.25-35.*
5. *Drabo,A.(2010) "Environment Quality and Economic Convergence: Extending Environmental Kuznets Curve Hypothesis", Economics Bulletin, Vol. 30 no.2 pp. 1617-1632.*
6. *Grossman G, Krueger A.(1991) "Environmental impacts of a North American free trade agreement", NBER working paper; p.3914.*
7. *Grossman, G. M. and Krueger, A. B. (1995) "Economic growth and the environment", Quarterly Journal of Economics, 110, 353–377.*
8. *Kim, H. S and Beak, J. (2011) "The Environmental consequence of economic growth revisited", Economics Bulletin, 31: 1198-1121.*
9. *McConnell, K. (1997) "Income and the demand for environmental quality.",Environment and Development Economics, (2): p.383-399.*
10. *Bo,S.(2011) "A Literature Survey on Environmental Kuznets Curve" ,Energy Procedia (5) 1322–1325.*