

## Investigating of the relationship between air pollution and intensity of energy among the members of OPEC

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**Abstract:** One of the most important phenomena which people encounter is air pollution. One of the main causes is the high consumption of fossil fuels. Carbon dioxide from the burning of fossil fuels has the largest share of greenhouse gases and air pollution is responsible. Given the importance of this issue, this study examines the relationship between air pollution and energy intensity in the OPEC countries in the period 2013-1985 using Data from the World Bank and the International Energy Agency in Eviews software and econometric models such as panel data and vector error correction is discussed. The results indicate that the GDP per capita, economic openness, energy intensity and urban population has a significant positive effect on the carbon dioxide gas emissions per capita. Vector error correction model showed that there are three optimal lag in the model. It was also noted by both the test and the maximum amount of special effects, there is a vector of cointegration between the variables of the model.

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### Introduction:

With Looking at the history of energy development is understood that energy has become a political factor in international relations and the main exporters of energy never could be away of political influence on socio-economic status. No country during the history could increase the level of human development without increasing of its per capita energy consumption (Narin et al, 2009). Growing population, Energy dependence and consequently the growth of energy consumption, especially fossil fuels, is causing environmental problems. One of the most important environmental problems and pollution, energy and air pollution caused by emissions from the combustion of fossil fuels releasing and leaks. Sulfur oxides, nitrogen oxides, carbon monoxide, particulate matter, hydrocarbons and carbon dioxide are greenhouse gases which As a result of energy sector activities, particularly combustion of hydrocarbon fuels find a way into the atmosphere. Among the consequences of greenhouse gas emissions (especially carbon dioxide) it can be pointed to as the phenomenon of climate change and global warming cited which is shows the importance of the global dimension. Now measure of energy intensity is one of the strategic measures in developed countries that its purpose to assess the energy efficiency both in terms of reducing dependence on outside as well as the consequences of climate control high energy consumption in use (Baumann, 2008). Given the extensive role in the energy-producing countries and oil-exporting economies and high energy consumption in these countries, in this study,

we survey the relationship between energy intensity and environmental pollution in selected oil countries has been applied with using econometric methods to check whether the higher energy intensity is even higher than air pollution. In order for this research a model is presented, according to the survey, a number of oil-producing countries have been estimated with using of panel data. The population of this research is the 12-member OPEC. The variables of this research are: amount of Carbon dioxide emissions as the dependent variable and GDP per capita, energy intensity, the urban population and the level of economy (The sum of exports and imports divided by GDP in the period 2013-1985) are considered as the explanatory variables.

### Research literature

No country during the history could increase the level of human development without increasing of its per capita energy consumption (Narin et al, 2009). Growing population, Energy dependence and consequently the growth of energy consumption, especially fossil fuels, is causing environmental problems. Fortunately, today, due to rapid economic development and increasing of energy demand, People pay more attention to its environmental consequences. One of the most important environmental problems and pollution, energy and air pollution caused by emissions from the combustion of fossil fuels releasing and leaks. Sulfur oxides, nitrogen oxides, carbon monoxide, particulate matter, hydrocarbons and carbon dioxide are greenhouse gases which As a result of energy sector activities, particularly combustion of hydrocarbon fuels find a

way into the atmosphere. Carbon dioxide is one of the most important greenhouse gases and the world, according to the energy consumption involved in its production. The United States of America alone release more than 22% of carbon dioxide into the atmosphere. Among the consequences of greenhouse gas emissions (especially carbon dioxide) it can be pointed to as the phenomenon of climate change and global warming cited which shows the importance of the global dimension that shows the importance of the global dimension. On the other hand, most policy makers have found the need to replace fossil fuels with cleaner fuels such as nuclear energy and renewable energies, and on the other hand seek to improve the fuel consumption. Due to the fact that energy efficiency has direct relation to the reduction of fossil fuel consumption, reduction of greenhouse gas emissions and then reduction of air pollution, slow climate changes, energy management, Reduction of consumer energy services, and improve economic competitiveness (Amar, 2008). The importance of energy efficiency is clearer in the context of climate changes. Uncertainty of pre-designed scenarios is one of the main problems lays on the purposes. Environmental goals independent of economic situation is more difficult especially for developing countries that the economic mobility is more current in them.

Kaya Union

Union Kaya (Kaya, 1989), shows this relationship in this these terms:

$$C \equiv P \frac{Y}{P} \frac{E}{Y} \frac{C}{E}$$

The C: carbon emissions, P: population, Y: gross domestic product (GDP) and E: energy.

So:

Carbon emissions from energy=Carbon emissions per unit of energy ×Energy consumption per unit of GDP×GDP per capita×population. The relationship can be written as follows:

The rate of carbon emissions

$$= \left( \frac{G + C}{YEAR - INDIVIDUAL} \right) = \text{Carbon intensity of energy} \left( \frac{G+C}{EJ} \right) \times \text{Energy intensity GDP} \left( \frac{EJ}{\$} \right) \times \text{GDP per capita} \left( \frac{\$}{YEAR - INDIVIDUAL} \right)$$

Kaya variable energy intensity of the Union is  $\frac{E}{Y}$ . Here alliance Kaya has become a rates change

over the time as follows:

$$c = p + \left( \frac{\dot{Y}}{P} \right) + \left( \frac{\dot{E}}{Y} \right) + \left( \frac{\dot{C}}{E} \right)$$

**Background research**

Silveira and Lvkn (2008), have considered the global perspective of industrial energy intensity in a study, in this study, they have pointed the need to reduce emissions of carbon dioxide. Comparing energy intensities among groups of countries and between countries indicate that there is great potential for reducing energy consumption and emissions associated with its 2 CO. Four sub-sector in developing and transition economies also have shown similar but different potential to reduce energy consumption and carbon dioxide emissions. Alam et al (2007) in his study, focused on the effect of the determining factors in the period 1971 to 2005 on environmental pollution in Pakistan. The main findings of this study suggest that the increasing in GDP and energy intensity increased environmental pollution (carbon dioxide emissions). Kvkla Gries (2009) showed that per capita income in developing countries has led to the restructuring of trade and economic activity. Recovery and colleagues (1390) examined the social and economic factors affecting the carbon dioxide emissions per capita in Iran. The main objective of this study was to evaluate the effect of economic growth on energy consumption and pollution. Pourkazemi and Abraham (1387) in their study using annual time series data for the years 1980 to 2003 to examine the environmental Kuznets curve focused on the Middle East. Hassan Tash and Naderian (1388) used scenario building method to calculate the potential to reduce the energy intensity. According to the results of different scenarios, the impact of this potential have been calculated on the export of oil and oil revenues of OPEC, world oil balance and reduce carbon dioxide emissions.

**Research Methodology**

This model is estimated by using panel data or panel data. This estimation procedure method is a combination of time-series and cross-sectional data. One of the leading problems is removing of estimating the number of variables. Therefore, the results of these estimates are not efficient. To fix this problem it can be used from panel data model which is famous as an error model. The model is as follows:  $Y_{it} = \beta + \sum_{j=2}^k \beta_j X_{ji} + \sum_{p=1}^s Y_p Z_{pi} + \delta_{it} + \epsilon_{it}$  (3-1)

In this model Y is dependent variable, X is visible explanatory variable and Z is none observed explanatory variables. This method does not work because of a number of variables and using fixed effects models, random effects regressions seemingly unrelated have better results (Zarra and Anvari, 1384).

**Fixed effects model**

In the fixed effects model, the regression slope at any point is constant and the constant cross-sectional profile varies. Although the effect is not

significant, but there is a significant difference between the sections and coefficients don't change with time. One of the methods of showing the effect of the cross is using of dummy variables. The general form of the model is as follows:

$$Y_{it} = \alpha_1 + \alpha_2 DUM_1 + \alpha_3 DUM_3 + \sum \beta_i X_{it} + e_{it} \quad (3-2)$$

In this regard represents a vector of independent variables, DUM dummy variables to show the effect of the cross, Vector of dependent variables, error sentences equation.

$$Y_{it} = \alpha_1 + \lambda_t + \beta_1 X_{it} + \beta_2 X_{2t} + e_{it} \quad (3-3)$$

In this regard represents a vector of independent variables, Vector variables, error sentences equation, is the effect of fixed sentence on the time. To show these effects it has been used of *i-1* dummy variable for level, *t-1* dummy variable for time as follows:

$$Y_{it} = \alpha_1 + \sum_{i=1}^n \alpha_i DUM_i + \lambda_0 + \dots + \lambda_t + \beta_2 X_{2t} + \beta_3 X_{3t} + e_{it} \quad (3-4)$$

In this regard represents a vector of independent variables, DUM dummy variable indicator to show the effect of the cross, Vector of dependent variables, the error of equation and is the effect of time on fixed sentence.

**3-2) seemingly unrelated regression model.**

In addition to the usual variables in this model the dependent variable is affected by a series of hidden elements which are not clear in the form of equations.

$$\Delta Y_{it} = \sum_{j=2}^k B_j X_{jit} + \delta + \epsilon_{it} - \epsilon_{it-1} \quad (3-5)$$

**3-3) model of random effects**

In model of the fixed effects to achieve effective estimates, elimination method of unmeasurable variables is used that leads to eliminate a large number of variables that model. To solve this problem the variable enters components of error. This method is called the random effects and its requirements is the selected random variables with regard to this requirement and the lack of correlation between disturbing elements of the explanatory variables, this method will lead to the achievement of effective estimates,. This is a regression model with random sentence as follows:

$$Y_{it} = \alpha + \beta_1 X_{it} + \beta_2 Z_{it} + \epsilon_{it} + u_{it} \quad (3-6)$$

In the above *Eit* error item is any point of view and *uit* is random effects of any level.

**3-4) Diagnostic tests**

In this model, several tests are used to determine the model such as the Chow and Hausman test are the most important type.

Chow test is used for the detection of fixed-effects of integrated effects, Hausman test is used to determine the fixed effects of random effects. Correct Statistics for significance test of Chow test statistic F is as follows.

$$F_0 = \frac{(RRSS-URSS)/(N-1)}{URSS/(NT-N-1)} \sim F_{N-1, N(T-1)-K} \quad (3-6)$$

Covariance matrix test based on the covariance matrix differences between fixed and random effects is obtained in two ways. Hausman test is as follows (Greene, 2000: 577):

$$w = \chi^2(k-1) = [\hat{b} - \hat{\beta}]' \Psi^{-1} [\hat{b} - \hat{\beta}] \quad (3-8)$$

$$\Psi = \text{var}[\hat{b} - \hat{\beta}] = \text{var}[\hat{b}] - \text{var}[\hat{\beta}] \quad (3-9)$$

**4.1 Model**

In this study, factors influencing air pollution model based on technical study and others (2006) is presented. They used STIRPAT model in this study. This model, is a model that is interdisciplinary communication between natural sciences and social sciences states. Each ecosystem consists of four principles of interactive components, the environment, social organization and technology. The basic model of research are as follows:

$$I = aP_i^b A_i^c T_i^d e_i$$

**1-4**

I= Environmental change, P = population, A = frequency (in this study, per capita GDP in the base year 2005 is considered.), T = Technology that log is measured as follows:

$$\ln I_{it} = a + b(\ln P_{it}) + c(\ln A_{it}) + d(\ln T_{it}) + e_i$$

**2-4**

And this can be stated as follows:

GDP / carbon dioxide emissions \* Population / GDP \* population = emissions of carbon dioxide

-2- Static test (test of the reliability of variables)

When a variable is reliable that the average, variance and autocorrelation coefficients remain constantly over time. Despite the unstable variables in the model allows the t and F tests don't have to be valid and may lead to the fake regression. The results of the stationary test for variables in this study are shown in the table below.

As can be seen, according to the results of the tests, all variables in the level are unstable therefore we should make differences from all variables and then to estimate the relevant variables into a regression. To make ensure not to fake corresponding regression the co-integration tests has been performed for variables.

Variables	Loieen	Eaim and Shieen	Fhisher	Feliphen and Fisher
Energy intensity	84/0 80/0	22/0 58/0	63/7 26/0	L
GDP	85/10 00/1	67/0 74/0	98/29 11/0	56/11 96/0
Population	69/1 95/0	75/3 99/0	88/6 99/0	09/5 99/0
Economic play	44/1 92/0	99/2 99/0	47/11 00/1	9/9 00/1
Emission of carbon dioxide	76/0 77/0	00/1 84/0	10/11 80/0	63/8 92/0

variables	Loien	Eaim and Shieen	Adie f Fisher	Felipheen and Fisher
Energy intensity	92/3- 00/0	48/4- 00/0	89/33 00/0	24/48 00/0
GDP	96/4 00/1	91/3- 00/0	03/93 00/0	253/109 00/0
population	22/5- 00/0	06/11- 00/0	092/151 00/0	89/154 00/0
Economic play	56/12- 00/0	46/10- 00/0	49/129 00/0	48/152 00/0

Results of Co-integration tests

However, if the variables in the data composition can be determined by subtracting supply, but to maintain long-term data on the level of co-invented method is a combination of variables in the data. It helps that regression without the fear of being false estimated on the basis of variables. The concept of co-existence is a long run relationship that the economic system over time moves towards it.

For co-integration tests on a combinative data, there are three methods of Kao, Pdrvny and Fisher. Kao and Pdrvny method s by Granger and Fisher is by Yohansan. In this study, Kao method is used for the presence of co-integration between variables. In Cao method hypothesis H0 that there is no co-existence and H1 hypothesis there is the existence of co-integration between variables. In this study, Kao co-integration test has been done for all models that shows that there is no co-integration for hypothesis H0.

Table 4-3 The variables convergence test

possibility	T statistics	ADF
0198/0	05/2-	Cross-section F

-3- Diagnostic tests

After it was confirmed that there is a long-term relationship between the variables and there is no the risk of spurious regression, we should determine them by Chow and Hausman tests of estimation method.

4-3-1- Chow test to determine the method of the fixed effects.

To determine this subject, the same or different intercept for the variables should be considered, the following hypothesis is considered:

$$H_0: \beta_{11} = \beta_{12} = \dots = \beta_{1N} \quad (4-5)$$

$$H_1: \beta_{11} \neq \beta_{12} \neq \dots \neq \beta_{1N}$$

The null hypothesis states that intercept is the same for different levels and can be used of OLS method. As we see the F statistic calculations is smaller than table F statistic, and the level of possibility is under 05/0, so it should be a fixed effects of model.

Table 4.4 Chow test to detect the fixed effects or the same intercept

possibility	statistics	freedom	Effect test
Cross-section F	11.215	21/278	00/0

-3-2- Hausman test

In the second stage should be recognized that the model in form of which one can be expressed the fixed and random effects and we will review the test questions. Hausman test is as follows:

The null hypothesis of this test indicates to use the opposite hypothesis and random effects is indicator of fixed-effects approach. Table (4-5) Hausman test shows the following results:

Table 4.5: Test Results of determining model (Hausman test)

Chi-sq.Statistics	Prob
37.52	0.00

The results presented in Table (4-5) shows that the null hypothesis that the random pattern can be used to replace the fixed pattern rejected, and it can be concluded that the best estimate is using fixed effects. After the results obtained from the model, fixed effects given.

Table 4-6: Experimental factors affecting carbon dioxide (the dependent variable)

Independence variable	coefficient	T statistic	Possibility
Energy intensity	13/0	46/2	04/0
Economic play	18/0	84/1	06/0
GDP	02/0	70/19	00/0
population	0003/0	06/2	03/0
GDP	05/0	72/2	02/0
		= 74/1	=98/0

The results show that except the game economy is significant at the 10% level. All variables are significant at the 5% level. It is seen that with the increase of a variable percentage of the game's economy, increase population and energy intensity, emissions of carbon dioxide, respectively, 18/0, 13/0 and 0003/0 percent.

**4-4panel Granger scausality test**

The final stage of econometric methodology is to investigate Granger s causality between the variables of the model (if any), so following Granger (1988) VAR models, (VAR) for Granger causality test is applied, VAR model stipulates the following regressions:

**(4-6)**

$$dco = \sum_{m=1}^n \delta e_{t-m} + \sum_{i=1}^n \alpha_i ddb_{t-i} + \sum_{j=1}^n \beta_j dgd_{t-j} + \sum_{k=1}^n \gamma dp_{t-k} + \sum_{f=1}^n \xi_f de_{t-f}$$

$$de = \sum_{m=1}^n \delta e_{t-m} + \sum_{i=1}^n \alpha_i ddb_{t-i} + \sum_{j=1}^n \beta_j dGdp_{t-j} + \sum_{k=1}^n \gamma dp_{t-k}$$

$$ddb = \sum_{m=1}^n \delta e_{t-m} + \sum_{i=1}^n \alpha_i ddb_{t-i} + \sum_{j=1}^n \beta_j dGdp_{t-j} + \sum_{k=1}^n \gamma dp_{t-k}$$

$$dp = \sum_{m=1}^n \delta e_{t-m} + \sum_{i=1}^n \alpha_i ddb_{t-i} + \sum_{j=1}^n \beta_j dGdp_{t-j} + \sum_{k=1}^n \gamma dp_{t-k}$$

Based on the corrected models above, if the sum of the coefficients  $\alpha_i$  and  $\beta_j$  and  $\gamma_k$  and  $\xi_f$  are meaningful and  $\delta_m$  is meaningless causality is one-way from the variables  $dp$  and  $ddb$  and  $de$  and  $dgd$  to  $de$  is as if  $\alpha_i$  and  $\beta_j$  and  $\gamma_k$  and  $\xi_f$  are meaningless one-way causality is from the  $de$  to the other variables in the regression coefficient and if the sum of coefficient of the variables are not statistically significant independent variables are the same in the case where the sum of the coefficients of the variables are meaningful and relationship is mutual.

Table 4 -7 results of Granger s causality test

Test statistic	the effectiveness of growth	Variables
dco→de	Affectless	1.48752 p=0.2279
de→dco	Affectless	0.24636 0.7818
ddb→dco	Affectless	0.40236 0.6691
dco→ddb	Effective	10.9868 3.E-05
dp→dco	Effective	3.60549 0.0286
dco→dp	Effective	6.40851 0.0019
dgd→dco	Affectless	0.10527 0.9001
dco→dgd	affectless	0.23673 0.7894

According to data from the above table, as well as the null hypothesis is based no effect of one variable on other variables, we conclude that the  $\alpha$  and  $\delta$  and  $\gamma$  are meaningful so we conclude that there is one way causation of the  $co$  to  $db$  and  $db$  to  $co$  and  $co$  to  $p$ .

Autoregressive panel shows the corrected model

The study examines the effects of air pollution in countries of the OPEC factors is used

Autoregressive method of the panel. Overall equation in two variables are as follows:

**(4-7)**

$$\begin{bmatrix} y_{it}^1 \\ y_{it}^2 \end{bmatrix} = \begin{bmatrix} a_{10} \\ a_{20} \end{bmatrix} + \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{bmatrix} \begin{bmatrix} y_{i,t-1}^1 \\ y_{i,t-1}^2 \end{bmatrix} + \begin{bmatrix} e_{it}^1 \\ e_{it}^2 \end{bmatrix}$$

$$\begin{pmatrix} e_{it}^1 \\ e_{it}^2 \end{pmatrix} \sim N(0, \Sigma) \text{ where } \Sigma = \begin{bmatrix} \sigma_1^2 & \sigma_{12} \\ \sigma_{21} & \sigma_2^2 \end{bmatrix} \Rightarrow y_{it} = A_1 + A_1 y_{i,t-1} + e_{it}, e_{it} \sim N(0, \Sigma)$$

where  $A_0 = B^{-1}\Gamma_0$ ,  $A_1 = B^{-1}\Gamma_0$  and  $e_{it} = B^{-1}\varepsilon_{it}$   
 Equation (1) is a standard model of var panel. According to theoretical and empirical studies about pollution and taking into account the factors influencing empirical model is presented as follows:

**(4-8)**

$$\begin{aligned}
 Co_{it} &= b_{10} - b_{11}Co_{it-1} + b_{12}E_{it-1} + b_{13}Db_{it-1} + b_{14}Gdp_{it-1} + b_{15}P_{it-1} + \varepsilon_{1it} \\
 E_{it} &= b_{20} - b_{21}Co_{it-1} + b_{22}E_{it-1} + b_{23}Db_{it-1} + b_{24}Gdp_{it-1} + b_{25}P_{it-1} + \varepsilon_{2it} \\
 Db_{it} &= b_{30} - b_{31}Co_{it-1} + b_{32}E_{it-1} + b_{33}Db_{it-1} + b_{34}Gdp_{it-1} + b_{35}P_{it-1} + \varepsilon_{3it} \\
 Gdp_{it} &= b_{40} - b_{41}Co_{it-1} + b_{42}E_{it-1} + b_{43}Db_{it-1} + b_{44}Gdp_{it-1} + b_{45}P_{it-1} + \varepsilon_{4it}
 \end{aligned}$$

$$P_{it} = b_{50} - b_{51}Co_{it-1} + b_{52}E_{it-1} + b_{53}Db_{it-1} + b_{54}Gdp_{it-1} + b_{55}P_{it-1} + \varepsilon_{5it}$$

The variables used in the equations were determined as follows:

Co: emissions of carbon dioxide, E intensity, DB: the economic game, Gdp per capita GDP: P urban population.

**4-6- Determine the optimal model**

After selecting the variables used in stationary test model, an important issue in the model is to determine optimal VAR length. First Algvra estimates rank 1 and rank 2 and rank 3 and 4, we estimate, based on the criterion of maximum likelihood (LR) benchmark results for its third level is the lowest. Therefore, we estimate the model with the level 3.

Table 4-8: Determination of the optimal model

Hanan	Queen	Schwarz	Akaike	Phillips Perron	maximum
0	NA	8.10e+60	154.4366	154.5221	154.4712
1	3868.850	7.79e+51	154.4366	134.1861*	133.8811*
2	24.67505	8.83e+51	133.7987	134.7386	134.1795
3	102.5304*	6.38e+51*	133.4726*	134.8398	134.0264

-7- Johansen co-integration test

Table 4-9: integration Test of Johansson

Null hypothesis	Specific amounts	Statistics of effect test	Critical level of 5 percent	possibility
$r = 0^*$	0.232	80.24	69.81	0.005
r	0.089	27.15	47.85	0.8483
r	0.034	8.27	29.79	0.9958

Thus, according to the table for using convergence Johansson test and to determine the equilibrium relationship of two statistics stasis effect, maximum values were used. Statistics of test effects are at the 90 percent confidence level sand they are lower than 27.15 and 47.84, there is the convergence

between the vector model. It was observed that according to two statistics and maximum of values for the variables we conclude that there is a vector of integration and there is a long-term relationship between the variables.

Table 4-10: Analys ` is of variance air pollution

D	S.E	Co	E	Db	P	Gdp
1	39813.07	00/100	0.000	0.000	0.000	0.000
2	55885.74	98.54	0.01	0.054	1.045	5.18E-05
3	46209515	15.79433	84.205	1.18	2.61E-06	5.91E-10
4	86400486	15.94315	83.83	1.70	0.177	1.65E-07
5	9.75E+09	15.74724	84.25	2.09	5.09E-05	1.32E-11
6	3.66E+10	15.85253	84.092	2.37	0.0439	4.53E-08
7	2.03E+12	15.74312	84.25	2.58	0.0002	6.88E-11
8	1.18E+13	15.81966	84.15	2.73	0.018147	1.93E-08
9	4.12E+14	15.73840	84.26	2.84	0.000518	2.65E-10
10	3.35E+15	15.80117	84.18	2.93	0.009311	1.03E-08

As seen in Table 4-10, in the first period, 100% of air pollution changes by its variable explained the genetic analyzes of variance defined in such a way that in the first period (short-term) fluctuations are usually related to each self-explanatory variable, but

in later periods, the amount of explanatory has been reduced so that the long run is 15.80% and it indicates that in the long term the share of other variables in explaining changes in carbon dioxide emissions is increasing and processing model well.

## Conclusion

Results showed that the GDP per capita, openness, energy intensity and the urban population has a positive effect on per capita emissions of carbon dioxide gas, and all of them are statistically significant. In other words, the elasticity of carbon dioxide emissions per capita rather than the per capita GDP is positive, ie an increase of one percent in GDP per capita, emissions has increased to 0.45%. Positive and significant effect of increasing per capita gross domestic product of per capita carbon dioxide emissions and increase environmental pollution, in addition is consistent with theory, empirical studies such as the studies of Carlos (2007) and world (2007). positive and significant impact of GDP per capita on environmental pollution can be interpreted as the increase in GDP per capita, that it needs to increase the use of inputs and energy, and this causes an increase in emissions of carbon dioxide and the environmental pollution.. Another reason and its intensifying to be low production technology and technical inefficiencies in the productive sectors, especially industry. The transport sector is as one of the largest energy consumers, energy has no technical efficiency as well as low prices and substantial subsidies to energy efficiency is not economic. The same argument holds true in terms of the cost of domestic and commercial sector.

In addition to the preceding cases said generation, transmission and distribution of electric energy have the low efficiency in the production and waste in transmission and distribution networks that actually has increased over emissions of carbon dioxide in exchange for one economic product. The elasticity of emissions of carbon dioxide of per capita energy use is compared to the intensity, and indicates that with increase of one percent in the intensity of energy equals to 0.02% and percentage for producing a unit of product, per capita emissions of carbon dioxide has increased by 0.02. Positive and significant impact on increasing the intensity of using energy of per capita emissions of carbon dioxide and increase environmental pollution, in addition to is consistent with theory, empirical studies, such as studies of Kong (2007) and world (2007). Due to the major consumption of fossil fuel energy, the most important source of air pollution is emissions of carbon dioxide from fossil fuel is exported. The main reason for the low energy efficiency in Iran can be resulted in tension of emissions of carbon dioxide per capita rather than energy intensity

Economics play has a positive relationship between temperature and air pollution, in addition to compatibility with the theoretical foundations of research, suggests that trade liberalization can have positive and negative effects on the environment by

studying Oskouei (1387) for low and lower middle income countries is consistent and high-middle-income countries, is inconsistent.

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