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Impact of Energy Consumption on Environment Degradation in Pakistan

Muhammad Rizwan Yaseen[1], Naima Serwar[2], Irfan Hussain Khan[3]

[1]Assistant Professor, Department of Economics, Government College University, Faisalabad-38000, Pakistan.
[2]Government College University, Faisalabad-38000, Pakistan
[3]PHD scholar, Department of Economics, Government College University, Faisalabad-38000, Pakistan.

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ABSTRACT

The existing scenario showed the contact of energy in consumption level and its environment degradation effect for Pakistan economy by means of data from 1987-2012. The intention of research is in the direction of ensure the energy consumption impact's on air pollution. Variables like Carbon dioxide emissions (CO2), Nitrogen oxides emission (NOX), and sulfur dioxide emission (SO2) are used proxy for air pollution. There are numbers of proxy used for energy consumption like consumption of domestic gas (cgd), consumption of coal (ccol), consumption of high diesel oil (chdo), and consumption of gasoline (cgaso). In study air pollution is used as dependent variable. For independent energy consumption impact, trade openness and GDP variables be used in study. To check extensive and little run affiliation between variables Johnson Cointegration Approach in addition to Vector Error Correction Model (VECM) technique be being applied. Empirical Results illustrate that in Pakistan energy consumption and air polluting showed strong association.

KEYWORDS: Air pollution, Carbon dioxide emission, Energy consumption, GDP, Nitrogen oxides, Sulfur dioxide emission, Vector Error Correction Model.

INTRODUCTION

In the direction of cut out the total content of energy consumption effect and green- house gas emissions use of efficient consumption of energy is an inexpensive way. At national and international level different energy measures are recommended. Nearly all residential and commercial sectors extensively use greenhouse gas emissions. The gas emission can be compact from building by using different method like controlling energy supply, by lessening energy consumption or better building structure, mounting energy efficiency and used other instrument which helpful in reduced energy demand in building(Khan et al 2013).Few decades ago social sciences research extensive use association involving pollutant environmental, consumption of energy and GDP of that economy.

Kuznets Curve (EKC) Environmental hypothesis, at some threshold level output reach when carbon dioxide emission increases at this level and after that diminishing in emission prevails. There are three strands are used in this research according to the past history. Study showed inverted U-curve association among environment and economic development resembles as per hypothesis of EKC. Next strand explain correlation linking energy consumption and GDP and further suggest that factor like energy consumption and efficient consumption of energy may direct to more growth in economy. Growth in economy leads to changes in CO2 emissions according to literature cited and also initiate that the energy consumption is an input of CO2 emissions (Omri 2013).

Economic development is correlated to consumption in energy; its means privileged in development of economy are associated when additional use of energy is utilized. Economics growth can be determined jointly by the consumption in energy and Economic development; in the literature the importance of this relationship has been well predictable. The present studies tend to explained co- integrating among output and energy consumption with the advancement of time series analysis. Present study illustrates that pollutant emissions correlate with income levels increase (James ang 2007). These studies describe that RUR sub-regions (urban, peri-urban and rural areas) their theoretical, methodological and empirical air pollution emission data and estimated the response functions related to air pollution . In the study responsible sources of air pollution are all urbanized area. In the peri-urban all energy sources for urban supply like (refineries, power plants, district heating etc.) which are located in it. And rural regions, which means that environmental penalty of urban-activities caused (such as ambient air pollution and air pollutant emissions) are "outsourced" into neighboring regions. From the different energy sources thus it is necessary to construct different emission-generating actions which have different spatial extent, effects on local environmental pollution (Wolf Ganget al 2010).

***Corresponding Author:** Muhammad Rizwan Yaseen, Assistant Professor, Department of Economics, Government College University, Faisalabad-38000, Pakistan. Email address: rizwany2001@yahoo.com

Under the heading ongoing major global concern, the pollutant emissions can be considered. Organizations around the world, such as the United Nations (UN) or may be the work of the World Economic Forum (WEF), in order to reduce the adverse effects from the past few decades of global warming and climate change on the economy. In order to reduce greenhouse gas (GHG) United Nations Framework Convention on Climate Change Kyoto Protocol (UFCCC) is one of the important solutions. The main contributor to air pollution and from 1994 and 2002, energy production and transport sectors considered to be 31% and 30%. Tunisia economists have developed a framework of trade opening affect the environment and pollution checking. The first study investigated the framework of the North American Free Trade Agreement (NAFTA), the impact of trade liberalization, three independent impact on the environment: the size, structure and technology. First, the scale effect shows the impact on economic activity greenhouse gas emissions from business growth. It concluded that the economic and energy activities are trade openness increases. This increase in the scale of economic activity and energy use will lead to higher greenhouse gas emissions levels. Secondly, the effect of the composition explained that trade liberalization has changed the country for the production of those products has a comparative advantage. Third, improve the gas. The impact on greenhouse gas emissions will depend on a country has a comparative advantage (Farhani et al. 2014) The present study showed that environmental pollution is the sources of production procedure, expenditure process of goods and services. The consumption in petroleum product use improved by 0.5% and utilize of coal, gas and electricity by 5.0%, 6.8%and 2.5% respectively. However in GDP, International trade and energy consumption it is possible that environmental condition improve at a certain level.

In this study shows CO2, NOX, and SO2 are used as independent variables that establish the impact of energy consumption on environment degradation. Carbon dioxide (CO2) is a colorless, odorless gas. At naturally and through human activities CO2 is produced; it is created through burning gasoline, wood, coal and oil. Use of Carbon dioxide is not normally found at dangerous levels in indoor environments. The carbon dioxide itself can cause headache, dizziness, nausea and other symptoms at use of high levels. At the range of 40,000 ppm range of CO_2 is immediately dangerous to life and health which is also cause suffocation as it replaces oxygen in the blood-exposure. However $CO_2$is very rare poisoning. The SO2 gas is heavy pungent toxic gas which is colorless liquid in nature, which is extensively used in making sulfuric acid in bleaching powder as a preservative and as a refrigerant and mainly use in industrial area. The use of coal and oil at electric power plants create sulfur dioxide in the air.

The results showed that industrial facilities using coal or oil, petroleum refineries, cement manufacturing, metal processing, pulp manufacturing, copper smelting, another source can be generated in the air of sulfur dioxide. Train sulfur dioxide into the air, a large number of ships and other industries as fuel. Especially for people with lung disease may lead to short-term exposure to air can be life-threatening breathing difficulties and obstacles caused by the respiratory tract, electronic high level of sulfur dioxide. The results showed that chronic exposure to sulfur dioxide reasons existing heart disease. Diseases such as nose, throat number, and lungs, causing coughing and sulfur dioxide and breathing difficult. Studies have shown that nitric oxide (NOx) as they do not have a color, number of smell, taste or quality, non-toxic. In air, it is rapidly oxidized to nitrogen dioxide. The main source of anthropogenic burning of fossil fuels to generate nitrogen oxides. Upper respiratory tract infection caused by the smoke part of nitrogen dioxide is known to stimulate the lungs, increasing susceptibility. The purpose of this study was to show that high in the air pollution diesel, coal, domestic gas and gasoline consumption in Pakistan affected. Principal component analysis (PCA) used three pollution emissions.

The result of consumption in energy and on carbon discharge in the USA was firstly explained by Soytes et al (2007). In study all variables are in natural logarithms form and data set comes from world development indicators (WDI). Granger causality test used for the purpose of estimation used Diagnostics.. The empirical results showed that in USA income does not affect emission in long run, but energy use does affect.

B. Ang (2008) narrated that in Malaysia output, pollutant emissions, and energy consumption showed long run relationship between them. From World Bank all the data set used for study. Econometric technique like Multi Variate and Vector Error Correction Model apply for assessment purpose. Main finding of study showed that in period of long run pollution and energy utilization are positively associated to production

Ozturk et al (2012) showed the situation of Turkey that different variables like economic growth, financial development, trade and consumption in energy and carbon emission have correlation between them. For study World development indicators technique use for all the data set. Estimation was done by The ARDL model. Empirical result showed that an add to per capita consumption in energy escort to increase per capita carbon emission. But in long run it's showed that development in financial has no considerable effect on carbon emission.

Bukhari (2012) explored the condition of Pakistan in the long run collision of trade, consumption in energy and income on the environment. (WDI)World development indicators use as key for the data set used for research. Researcher use Econometric technique like ARDL use for analysis purpose. It is observed that results observed

significant affiliation along with variables. With the long run coefficients trade openness showed improves environment quality

Khan et al (2013) explained long run relationship between consumption in energy and greenhouse gas emission for dissimilar groups of countries. Study showed international financial statistics and world development indicators use for data sets. Econometric technique like Johnson cointegration and Granger causality techniques for the estimation purpose. The empirical results revealed that energy consumption does not correlate with gas emission. Result showed that energy consumption is closely connected with greenhouse emissions by using a Johnson technique.

Omri (2013) expressed that 14 MENA countries showed the association of CO2 emission, consumption in energy and growth in economic growth by using simultaneous models. World Bank used for data technique. Durbin-Watson and Hausman Test used for the estimation purpose. The study revealed countries like Bahrain, Algeria and other Arab countries showed that consumption in energy has a considerable positive sign with per capita GDP and irrelevant positive collision for Jordan, Syria and Morocco considerable harmful sign for Bebanon and Egypt.

Katircioglu (2014) demonstrate the condition in Turkey with using variable like tourism, energy consumption and environmental degradation as peroxide CO2 emission that show long relationship. World Bank development indicators and Turk stat use for data set. Econometrics technique for estimation purpose like bounds test through ARDL model was used. Study showed that CO2 emission and its determinants including tourism revealed that strong association in extensive period of economy. Main finding observed that Tourism show positive and considerable result on CO2 release both in short and extensive term. Study revealed situation in Turkey tourism development not only increases income and energy consumption but also increases CO2 emission.

Saidi (2014) observed condition for 58 countries it is the contact of consumption in energy and CO2 emission. World Bank used for data set for study .econometrics technique like used Generalized Method of Moments Estimator (GMM) for the purpose of estimation. The main finding of study revealed that consumption in energy plays a central position in financial progress but it creates high pollutions in economy. In other words for economic growthCO2 emission showed negative effect on it.

Farhani et al (2014) describe the Tunisia condition where carbon dioxide emission (CO2), output, energy consumption and trade showed strong relationship between them. World Bank and Econstat use for data technique. Econometric techniques like ARDL and Granger causality for the intention of analysis used. The main finding of study showed that two fundamental associations among variables, in little run period GDP, GDP^2 and energy consumption there are three Granger causality unidirectional relationships are used and applied. In both period Trade openness showed the direct effect on CO2 emission n.

DATA, VARIABLES AND MODEL:

DATA SPECIFICATION

In study World Bank, World Development Indicators (WDI 2014) and REAS (Regional Emission Inventory in Asia), from the period of 1987 – 2012 used for Time series analysis on Pakistan to show impact of energy consumption on environment degradation.

MODEL SPECIFICATION

In these study variables like i.e. PCI, GDP, trade openness, gasoline's consumption, coal's consumption, consumption of high diesel oil and domestic gas's consumption are being used. In study GDP is use as proxy for economic growth and for energy consumption variable like consumption of gasoline, coal, high diesel oil and domestic gas are used as proxies. For environment degradation air pollution gases are use. In study for air pollution gases indicator like Carbon dioxide emissions (CO2), Nitrogen oxides emission (NOX)and sulfur dioxide emission (SO2) are used as proxies. Principal Components (PCA) Analysis technique used in this research which show the combine effects of these entire variable CO2, NOX, SO2 as new variable in the air pollution.

In 1901Karl Pearson firstly defines Principal component analysis (PCA). PCA is a convenient technique by which correlated variables are uncorrelated. To identify a variable that has more explanatory power PCA is being used. To convert the p dimensioned data into one dimension also PCA use. Eigen value. use for Principal component (PCA).

Variable like CO2, SO2, and NOX use as proxies for air pollution emission. PCA use for to reduce the dimension of data set index of gas emission. In equation PCA is used as the dependent variable. All variables included and all variables Eigenvalue is 1 so variation capture the 100%.

Principal Components Analysis
Date: 07/17/14 Time: 15:16
Sample: 1987 2012
Incorporated observations: 26

Using 3 of 3 possible components

Eigen values: (Sum = 3, Average = 1)

Number	Value	Difference	Proportion	Cumulative Value	Cumulative Proportion
1	1.000000	1.22E-15	0.3333	1.000000	0.3333
2	1.000000	6.66E-16	0.3333	2.000000	0.6667
3	1.000000	---	0.3333	3.000000	1.0000

Eigen vectors

Variable	PC 1	PC 2	PC 3
CO2	-0.471072	0.751917	0.461207
NOX	0.624178	0.653593	-0.428039
SO2	0.623292	-0.086238	0.777219

Ordinary correlations:

	CO2	NOX	SO2
CO2	1.000000		
NOX	-0.000000	1.000000	
SO2	-0.000000	0.000000	1.000000

METHODOLOGY

In previous studies different econometric techniques like i.e. Granger Causality Test, Autoregressive Distributed Lags (ARDL) Models, Johnson Jubilees (JJ) Co integration, and Diagnostics test. To check stationary of all variables with ADF test practical on different variables like pc1, variable ccol are stationary at level, cgd, chdo & trade openness stationary at 1st difference and cgaso, GDP stationary at 2nddifference then by taking the log of all variables. In study Johnson Test is applying. At 1st difference entire variables are stationary.

MODELS:

For the purpose of estimation in this paper take four models. These are following;

$lnpc1=\beta_0+\beta_1(LGDP)+\beta_2(lntrdop1)+\beta_3(lnchdo)+\mu_4$.....1

$lnpc1=\beta_0+\beta_1(lngdp)+\beta_2(lntrdop1)+\beta_3(lnccol)+\mu_4$.....2

$lnpc1=\beta_0+\beta_1(lngdp)+\beta_2(lntrdop1)+\beta_3(lncgaso)+\mu_4$……3

$lnpc1=\beta_0+\beta_1(lngdp)+\beta_2(lntrdop1)+\beta_3(lncgd)+\mu_4$…….4

$lnpc1=\beta_0+\beta_1(lngdp)+\beta_2(lntrdop1)+\beta_3(lnchdo)+\beta_4(lnccol)+\beta_5(lncgaso)+\beta_6(lncgd)+\mu_7$….5

In these four models β_0 is intercept, (β_1,β_2,β_3)is slope of coefficient,(μ) is error term.

Whereas;

LGDP = log of gross domestic product (constant LCU)
LTRDOP1 = log of trade openness (export + import/GDP*100)
LCHDO = log consumption of high diesel oil (Kt of oil equivalent)
LCCOL = log consumption of coal (Thousand short Tons)
LCGASO = log consumption of gasoline (Kt of oil equivalent
LCGD = log consumption of domestic gas (Kt of oil equivalent)
LPC1 = environment degradation

ESTIMATION AND INTERPRETION:
Hypothesis for the model is:
H_o= No co integration
H_1= At most 1 co integration

MODEL 1:
Date: 08/11/14
Sample (adjusted): 1989 2012
incorporated observations: 24
Linear deterministic : Trend assumption:
sequence: LPC1LGDPLTRDOP1LCHDO
Lags time (at first stage): 1 to 1

Johansen Results

Hypothesis		Trace Test		Maximum Eigen-value Test	
Null	**Alternative**	**Statistic**	**Critical Value**	**Statistic**	**Critical Value**
r = 0	r = 1				
r = 1	r = 2				
r = 2	r = 3	60.64995*	47.85613	31.80775*	27.58434
r = 3	r = 4				
		28.84220	29.79707	18.64997	21.13162
		10.19223	15.49471	10.08068	14.26460
		0.111546	3.841466	0.111546	3.841466

Table 1.1 above indicates R = 0 of the null hypothesis that there is no co-integrate vector by total integration of R = 1 alternative hypothesis testing. In tracking statistics said that if value is greater than the critical value (respectively 60.64995> 47.75613) is greater than the null hypothesis is rejected trace levels of 0.05% on the basis of statistics. In the case of the intrinsic value of the statistics, the critical value is the ratio of the null hypothesis and significance level of 5% of the intrinsic value of the statistic is denied smaller, because the statistics are the largest eigenvalue is calculated as the threshold is 31.80755 and 27.58434 .
A co-integrate vector is represented by R = 1 if we test for R = 2 alternative hypothesis null hypothesis null hypothesis by showing that it can not use any tracking statistics if rejected. Because the 0.05% level of significance (28.84220 <29.79707 respectively) tracking statistics value is smaller than the critical value.
In the statistical case of significant eigenvalues, 0.05% of the level of the maximum intrinsic value is greater than the critical value (18.64997 <21.13162 respectively) is small, again the null hypothesis can not be rejected at r = 2 null hypothesis alternative hypothesis R directed = 3.
It did this, according to statistics tracking test may be a co-integration equation at the 0.05 level of significant statistics and maximum eigenvalue also indicates a common integrated at the 0.05 significance level equation.

LONG RUN ANALYSIS FOR PC1

In Pakistan economy there exist a long-run relation between PCI and its determinants of the GDP, trade openness, consumption of coal, consumption of high diesel oil, consumption of domestic gas and consumption of Gasoline which all are determined by using data annual data from 1987 to 2012. Table 1.2 shows long run co-integrating vectors for PCI by using Johnson technique.

Table 1.2 Estimates of Long run co-integrating

Dependent variable:LPC1			
Independent variable	**Coefficients**	**Standard Error**	**T – Statistic**
LGDP	-0.5515	0.210	2.625
LTRDOP1	-0.232	0.121	1.927
LCHDO	1.2765	0.200	6.360

In study normalize LPC1 is dependent variable on other hands variables like LGDP1,LTRDOP1 and LCHDO are use as independent variable. There exist negative relationship between LGDP and LPC1 and other

variables remain constant if 1 percent change in LGDP leads to decrease in LPC1 by0.5515 percent. On other side of study show that there exist negative relationship between TRDOP1 and LPC1 If other variables remain constant then 1 percent change in LTRDOP1 leads to 0.232 percent decrease in LPC1. LPC1 and LCHDO shows positive relationship if other variables remain constant then 1 percent change in LCHDO leads to increase in LPC1 by 1.2765 percent.

1.3 ESTIMATION OF ERROR-CORRECTION MODEL

1.3.1 SHORT RUN DYNAMICS

The short run dynamic model modify by using the error correction mechanism (ECM).According to references of Pakistan the effect of energy consumption on environment degradation in Pakistan by applying VECM. In study t-ratios of the ECM terms also examined the long run causality in model.

It is note that even if the coefficients of lagged differences of the explanatory variables are not significant at VECM if causality to emerge

ECM FOR PC1:

The results described in the table 1.4 shows air pollution depend on GDP, trade openness, and consumption of high diesel oil.

Table 1.4Vector Error-Correction

Variables	Coefficients	Standard Error	T-Statistics
ECM	-0.49670	0.0896	5.5449
D(LPC1(-1))	0.26139	0.1302	2.0072
D(LGDP(-1))	4.03821	0.9033	4.4701
D(LTRDOP1(-1))	0.05914	0.0317	1.8635
D(LCHDO(-1))	-1.54559	0.2601	5.9418
Constant	-0.09519	0.0393	2.4180

Above table showed t- statistics value is higher than critical value then this model ECM result is negative and significance because; there exist short run dynamics. At the rate of 49% of significance short run equilibrium convergent in to long run equilibrium.

MODEL 2:

Date: 08/11/14 Time: 12:06

Sample (adjusted): 1990 2012
incorporated observations: 23
: Linear deterministic trend : Trend assumption
sequence: LPC1LGDPLTRDOP1LCCOL
Lags time (at first stage): 1 to 2

Table 2.1Results of Johansen technique

Hypothesis		Trace Test		Maximum Eigen-value Test	
Null	Alternative	Statistic	Critical Value	Statistic	Critical Value
r = 0	r = 1	55.89257*	47.85613	22.62148	27.58434
r = 1	r = 2	33.27109*	29.79707	21.54786*	21.13162
r = 2	r = 3	11.72323	15.49471	10.66410	14.26460
r = 3	r = 4	1.059132	3.841466	1.059132	3.841466

Table 2.1 above test results so that r = 0 of the null hypothesis that there is no co-integrate vector by using the Johansen co-integration of technology R = another hypothesis test 1. On the basis of the statistical significance of trace on the 0.05% level (55.89257> 47.85613 respectively) the null hypothesis is rejected as a tracking statistic is greater than the threshold. The formula for the maximum Eigenvalue statistic is 27.58434 22.62148 and criticality

Eigenvalue statistic, if the value of the critical significance level of 5% ratio of Eigenvalues greater statistical null hypothesis is not rejected. When r = 1 for R = alternative hypothesis 2 null hypothesis by significant 0.05% level the null hypothesis is rejected applied to tracking statistics is two-way co-integrate vector can test 33.89257 and it is larger than the threshold value as a tracking statistics, because the threshold is 29.79707.
In the null hypothesis r = 1, using the maximum Eigenvalue statistics are rejected. According to the largest Eigenvalue statistical tests Eigenvalues greater than the critical value at the 0.05 significance level (21.54786> 21.13162 respectively)
Two-way co-integrate vector means that if we (were 11.72323 <15.49471) test R = null hypothesis 2 for R = Alternative 3 assumes that a significant level of 0.05%, if the tracking statistics than the threshold value is small and the null hypothesis can not be Refuse. 0.05 significance level, and once again the null hypothesis can not be rejected at r = case of the intrinsic value of 3 statistics, the null hypothesis for R = alternative hypothesis 4 maximum intrinsic value is less than the critical value (10.66410 <14.26460 respectively)
It concluded that, based on two tracking statistics at the 0.05 level of significance test of co-integration of equations is possible and the maximum Eigenvalue statistic indicates a co-integration equation

Table 2.2 Estimates of Long run co-integrating vector

Dependent variable :LPC1			
Independent variables	**Coefficient**	**Standard error**	**T-Statistics**
LGDP	-0.710	0.817	0.881
LTRDOP1	0.480	0.557	0.880
LCCOL	0.028	0.462	0.060

In this study co integration equation LPC1 is dependent variable and LGDP, LTRDOP1, and LCCOL is independent variables.LPC1 and LGDP shows negative relationship if 1 percent changes in LGDP leads to decrease in LPC1 by 0.710 percent. On the other side if variables remain constant then 1 percent change in LTRDOP1 leads to 0.480 percent increase in LPC1, its exhibits positive relationships exist between LPC1 and LTRDOP1. LPC1 and LCCOL show positive relationship between if other variables remain constant then 1 percent change in LCCOL leads to increase in PCI by 0.028 percent.

ECM FOR PC1

The results elaborate in the table 2.3that air pollution depend on GDP, trade openness, and consumption of coal.

Table 2.3 Vector Error-Correction Model

Variables	Coefficients	Standard Error	T-Statistics
ECM	-0.0760	0.0872	0.88
D(LPC1(-1))	0.2381	0.3307	0.72
D(LPC1(-2))	-0.3716	0.3052	-1.22
D(LGDP(-1))	403515	2.0721	2.10
D(LGDP(-2))	-1.1332	2.0037	0.57
D(LTRDOP1(-1))	-0.0584	0.0689	0.85
D(LTRDOP1(-2))	-0.0048	0.0664	0.07
D(LCCOL(-1))	-0.4340	0.3116	1.39
D(LCCOL(-2))	0.1687	0.3531	0.48
Constant	-0.0857	0.1015	0.84

Short run dynamics exhibits by using this equation exist. at the rate of 7%.short run equilibrium convergent in to long run equilibrium.

MODEL 3:

Date: 08/11/14 Time: 12:11
Sample (adjusted): 1989 2012
Incorporated observations: 24
Linear deterministic trend : Trend assumption
Sequence: LPC1LGDPLTRDOP1LCGASO
Lags time (at first stage): 1 to 1

Table 2.4 Results of Johansen Technique

Hypothesis		Trace Test		Maximum Eigen-value Test	
Null	Alternative	Statistic	Critical Value	Statistic	Critical Value
r = 0	r = 1	56.39766*	47.85613	29.60982*	27.58434
r = 1	r = 2	26.78784	29.79707	14.55899	21.13162
r = 2	r = 3	12.22886	15.49471	12.07576	14.26460
r = 3	r = 4	0.153102	3.841466	0.153102	3.841466

Table 3.1 on the analysis, there is no common integration vector that if the test result R = 0 victory over the null hypothesis of r = alternative hypothesis tested by Johansen cointegration 1. 0.05 significance level (56.39766> 47.85613 respectively) tracking statistics the null hypothesis was rejected on the basis of statistics as the tracking value is greater than the critical value. It was rejected at the 5% level of significance and the null hypothesis, because the statistics are the largest Eigenvalue is calculated as 29.60892 and 27.58434 If the threshold is less than the threshold value statistical characteristic small.

There is only one common integration vector, if we test the null hypothesis R = 1 against the alternative hypothesis of r = 2. 0.05% level of significance, because the threshold is 29.79707, the null hypothesis can not be rejected as a tracking statistic is 26.78784 and it is less than the critical value.

0.05 significance level (14.55899 <21.13162 respectively) with r = 1, the null hypothesis can not use the maximum intrinsic value, if the intrinsic value is less than the maximum threshold is rejected.

It shows that the null hypothesis can not use any tracking statistics, R = 2 if we test the null hypothesis of r = 3. The alternative hypothesis significance level of 0.05% (12.22886 <15.49471 respectively) the null hypothesis is rejected cannot be rejected because tracking statistics value is smaller than the critical value. Again at 0.05 significance level the null hypothesis can not reject the null hypothesis at r = R = 3 for the largest Eigenvalue 4. Another hypothesis in the case of characteristic values is less than the critical value (12.07576 <14.26460 respectively)

It can be concluded at the 0.05 level of significance of tracking statistics shows a co-integration equation and maximum Eigenvalue statistics is possible.

Table 3.2 Estimates of Long run co-integrating vectors

Dependent variables : LPC1			
Independent variables	**Coefficients**	**Standard Error**	**T-Statistics**
LGDP	0.897	0.327	2.743
LTRDOP1	-0.944	0.184	5.118
LCGASO	0.203	0.390	0.508

In normalize cointegration variable like LPC1 is dependent variable and LGDP, LTRDOP1, and LCGASO independent variables. Other variables explain positive relationship between LPC1 and LGDP if 1 percent change in LGDP leads to increase in LPC1 by 0.897 percent and all other are remain constant. If on other variables remain constant then 1 percent change in LTRDOP1 leads to 0.944 percent decreases in LPC1, there exhibits negative relationship between LPC1 and LTRDOP1. There shows positive relationship between LPC1 and LCGASO if other variables remain constant then 1 percent change in LCGASO leads to increase in LPC1 by 0.203 percent.

ECM FOR PC1

The results elaborate in the table 5.10 shows that air pollution depends upon GDP, trade openness and consumption of gasoline.

Table 3.3 the Vector Error-Correction Model

Variables	Coefficients	Standard Error	T-Statistics
ECM	-0.2390	0.094	2.54
D(LPC1(-1))	0.1393	0.195	0.713
D(LGDP(-1))	1.2777	1.396	0.915
D(LTRDOP1(-1))	0.1499	0.070	2.138
D(LCGASO(-1)	-1.0919	0.335	3.264
Constant	0.0257	0.067	0.382

In this result of ECM is important because t- statistics is larger than value of critical. On 23% short run equilibrium converges in to long run equilibrium.

MODEL4:

Table 4.1 Results of Johansen Technique

Hypothesis		Trace Test		Maximum Eigen-value Test	
Null	Alternative	Statistic	Critical Value	Statistic	Critical Value
r = 0	r = 1	49.18874*	47.85613	25.75953	27.58434
r = 1	r = 2	23.42922	29.79707	14.86161	21.13162
r = 2	r = 3	8.567604	15.49471	8.560494	14.26460
r = 3	r = 4	0.007110	3.841466	0.007110	3.841466

Table 4.1 above analysis, where r = 0 of the null hypothesis that there is no co-integrate vector, by using Johansen cointegration test results for R = 1 alternative hypothesis testing. In the statistical data base to track the 0.05 level of significance (49.18874> 47.85613 respectively) the null hypothesis is rejected as a tracking statistic is greater than the threshold. In the statistical case the intrinsic value of the significance level of 5% critical value is less than the characteristic value statistics so the null hypothesis can not be rejected, because the statistics maximum intrinsic value is calculated as 25.75953 and the threshold is 27.58434.

The results showed that only one co-integrate vector, if we test the null hypothesis R = 1 against the alternative hypothesis of r = 2. In a significant level of 0.05%, if we use statistics to track the null hypothesis can not be rejected as a tracking statistic is 23.42922 29.79707 and it is smaller than the critical value.

0.05 significance level (14.86161 <21.13162 respectively) with r = 1, the null hypothesis can not use the maximum Eigenvalue statistic, if the maximum Eigenvalue test statistics Eigen values is less than the critical value is rejected.

The null hypothesis can not be rejected by any tracking statistics, if we test the null hypothesis R = R = 2 to 3 alternative hypothesis, here. 0.05% level of significance (8.567604 <15.49471 respectively) the null hypothesis can not be rejected. 0.05 significance level and once again we can not reject the null hypothesis null hypothesis at r = R = 3 for 4 alternatives under the assumption that the maximum value of the intrinsic characteristics of the statistical value smaller than the critical value of the case (8.560494 <14.26460 respectively)

Table 4.2 Estimates of Long run co-integrating vectors

Dependent variable : LPC1			
Independent variables	Coefficient	Standard Error	T-Statistics
LGDP	12.317	6.072	2.02
LTRDOP1	9.819	1.694	5.795
LCGD	-5.727	3.723	1.538

In this study normalize cointegration equation use variable LPC1 as dependent variable and LGDP, LTRDOP1 and LCGD use as independent variables. The study exhibits positive relationship between LPC1 and LGDP if 1 percent change in LGDP leads to increase in LPC1 by 12.317 percent and all other variables remain constant. On the other hands if all variables remain constant then 1 percent change in LTRDOP1 leads to increase in LPC1 by 9.819 percent; there analysis positive relationship between LPC1 and LTRDOP1. LPC1 and LCGD show negative relationship, if all other variables remain constant then 1 percent change in LCGD leads to 5.727 percent decrease in LPC1.

ECM FOR PC1

The results are in the table 4.3 show that air pollution depends upon the GDP, trade openness, and consumption of domestic gas (cgd).

Table 4.3 the Vector Error-Correction Model

Variables	Coefficients	Standard Error	T-Statistics
ECM	0.0079	0.014	0.0552
D(LPC1(-1))	-0.1151	0.229	0.229
D(LGDP(-1))	2.585	1.704	1.517
D(LTRDOP1(-1))	0.0267	0.092	0.289
D(LCGD(-1))	0.2527	0.631	0.400
Constant	-0.0592	0.087	0.678

Error correction model show that ECM value is not negative result, so it means that at the rate of 7% short run dynamics diverge in to long run.

MODEL 5:

Table 5.1 on the analysis, Johansen cointegration test results null hypothesis R = 0, which means there is no cointegrating vectors, respectively, for an alternative hypothesis to test r = 1. 0.05 significance level (232.0916> 125.6154) tracking statistics null hypothesis was rejected on the basis of the track as the statistical value greater than the threshold. In the case of the intrinsic value of the statistics, the critical value of the ratio of the intrinsic value of the statistic is small. There may be two co-integrating vectors, if we test the null hypothesis R = 1 to R = 0.05% significance level alternative hypothesis 2 because the critical value of 95.75366, tracking statistics null hypothesis is rejected is 136.4119 it is larger than the critical value.

Table 5.1:Results of Johansen Technique

Hypothesis		Trace Test		Maximum Eigen-value Test	
Null	**Alternative**	**Statistic**	**Critical Value**	**Statistic**	**Critical Value**
r = 0	r = 1	232.0916*	125.6154	95.67978*	46.23142
r = 1	r = 2	136.4119*	95.75366	57.74206*	40.07757
r = 2	r = 3	78.66980*	69.81889	33.93929*	33.87687
r = 3	r = 4	44.73052	47.85613	26.29562	27.58434
r = 4	r = 5	18.43490	29.79707	10.46665	21.13162
r = 5	r = 6	7.968244	15.49471	7.953654	14.26460
r = 6	r = 7	0.014589	3.841466	0.014589	3.841466

0.05 significance level (57.74206> 40.07757 respectively) as the maximum Eigenvalue test statistics Eigen values is less than the critical value r = 1, the null hypothesis using the maximum Eigenvalue statistics are rejected increases.
Test largest Eigenvalues in this study showed, R = 3, and tracking statistics shoes R = 3. If we test the null hypothesis R = 3 for R = 4, mean substitution assumptions may have three co-integration vector. Here, the null hypothesis can not be rejected by any tracking statistics. 0.05% level of significance (44.73052 <47.85613 respectively) tracking statistics can not be rejected and smaller than the critical value the null hypothesis. 0.05 significance level, and once again the null hypothesis can not be rejected at r = 4 null hypothesis for R = 5 alternative hypothesis maximum Eigenvalues Eigenvalue statistic is smaller than the threshold conditions (26.29562 <27.58434 respectively) .
Based on the above analysis shows that tracking statistics exam cointegration equation can be significant at the 0.05 level and the maximum Eigenvalue statistics for 0.05 level of significance to explain the three co-integration equation.

Table 5.2 Estimates of Long run co-integrating vectors

Dependent variable :LPC1			
Variables	**Coefficient**	**Standard Error**	**T-Statistics**
LGDP	-4.417	0.314	14.06
LTRDOP1	-0.052	0.022	2.41
LCCOL	1.209	0.068	17.82
LCHDO	0.777	0.069	11.32
LCGASO	0.395	0.070	5.62
LCGD	1.501	0.143	10.46

In this standardize equation LPC1 is dependent variable. If all other variables remain constant then 1 percent change in LGDP promote to 4.417 percent decrease in LPC1. In addition, variables remain constant then 1

percent change in LTRDOP1 progress to decrease in LPC1 by 0.052. If other variables remain constant then one % change in consumption of energy add to in LPC1 by 1.209, 0.777, 0.395, and 1.501.

ECM FOR PC1

The results analyzed in the table 5.3 shows that air pollution depends upon the GDP, trade openness, and energy consumption.

Table 5.3 the Vector Error-Correction Model

Variables	Coefficients	SE	T-Statistics
ECM	-0.228	0.213	1.069
D(LPC1(-1))	0.426	0.241	1.769
D(LGDP(-1))	3.824	1.506	2.537
D(LTRDOP1(-1))	0.011	0.054	0.198
D(LCCOL(-1))	-0.407	0.267	1.524
D(LCHDO(-1))	-0.889	0.410	-2.165
D(LCGASO(-1))	-0.560	0.533	1.051
D(LCGD(-1))	-0.202	0.589	0.344
C	-0.047	0.075	0.640

The results show that at the rate of 22%.ECM value is negative so short run dynamics converge in to long run dynamics

CONCLUSION

The main purpose of this study was to check the degradation of the environment from the impact of energy consumption in Pakistan 1987-2012 To see the energy consumption of carbon dioxide, the impact of sulfur dioxide and NOX as air pollution and other effects of air pollution are also other factors that Pakistan principal research theme. To check the long-term cointegration relationship between Johnson and the vector error correction model was used to assess the relationship between short-term. The present study describes, in Pakistan, there is a long-term relationship between energy consumption and air pollution prevails. In Mode 1 is observed, trade openness and GDP losses, sharply PCI and CHDO (high diesel consumption) related to the absolute and PCI-related. In Model 2 shows that GDP is negative and inconsistencies related to PCI. And trdop1 and CCOL (coal consumption) positive and inconsistencies associated PCI. In model 3 is observed positive GDP significantly related to PCI and cgaso (gasoline consumption) positive and he had no reason related to PCI. Trdop1 negative and significant correlation for the PCI. In model 4 GDP and trdop1 completely, much related to PCI. CGD (domestic consumption of natural gas) is negative and the associated PCI. 5 The model finds that energy consumption and actively involved in a wide range of PCI. With GDP and TRDOP is negative and significantly related to PCI. Result vector error correction model explanation Model 1, Model 2, the presence of short-term dynamic relationship models 3 and 5. But in the model 4 concluded that only a long-running relationship between the presence of short-term affiliation does not exist. It is observed that the energy consumption showed: negative, positive impact on carbon dioxide, nitrogen oxides, and sulfur dioxide emissions. Results support, it shows in Pakistan, has a U-shaped Kuznets curve environment.

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