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GDP AND POLLUTION: EMPIRICAL ANALYSIS FOR THE NAFTA TRADE BLOC

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ABSTRACT

The tradeoff between pollution control and GDP growth is one of the major concerns for the economists. It is observed that with the increase in GDP pollution/emission also increases. In this paper I have examined the relationship between level of emission and GDP for NAFTA countries. The linkages between emission and GDP has been examined by using correlation analysis. The empirical analysis has indicated that there is positive correlation between GDP and emission for the NAFTA countries.

JEL Classification: O11

KEY WORDS: *Pollution, Emissions, GDP, CO_2, Correlation*

1. INTRODUCTION

There are plenty of studies related to the linkages between GDP and pollution. It has been argued that higher growth in GDP induces higher level of pollution especially if the growth is induced by the growth in manufacturing sector. Weaker environmental regulation in a country may encourage the manufacturing sector to pollute more and hence in can lead to the degradation of the environment through the higher level of emissions. Ample indication advocates that development triggers structural transformation of the production side of the economy. However, there are very few studies which have dealt with the linkage between environmental pollution and economic growth for the NAFTA (North American Free Trade Agreement) trade bloc. In this empirical work, I have attempted to investigate the linkage between environmental pollution and economic growth for the NAFTA countries. The organization of the paper is as follows; Section 2 deal with the Methodology and Data, section 3 presents preliminary data analysis, section 4 presents the results and discussion and finally section 5 concludes.

2.METHODOLOGY AND DATA

The linkages between GDP and pollution has been established by correlation analysis. In this study, I have considered CO_2 as a measure of

pollution. The CO_2 is considered because it is considered one of the major contributors of global warming as greenhouse gas (Talukdar and Meisner, 2001). Moreover, time series data on CO_2 emission is also available. The study is based on all NAFTA countries (USA, Canada and Mexico) over the period of 1990– 2013.

The data on GDP and CO_2 has been collected from World Development Indicator of World Bank database.

3.PRELIMINARY DATA ANALYSIS

The present study is based on the countries of NAFTA area. The countries are USA, Canada and Mexico. The study is based on the period of 1990 – 2013. Preliminary data analysis reveals some interesting facts on the relationship between GDP and CO_2 emission.

Table 1: Descriptive Statistics of GDP and CO_2 for USA

CO2		*GDP*	
Mean	5374377	Mean	1.11E+13
Median	5392052	Median	1.08E+13
Standard Deviation	311011.3	Standard Deviation	3.47E+12
Sample Variance	9.67E+10	Sample Variance	1.21E+25
Range	972778.1	Range	1.07E+13
Minimum	4822384	Minimum	5.98E+12
Maximum	5795162	Maximum	1.67E+13
N	24	N	24

Table 2: Descriptive Statistics of GDP and CO_2 for Canada

CO2		*GDP*	
Mean	498877.3	Mean	1.01E+12
Median	498143.6	Median	7.5E+11
Standard Deviation	39442.48	Standard Deviation	4.6E+11
Sample Variance	1.56E+09	Sample Variance	2.12E+23
Range	126405.2	Range	1.27E+12
Minimum	426780.1	Minimum	5.77E+11
Maximum	553185.3	Maximum	1.84E+12
N	24	N	24

Table 3: Descriptive Statistics of GDP and CO_2 for Mexico

CO2		*GDP*	
Mean	398634.4	Mean	7.27E+11
Median	393747.8	Median	7.19E+11
Standard Deviation	56294.47	Standard Deviation	3.05E+11
Sample Variance	3.17E+09	Sample Variance	9.32E+22
Range	174310.8	Range	9.99E+11
Minimum	314291.2	Minimum	2.63E+11
Maximum	488602.1	Maximum	1.26E+12
N	24	N	24

Observations from Table 1 – Table 3

(a) The size of the economy (measured in GDP) is highest for USA followed by Canada and Mexico.

(b) CO_2 emission is highest for USA followed by Canada and Mexico. One possible reason behind this is the size of the economy (in terms of GDP) of USA. Thus it indicates that higher volume of GDP is positively associated with the higher level of emission.

Figure 1: Trend analysis of CO_2 emissions for USA

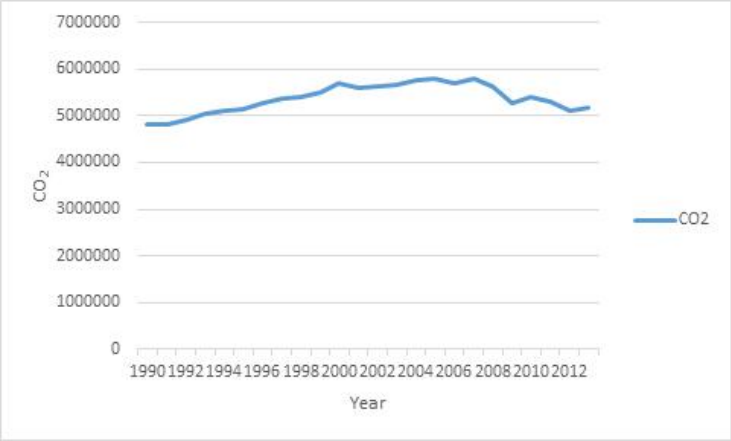

Figure 2: Trend analysis of CO_2 emissions for Canada

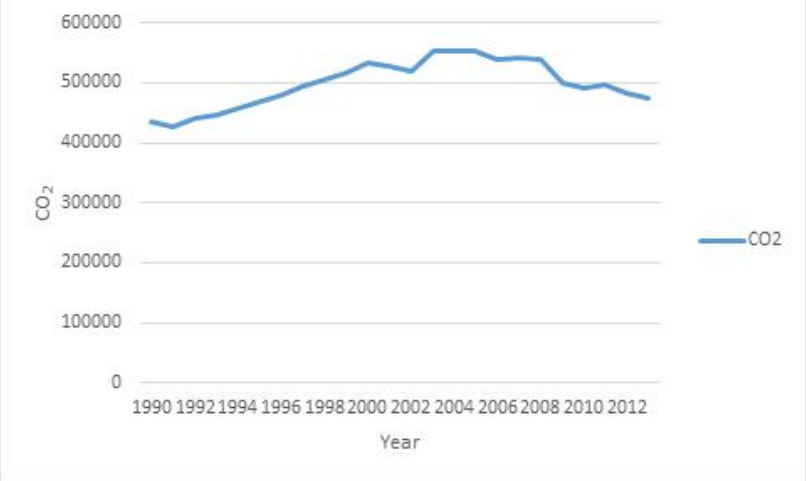

Figure 3: Trend analysis of CO_2 emissions for Mexico

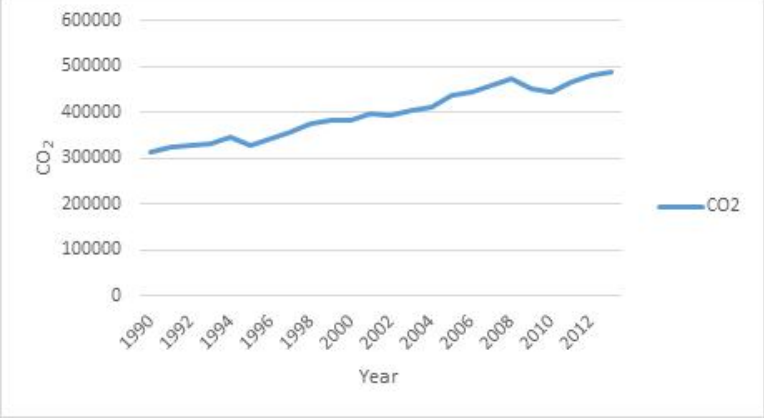

Figure 1 – 3 indicates that for all the NAFTA countries CO_2 emissions are increasing. However, for USA and Canada it has started to decrease after the period of 2006.

4.RESULTS AND DISCUSSION

Correlation analysis has been conducted to examine the linkages between pollution and GDP for NAFTA countries. Correlation analysis has been presented in Table 4.

Table 4: Correlation between CO_2 emissions and GDP

	USA	Canada	Mexico
Correlation Coefficient	0.499	0.307	0.981

The correlation analysis indicates that for all three countries there is positive association between carbon di oxide emission and GDP. The correlation coefficient between CO_2 and GDP is highest for Mexico followed by USA and Canada. The results suggest that environmental pollution (emission) due to the economic growth is highest in Mexico followed by USA.

5. CONCLUSIONS

This paper has tried to explain one of the major issues in the domain of environmental economics. The issue of linkages between pollution/ emission with GDP is important because of the fact that in general economic growth comes with the higher level of pollution for most of the countries. It is argued that this linkage is stronger in less developed economies. However, the results of the empirical analysis has shown that even in developed nations (e.g. USA and Canada) this linkage exist. Though the linkage is more evident in Mexico, it is found that the positive association between CO_2 emission and GDP exist in USA also. Thus for policy makers it is important to device some strategy for higher GDP growth with lower level of emission.

REFERENCES

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