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ANALYSIS OF THE RELATIONSHIP BETWEEN ECONOMIC GROWTH AND ENVIRONMENTAL POLLUTION IN IRAN (EVIDENCE FROM THREE SECTIONS OF LAND, WATER AND ATMOSPHERE)

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ABSTRACT

Never in the history of concerns about environmental pollution caused by economic growth is not as much today. Economically, the country where production is mainly based on the polluting industries of oil, gas and petrochemical projects those are not exempt from this. Environment of a desert country with a different climate, the sea and the forest, which can be affected by the polluting industry so both economically and environmentally suitable case for examining the relationship between economic growth and environmental pollution in parts of atmosphere, water and land. The amount of carbon dioxide emissions per capita, biochemical oxygen demand per capita, per capita and GDP per capita deforestation, respectively, as indicators of pollution, atmosphere, water, land and economic growth were considered. In this study, an inverted U-shaped environmental Kuznets curve hypothesis is about the ordinary least squares method having been tested. The results indicate that the N inverse relationship (И) exists between economic growth and pollution of the atmosphere and water in addition to confirming the Kuznets inverted U, the other part of this equation is also introduced. But the ground upside down U-shaped relationship is obtained which confirms the Kuznets hypothesis. So when the economy is up or down enough measures to mitigate the effects of the oil, gas and petrochemical pollution of the atmosphere, water and land should be considered.

KEYWORDS: Environmental Kuznets curve, carbon dioxide emissions, biochemical oxygen demand, deforestation

Man using the natural environment provides opportunities to enhance their welfare and thereby provide economic growth. Today, it is so intense that other natural resources meet human needs not fear that goes with this trend continues down to become dangerous for human habitat. So some people believe that this growth is causing environmental pollution. The economic growth rate is greater that its production requires more energy consumption. Most of the energy consumed by the means of a natural resource on the other hand, is meant to increase the waste of resources, both of which are damaging to the environment. In conclusion we can say that economic growth can lead to increased pollution. On the other hand, some people believe that economic growth leads to more efficient use of resources can thus reduce environmental pollution and negatively associated with it. Economic growth can lead to more efficient production and import advanced technology and raw materials that fuel consumption and less work. As a result, the technology in this way also reduces the use of natural resources and the reduction of waste production. Hence it can be said that economic growth could reduce pollution to the environment. In general we can say that economic growth can be increased and reduced environmental pollution. The possibility of both theories are correct, but the question is that which one has the most impact and can affect the contamination of the environment more. In other words, under the circumstances of this relationship is negative and positive in other cases, the relationship between economic growth and the variable is pollution of the environment. Research conducted so far indicate an inverted U -shaped relationship is called the Environmental Kuznets curve, which represents the environmental Kuznets hypothesis. According to this hypothesis in the early stages of development, economic growth will result in increased pollution .This positive relationship continues until a tipping point, but from this point onwards, with economic growth, environmental pollution is reduced. Some studies have been done in this area to confirm this hypothesis. Iran is one of the developing countries to achieve economic growth needed to boost economic activity. The main economic activities in the oil and gas field and are one of the largest manufacturers and exporters of petrochemical products (USEIA, 2013). However, during the extraction of oil and gas wells and transportation for export or for the processes to convert them into other products and petrochemical industry during conversion operations are heavily pollute the environment. In addition to the consumption of gasoline, diesel, fertilizers and plastics, in

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turn, may cause contamination. Hence, Iran as a country to sustain its economic growth relies on polluting industries and large investments in this sector does that it is a further boost for the economy is good for environmental study because continuing the trend of environmental pollution is steadily increasing and may be critical in the coming years to become uncontrollable. Iran is a country that has diverse habitats and geographic locations so that in the northern region of dense forests and abundant, and in the East, such as the Dasht-e Kavir and Kavir-e Lut desert so vast that it is virtually free of any plant. Southern part of the Persian Gulf and Sea of Oman, there is freeways. It is part of the West has high mountains. This diversity along environmental pollution, economic activity increases the need to study the economic and environmental issues in the community. In conclusion we can say that Iran is a very polluting the terms of the economic activity in the field of oil, gas and petrochemical and on the other hand due to the different ecological regions like sea, deserts, forests and mountains can be a good choice for environmental and economic studies, this study is designed in the same direction.

RESEARCH BACKGROUND

First study that led to Simon Kuznets environmental curve was done by (Grossman & Krueger, 1991) entitled "The environmental impact of the North American Free Trade Agreement" NAFTA ". NAFTA, the North American Free Trade Agreement, a Memorandum of trade between the three countries United States of America, Canada and Mexico are. The three countries are contractually obligated to reduce trade barriers between themselves. Grossman and Krueger After examining the relationship between free trade and economic growth with environmental pollution to the conclusion that this relationship , like the relationship between per capita income and income inequality U-shaped keel that Simon Kuznets 's study, known as economic growth and income inequality in 1955, it realized. Also (Roca et al, 2001) in 2001, in an article entitled "Economic Growth and atmosphere pollution in Spain: Environmental Kuznets curve hypothesis" the relationship between economic growth and pollution of the atmosphere using Dickey Fuller test and the Watson camera seemingly Unrelated Regression been studied. In this paper, a per capita greenhouse gas Tuesday as the dependent variable is considered endogenous (carbon dioxide, sulfur dioxide and nitrogen oxides). Each of these gases has been examined in a separate model that will continue to pay them. The amount of electricity generated from nuclear power plants and coal for carbon dioxide emissions per capita electricity production in thermal power plants for sulfur dioxide and per capita electricity production in thermal power plants and per capita energy consumption in the transport sector for nitrogen oxides as an independent exogenous variables have been considered. The GDP per capita is between carbon dioxide and sulfur dioxide as an independent variable in common. They all have a disturbing part of the natural logarithm of all variables are included. After doing the calculations, it was found that there was a strong relationship between per capita GDP and per capita carbon dioxide emissions. The use of nuclear power to carbon dioxide emissions, coal effect was positive or negative. The effect of nitrogen oxides per capita energy consumption in the transport sector (the economy) and per capita electricity production in thermal power plants was positive. For sulfur dioxide, the effect of GDP per capita electricity production in thermal power plants was positive. Overall, this paper concludes that such growth increases pollution through emissions to atmosphere. Models used in this study are given below. Kuznets curve rightly using the following model were studied in the Spanish economy.

$$\left(\frac{CO_2}{P}\right)_t = \beta_0 + \beta_1\left(\frac{GDP}{P}\right)_t + \beta_2\left(\frac{GDP}{P}\right)_t^2 + \beta_3\left(\frac{GDP}{P}\right)_t^3 + \varepsilon_t \quad 1$$

Where, $\left(\frac{CO_2}{P}\right)$ per capita carbon dioxide emissions, $\left(\frac{GDP}{P}\right)$, GDP per capita, β are model parameters, ε and t the year is the disturbing part. The calculation results show that the variables are co-integration of different degrees of co-integration model is generally a result of the Kuznets hypothesis cannot be confirmed. The other variables were entered into the model (2) was obtained. Using the model, the relationship between carbon dioxide emissions per capita and GDP per capita on the one hand, the production of electricity in nuclear power plants and other coal were studied.

$$Ln\left(\frac{CO_2}{P}\right)_t = \beta_0 + \beta_1 Ln\left(\frac{GDP}{P}\right)_t + \beta_2 Ln(Nuclear)_t + \beta_3 Ln(Coal)_t + \varepsilon \quad 2$$

Where $\left(\frac{CO_2}{P}\right)$ per capita carbon dioxide emissions, $\left(\frac{GDP}{P}\right)$, GDP per capita, β are model parameters, ε disturbing element, t the year, Nuclear

electricity production in nuclear power plants, Coal Production coal power plants and Ln is the natural logarithm. Also, using the model the relationship between per capita emissions of sulfur dioxide on the one hand and GDP per capita and electricity production in thermal power plants, on the other hand was examined.

$$Ln\left(\frac{SO_2}{P}\right)_t = \beta_0 + \beta_1 Ln\left(\frac{GDP}{P}\right)_t + \beta_2 Ln\left(\frac{Thermal}{P}\right)_t + \varepsilon_t \quad 3$$

Where $\left(\frac{SO_2}{P}\right)$, sulfur dioxide emissions per capita, $\left(\frac{GDP}{P}\right)$, GDP per capita, β are model parameters, ε disturbing element, t the year, $\frac{Thermal}{P}$ level of power generation in thermal power plants and the logarithm Ln is normal. Finally, to examine the relationship between per capita GDP and per capita emissions of nitrogen oxides were used in the following models:

$$Ln\left(\frac{NO_x}{P}\right)_t = \beta_0 + \beta_1 Ln\left(\frac{GDP}{P}\right)_t + \beta_2 Ln\left(\frac{Thermal}{P}\right)_t + \beta_3 Ln\left(\frac{Transport}{P}\right)_t + \varepsilon_t \quad 4$$

Where $\left(\frac{NO_x}{P}\right)$ and nitrogen dioxide emissions per capita, $\left(\frac{GDP}{P}\right)$, GDP per capita, β are model parameters, ε disturbing element, t the year, $\frac{Thermal}{P}$ level of power generation in thermal power plants, $\frac{Transport}{P}$ energy consumption in the transport sector, and Ln is the natural logarithm. Each of the above models both OLS and seemingly unrelated regressions were calculated. Model Number (1) variable degrees of co-integration and co-integration model are generally a result of the Kuznets curve hypothesis cannot be confirmed here. Model Number (2) coefficients for the natural logarithm of GDP per capita and electricity from coal with OLS and seemingly unrelated regression obtained identical respectively with + 0.24 + 0.19 they both show a direct relationship between carbon dioxide emissions and GDP on the one hand and on the other is the electricity produced from coal . The model number (3) that the ratio of sulfur dioxide to the natural logarithm of per capita GDP was achieved with -0.20 using ordinary least squares and seemingly unrelated regression coefficient is equal 19.1- for the amount of electricity produced from thermal power plants were obtained using ordinary least squares is equal to 60 . 0 and seemingly unrelated regression method with 0.61, which indicates a direct relationship between carbon dioxide emissions on the one hand , and GDP, on the other hand is electricity produced from coal . In this study, an inverse association between sulfur dioxide emissions and GDP join Spain in the Europe Union environmental agreements is justified because the Camera Watson statistic in the method of least squares to both regular and Seemingly Unrelated Regression to 6930.1 and 1.7140 . There is first the problem of autocorrelation coefficient set as well as both methods are very much the same and equal to 0.9687. Thus, the model has good explanatory power.

In model (4), the coefficient of thermal power plant for electricity produced from a seemingly unrelated regression with OLS and obtained 0.20 and a coefficient equal to the energy consumption in the transport sector was equal to 0.49 with OLS and seemingly unrelated regression was 0.50. The coefficient of determination adjusted for both methods is equal to 0.9645 and 1.6832and 1.6872, respectively Watson statistic, the camera ordinary least squares method and the Seemingly Unrelated Regression was obtained. Thus, a direct relationship between nitrogen oxides emissions from the production of electricity and thermal power plants and energy consumption in the transport sector are the same. As seen here, was rejected Environmental Kuznets curve. Diversify the environmental Kuznets hypothesis, only to change the method of calculating the environmental indicators is not limited. Some believe that the relationship will change in different economies, economic growth and environmental pollution. Their levels of per capita income, and they argued that these differences in the poorer countries due to the importance of economic growth, the environment has received less attention. Also, firms are less efficient due to the use of lower-tech devices and more waste but in countries with higher income due to the inability to produce or import more units with higher efficiency, less environmental pollution is caused (Magnani, 2001) in an article entitled "Environmental Kuznets curve: Policy development process or the result? ", To check whether it is paid in addition to income, other factors also influence the environmental Kuznets curve is less steep. He analyzed using data on 152 countries Huasman and Ramsey and their estimates in the model. The first period was estimated for all 152 countries in the years 1970, 1980 and 1990 for carbon dioxide, 1975, 1980, 1985 and 1990 for nitrogen dioxide and sulfur dioxide then conducted for

three categories of poor countries with GDP per capita less than $ 1500, with an average GDP per capita between the rich and the GDP per capita of $ 10000 in 1500 to over $ 10000.

$$m_{itG} = \beta_{0G} + \beta_{1G}x_{itG} + \beta_{2G}x_{itG}^2 + \beta_{3G}x_{itG}^3 + \gamma_G t + u_{itG} \quad 5$$

And

G=P,M,H 6

In which, m emissions, x GDP per capita, i country, γ animal for the desired variable, β are model parameters, t the year, G-type in terms of earnings, P poor country, M Country middle income, H high-income countries, ε_it error is estimated. The point of the curve of carbon dioxide per capita income for the years 1970, 1980 and 1990 to draw together, it is clear that the curves for 1980 and 1990 compared with the inverted U-shaped curve 1970 are mostly downward. However, in some countries, for each of the three groups of low-income, middle-income best linear function. The point of sulfur dioxide in third function is the best function for all years. Back to the first point, has a maximum value. Income level at which sulfur dioxide is maximized over time will change. The income level of U.S. $ 9200 in 1975 to America in 1980 increased to $ 12700 and a $ 7100 reduction in 1985 and again in 1990, an increase of $ 8,700. But some of the country's best linear function for rich and poor countries and middle-income countries is of second order. In the case of nitrogen dioxide analysis period , the income levels at which emissions fell between 9000 and America is $ 12,000 but does not follow a particular pattern , for example, U.S. $ 11,625 in 1975 , 12,100 in 1980, 900 in 1985 and 1990, is 10,020 . There was also a clear pattern in the analyzed group of countries to poor countries as a quadratic function, a function primarily of middle- income countries High-income countries were extracted from the third grade. Overall, it was concluded that poor countries are part of the Kuznets curve slope upward and downward slope of the upper income countries. Therefore classification of countries led more Kuznets curve is approved. In addition, other changes were made in the models. Contamination in other parts of the environment that caused them to ignore the error thorough understanding of the relationship between economic growth and environmental pollution are. Water pollution can be considered as an indicator for environmental pollution. In addition, in some studies, rather than the natural logarithm of GDP per capita is included in the model. In a study in 2010 (Fodhaan & Zeghdoud, 2010) was a function of third degree methods. In the study titled " Economic growth and pollutant emissions in Tunisia: An Empirical Analysis of the Environmental Kuznets curve " to examine the relationship between economic growth and environmental pollution began. The following model was used to study the carbon dioxide and sulfur dioxide as environmental indicators and GDP as an economic indicator for the period (1961-2004) were considered. Adjusted Dickey Fuller test first , the Phillips - Perron and KPSS to check the resident taking the time to review the collective model test Johansson and eventually error correction model was used to examine the causal relationships . They found a linear relationship between increasing carbon dioxide emissions per capita and GDP per capita there. On the other hand, GDP per capita between sulfur dioxide and reverse U -shaped relationship observed that the Kuznets hypothesis is confirmed. Kuznets curve is steep at $ 1200 per capita income (in constant prices of 2000), or about $ 3,700 to zero.

$$LnP_t = \alpha_0 + \alpha_1 LnY_t + \alpha_2 LnY_t^2 + \alpha_3 LnY_t^3 + \varepsilon_t \quad 7$$

P, where per capita emissions of pollutants, Y GDP per capita, t the year, and ε is the estimation error. Coefficients for carbon dioxide and sulfur dioxide have been obtained for the long term, respectively, are significant at the 5 percent and one percent. Coefficients of carbon dioxide are in the natural logarithm of GDP, the square and the cube to make 3.9615, and 1.2095- 0.0923. The sign of the coefficients can be realized between carbon dioxide and per capita GDP in the form of N there is a relationship. Also, the two roots by solving the cubic equation is obtained from the 600.325 and 765.785 of the turning point of the curve N are formed. In the case of sulfur dioxide coefficients for the natural logarithm of GDP, its square and cube are derived, respectively, -19.4515, 5.3053 and -0.3716. The sign of the coefficients can be realized between sulfur dioxide and per capita GDP in the form of N there is a relationship. Expand research in this area is limited to changes in variables and mathematical dimensions is not a function. Populations are also constantly changing. In some studies the environmental Kuznets hypothesis, the level of penetration has exceeded one or more of the various

sectors of an economy. On the other hand (Hamit-Haggar, 2012) in a study as a "greenhouse gas emissions and energy consumption and economic growth: The analysis of the collective vision of a panel of industry sectors in Canada, "began to examine the relationship between greenhouse gas emissions, energy consumption and economic growth in 21 sectors of Canadian industry (high the industries of pollution) the time period model 1990 - 2007.

$$GHG_{it} = \alpha_{i0} + \beta_{1i} ENC_{it} + \beta_{2i} GDP_{it} + \beta_{3i} GDP_{it}^2 + \quad 8$$

Where i kind of industry, α_i0 fixed effect for industry i, t: desired time period, GHG emissions logarithms, ENC logarithm of energy consumption, GDP logarithm of GDP, β_1 stretch of greenhouse gas emissions relative to energy consumption, β_2 stretch of greenhouse gas emissions relative to GDP, β_3 stretch emissions greenhouse square-GDP ratio is estimated ε_it error. Mothamat was used Pedroni method to evaluate the long-term relationship and to examine the relationships of VECM (vector error correction model) model (Granger). Unit energy consumption in industry is GJ, emissions units of measure GDP in 2002 is the Canadian dollar. He concluded that in the long term, there is a strong relationship between greenhouse gas emissions and energy consumption as a percent increase in energy consumption, greenhouse gas emissions are increasing at a rate of 0.82 percent. The direct relationship between GDP and emissions of greenhouse gases, but there is also the +3.01, however, the coefficient is the square of GDP - 0.07 and nonlinear relationship between emissions and economic growth can be observed. Score this study is that the relationship between energy consumption and economic growth in greenhouse gas emissions in various industrial sectors are analyzed separately. As observed, the environmental Kuznets hypothesis has been tested in different ways by researchers. Different ways to test this hypothesis by changing parameters, computational methods, variables and statistical communities has been different. Some of these studies confirm the hypothesis of Environmental Kuznets and others rejected it.

RESEARCH METHODOLOGY

In this study, for each of the various pollution index is defined. Indicator for the pollution in the atmosphere is considered to be the amount of carbon dioxide emissions per capita are the most polluting greenhouse gases. Units used for gas metric tons. In the water sector indicator that environmentalists use to measure the amount of pollution per capita amount of organic water pollutants are biochemical oxygen demand per capita, which is measured by the quantity (Clair et al, 2003). Justify the use of this index is provided by the infecting bacteria in water to survive the oxygen in the water they use so much oxygen in water is less than the amount of pollution is higher. This index is measured in units of kilograms per day (Goldman & Horne, 1983). For contamination of ground capita as an indicator of the amount of deforestation is considered. This value is actually negative, ie more per capita forest area and forest is greater than the denominator of the fraction that represents the amount of forest per capita, adjusted to be reduced. Square kilometer is a unit of measure deforestation. The growth rate of GDP per capita represents. Iran is a sample survey. The country has vast oil and gas industry is a sector that is considered a pollutant. Moreover, Iran is a developing country that has a different geographic region, such as deserts, mountains, forests and sea. All these factors, it is appropriate to evaluate the environmental and economic issues.

Models

Kuznets hypothesis of this study was to examine the relationship between economic growth and environmental pollution in the atmosphere has been used in the model. GDP per capita based on constant prices in 2000 dollars as an indicator of economic growth and per capita emissions were considered as indicators of pollution in atmosphere. Greenhouse gas carbon dioxide is studied. The model used is as follows:

$$CO_{2\,t} = \beta_0 + \beta_1 GDP_t + \beta_2 GDP_t^2 + \beta_3 GDP_t^3 + \varepsilon \quad 9$$

In CO_2 where per capita carbon dioxide emissions, GDP, GDP per capita, β are model parameters, ε and t the year is the disturbing part. After review of atmosphere, the Kuznets hypothesis of pollution on the water sector and economic growth were studied. In this section, the GDP per capita in terms of fixed prices in 2000 dollars as the economy and emissions of polluting water kilos per person workforce at every day as an indicator of pollution in the water was considered . The model in this section is as follows:

$$BOD_t = \beta_0 + \beta_1 GDP_t + \beta_2 GDP_t^2 + \beta_3 GDP_t^3 + \varepsilon_t \quad 10$$

Where, BOD biochemical oxygen demand per person, GDP, GDP per capita, β are model parameters, ε and t the year is the disturbing part. The Environmental Kuznets hypothesis on the ground was studied. GDP per capita based on constant prices in 2000 dollars as an indicator of economic growth and the total land area compared with forested areas in terms of square kilometers per person is considered as indicators of environmental pollution in the ground.

$$DF_t = \beta_0 + \beta_1 GDP_t + \beta_2 GDP_t^2 + \beta_3 GDP_t^3 + \varepsilon_t \quad 11$$

Where DF capita deforestation (loss of square kilometers of forest per person), GDP, GDP per capita, β are model parameters, ε and t the year is the disturbing part.

Data compilation

Data on emissions of carbon dioxide per ton per capita annually from 1965 to 2009, demand biochemical oxygen seasonally kilograms per day per person from 1994 to 2005, GDP per capita in terms of prices, dollar steady in 2000, from 1965 to 2009, deforestation per capita seasonally times square per person from 1986 to 2010 are available on the World Development Indicators database. Access to this database is possible through the World Bank website (World Bank, 2013). The first is the World Development Indicators database; World Bank Development Data is collected. The data base obtained from international sources that are officially approved by the World Bank .These data are all in Excel spreadsheet software Microsoft Office suite of programs.Eviews7 the software to perform calculations and estimates have been used in statistics and econometrics .Due to software compatibility Eviews7 Excel and easily exchange data did between them. Thus, the data extracted from databases in Excel format Eviews7 software were taken to be processed.

Method of calculation

After entering data in software Eviews7 was performed statistical and econometric tests. The vulnerability resides in the model variables were examined. If the econometric analyses of non-stationary variables are used, there is the possibility of spurious regression. This means that despite the lack of association between variables, the regression results indicate that the relationship between them is not therefore be relied on to non-residents of regression variables. Therefore Dickey Fuller unit root test was applied. If all variables in this test rejects the null hypothesis that all they can say is no unit root and are stationary. Static variables are being done to pave the way for further calculations. But if the variables are not stationary, they are calculated by subtracting the rank if they all have the same degree of difference they are making a living model is estimated to be about unit root test and the amount of waste produced. If the temperature difference is less than the amount of waste variables are said dwelled variables are co-integration and pseudo- regression model can be estimated without the worry.

After taking over the stationary phase, the model was estimated using ordinary least squares. The disturbing statements about his lack of correlation were assessed. Thus, Watson statistic was used for the exact values of the critical distance between the Watson cameras is available in the table. Another classic is the homogeneity of variance assumption that Pagan Godfrey test method used to check that the critical value is greater than the statistical variance anisotropy assumption can be rejected. The estimated coefficients of the exogenous variables are considered independent. If the statistics for GDP per capita, square and cube it and mark three significant negative coefficients, respectively, are positive and negative, which means the N inverse relationship (И) and the third function is between the GDP and pollution. If the t-statistic of GDP per capita and its square, but in this case there is more than a critical value for the cubic and the coefficients of GDP per capita and its square are positive and negative respectively, this relationship is inverted U shape and a quadratic function. GDP per capita is higher than the critical value of the test statistic is less than the square and cubic coefficients of GDP per capita, then mark it with a thick type of relationship for example, if positive means that the increase in GDP per capita increased amount of contaminants and the trend of GDP per capita, there is always some compromise.

RESEARCH FINDINGS

Evaluation of static variables taking

Traditional approaches typically based econometric time series based on variables that are stationary. Model with variable coefficients nomads may

result in a very high coefficient of determination that, while theoretically variables have no relationship with each other and thus the results have been confusing. In other words, estimates nomads variables may indicate there is a relationship between them if they do not really have any significant relationship between them. This mode is called pseudo regression. Usually for stationary time series process of taking a unit root test is used.

Unit root test

After collecting the data set to estimate the model using Eviews software variables were tested for unit roots. To perform this test, the method of Dickey and Fuller τ test was used. Dickey Fuller test on carbon dioxide emissions per capita was in the years 1965 to 2009, whereas the absolute value of τ equal to 0.540690, which was lower than the critical value at 5% level, ie the roots of -2.931404 not been settled. This can be seen in Table 1, if the GDP per capita, its square and cube, biochemical oxygen demand per capita and deforestation existed. So the Dickey Fuller test are living in these variables cannot be accepted. It should be noted that these tests were performed on variables in the following three forms:

1- Intercept

2- Intercept and time trend

3- Without intercept and time trend

Dickey Fuller test in the case of three significant but similar results were obtained following table shows only the results of the first cases.

Table 1: Results from Dickey Fuller test on variables

Variable	Prob	Critical value (5%)	Statistic τ	Test Result Static Vulnerabilities
GDP per capita	1946.0	-931404.2	-243421.2	Non-residence
Square of GDP per capita	2524.0	-931404.2	-082737.2	Non-residence
GDP per capita	2995.0	-931404.2	-967679.1	Non-residence
Carbon dioxide emissions per capita	9863.0	-929734.2	54090.0	Non-residence
Biochemical oxygen demand	6423.0	-925169.2	-255712.1	Non-residence
Deforestation per capita	1903.0	-895109.2	-250795.2	Non-residence

Source: research findings

After Dickey Fuller test with one degree of difference -making variables was performed on the absolute value of τ statistic for per capita carbon dioxide 5.587733 obtained the critical value at 5% ie 2.931404 was more of the variables with a the degree of difference is making a living . As can be seen in Table 2, similar results about the values for GDP per capita, its square and cube, biochemical oxygen demand per capita and deforestation were obtained suggesting that these variables have been living with the same degree of difference-making. t should be noted that all variables using the first mode Dickey Fuller test of the intercept terms were not settled but deforestation in the third case, ie without intercept and time trend, residents were allowed.

Table 2: Dickey Fuller test on the first difference of the variables

Variable	Prob	Critical value (5%)	Statistic τ	Test Result of Static Vulnerabilities
GDP per capita	0.0124	-2.931404	-3.509186	Resident
Square of GDP per capita	0.0069	-2.931404	-3.730186	Resident
GDP per capita	0.0031	-2.931404	-4.027946	Resident
Carbon dioxide emissions per capita	0.0000	-2.931404	-5.587733	Resident
Biochemical oxygen demand	0.0000	-2.926622	-6.641305	Resident
Deforestation per capita	0.0015	-1.944574	-3.237970	Resident

Source: research findings

The class is a group for all variables.

Atmosphere pollution model

Kuznets hypothesis in this study to examine the relationship between economic growth and environmental pollution in the atmosphere were used in the model that GDP per capita, square and cubic measures of economic growth and carbon dioxide emissions per capita pollution index is the atmosphere. Annual data for the period from 1965 to 2009 is investigated. Carbon dioxide emissions per capita, GDP per capita, squares and cubes were estimated using the following model.

$$CO_{2\,t} = \beta_0 + \beta_1 GDP_t + \beta_2 GDP_t^2 + \beta_3 GDP_t^3 + T + \varepsilon_t \quad 12$$

CO_2 where carbon dioxide emissions per capita, GDP, GDP per capita, T process variable, β are model parameters, ε and t the year is the disturbing part. After estimating model (12), whereas the Watson camera equivalent 619 495/0 of the Watson camera dl in the table below, then the model is positive autocorrelation. To fix the amount of carbon dioxide with a degree of autocorrelation lags were added to the model and the model was changed as follows.

$$CO_{2\,t} = \beta_0 + \beta_1 GDP_t + \beta_2 GDP_t^2 + \beta_3 GDP_t^3 + \beta_4 CO_{2\,t-1} + T + \varepsilon_t \quad 13$$

Where, $CO_{2\,t-1}$ Carbon dioxide emissions per capita with a degree are interrupted. The residual terms of regression equation (13), Dickey Fuller test under the absolute value of the statistic τ 4.933730 which is the critical value at 5% level that is more than 2.931404. That could be living five percent confidence interval was wide variability disturbing statements. According to Engel Granger definition of a collective variable is the degree is one. And the other terms of the regression residuals, they are living in is the mass of the order of equal or greater degree of all variables collectively linear combination of their own. As a result of these variables are at a wavelength of co-integration and moving. Hence there can be no fear of false regression; regression of these variables can be estimated with OLS. In addition, as explained in the next section the Watson camera base increased and the autocorrelation problem was solved.

Output result of the atmosphere pollution model

The estimated values of the model atmosphere pollution variables, coefficients, variables and coefficients of determination were obtained as described in Table 3.

Table 3: Results of the estimation model atmosphere pollution

Variable	Coefficient	prob	T-statistics	Type of Relationship
Intercept	12.23415	0.0568	1.964715	Positive
GDP per capita	-0.022073	0.0677	-1.880762	Negative
Square of GDP per capita	-05E1.34	0.0737	1.839131	Positive
GDP per capita	-09E -2.55	0.0896	-1.741756	Negative
Carbon dioxide emissions per capita, with a degree of interruption	0.652532	0.0000	5.081682	Positive
Process variable	0.032282	0.0048	2.997205	Positive
= 0.000000 Prob (F-statistic)		= 165.4455 F		
= 1.485882 D.W.		= 0.956081 R^2		

Source: research findings

The F-statistic is equal to 165.4455, which was higher than the critical value and the coefficient of determination equal to 0.956081, which implies the ability to model both the explanatory variables and the dependent variable is estimated. The t-statistics for GDP per capita, square and cube it was higher than the critical value and therefore the null hypothesis there is zero coefficients in the model can be rejected as a result, the coefficients of these variables in Table 3 can be accepted. In other words, the relationship of these variables with the dependent variable is the coefficients in Table 4-3. Watson statistic is equal amount of camera 1.485882 that the values between dl and du are the lack of decision-making. So you cannot say the model autocorrelation. One of the assumptions of classical linear regression, the assumption of equal variances is to ensure the establishment of Pagan Godfrey test method was used. F-statistic from this test was equal to 1.710859 and the probability statistics 0.1557. The null hypothesis of homogeneity of variance can be accepted. Because the symptoms of GDP per capita, its square and cube respectively, negative, positive and negative, intended function as N Reverse (И) and can be considered as complying with the environmental Kuznets hypothesis.

Model of Water Pollution

In this study, for Kuznets hypothesis about the relationship between economic growth and pollution, in the following model was used for the aqueous environment in which GDP per capita, square and cubic measures of economic growth and the biochemical oxygen demand per capita is an indicator of water pollution. Data seasonal is in period of 1994 to 2005. The biochemical oxygen demand per capita, GDP per capita,

square and cube it was estimated using the following model.

$$BOD_t = \beta_0 + \beta_1 GDP_t + \beta_2 GDP_t^2 + \beta_3 GDP_t^3 + T + \varepsilon_t \quad 14$$

Biochemical oxygen demand BOD values where per capita, GDP, GDP per capita, T process variable, β are model parameters, ε disturbing element and t year. After estimating the model, the Watson camera base equal to 0.806946 dl, which is lower than the model autocorrelation, is positive. To meet this demand, biochemical oxygen per one degree of autocorrelation lags were added to the model and the model was changed as follows.

$$BOD_t = \beta_0 + \beta_1 GDP_t + \beta_2 GDP_t^2 + \beta_3 GDP_t^3 + \beta_4 BOD_{t-1} + T + \varepsilon_t \quad 15$$

Where, BOD_{t-1} is a biochemical oxygen demand per capita amount, the residual sentences regression models were tested Dickey Fuller statistic τ is the absolute 3.446180 that is greater than the critical value at 5 percentages 2.925169. That could be living in a 5% confidence interval was wide variability disturbing statements. According to Engel Granger definition of a collective variable is the degree is one. And the other terms of the regression residuals, they are living in is the mass of the order of equal or greater degree of all variables collectively linear combination of their own. As a result of these variables are at a wavelength of co-integration and moving. Hence there can be no fear of false regression; regression of these variables can be estimated with OLS. In addition, as explained in the next section the Watson camera base increased and the autocorrelation problem was solved.

Output result of the water pollution model

The estimated values of the model water pollution variables, coefficients, variables and coefficients of determination were obtained as described in Table 4.

Table 4: Results of the estimation model for water pollution

Variable	Coefficient	prob	T-statistics	Type of Relationship
Intercept	0.034989	0.0000	4.669528	Positive
GDP per capita	-6.05-E51	0.0000	-4.765322	Negative
Square of GDP per capita	4.08-E16	0.0000	4.952200	Positive
GDP per capita	-8.12-E71	0.0000	-5.083494	Negative
Biochemical oxygen demand per capita, with a degree of interruption	0.360505	0.0000	3.608343	Positive
Process variable	-6.06-E20	0.0008	-3.465635	Negative
Prob(F-statistic) = 0.0000000		F = 113.2125		
D.W. = 1.420018		R2 = 0.932462		

Source: research findings

The F-statistic is equal to 113.2125, which was higher than the critical value and the coefficient of determination equal to 0.932462, which implies the ability to model both the explanatory variables and the dependent variable is estimated. The t-statistics for GDP per capita, square and cube it was higher than the critical value and therefore the null hypothesis there is zero coefficients in the model can be rejected as a result, the coefficients of these variables in Table 4 can be accepted. One of the assumptions of classical linear regression, the assumption of equal variances is to ensure the establishment of Pagan Godfrey test method was used. F-statistic from this test was equal to 1.917295 and the probability statistics 0.1123. The null hypothesis of homogeneity of variance can be accepted. Because the symptoms of GDP per capita, its square and cube respectively, negative, positive and negative, intended function as N Reverse (И) and can be considered as complying with the environmental Kuznets hypothesis.

Model of ground pollution

In this study, for Kuznets hypothesis about the relationship between economic growth and environmental pollution in the ground below was used in the model, GDP per capita, square and cubic economic growth and per capita index of the deforestation is land pollution. Data seasonal period from 1365 to 1389 is reviewed. The amount of deforestation per capita, GDP per capita, squares and cubes using the following model was estimated.

$$DF_t = \beta_0 + \beta_1 GDP_t + \beta_2 GDP_t^2 + \beta_3 GDP_t^3 + T + \varepsilon_t \quad 16$$

Where DF of deforestation per capita, GDP, GDP per capita, T process variable, β are model parameters, ε and t the year is the disturbing part. After the Watson camera model base equal to 0.991854 dl, which is lower than the model autocorrelation is positive.

Amount of biochemical oxygen demand per capita to meet with a degree of autocorrelation lags were added to the model was changed as follows.

$$DF_t = \beta_0 + \beta_1 GDP_t + \beta_2 GDP_t^2 + \beta_3 GDP_t^3 + \beta_4 DF_{t-1} + T + \varepsilon_t \quad 17$$

Where, DF_{t-1} is a biochemical oxygen demand per capita amount, the residual sentences regression models were tested Dickey Fuller statistic τ is the absolute 3. 472379 that is greater than the critical value at 5 percentages 2. 893589. That could be living in a 5% confidence interval was wide variability disturbing statements. According to Engel Granger definition of a collective variable is the degree is one. And the other terms of the regression residuals, they are living in is the mass of the order of equal or greater degree of all variables collectively linear combination of their own. As a result of these variables, and they move at a wavelength of co-integration. Hence there can be no fear of false regression estimate OLS regressions with these variables. The GDP variable sized cubes additional variables we tested the F-statistic equal to 0.99248, which is less than the critical value. In other words, remove this variable from the model, the model does not matter 17. Thus, the variable was removed from the model and the model was estimated.

$$DF_t = \beta_0 + \beta_1 GDP_t + \beta_2 GDP_t^2 + \beta_4 DF_{t-1} + T + \varepsilon_t \quad 18$$

Output result of the ground pollution model

The estimated amount of groundwater pollution model variables, coefficients, variables and coefficients of determination were obtained as described in Table 5.

Table 5: Results of the estimation model for land contamination

Variable	Coefficient	Prob	T-statistics	Type of Relationship
Intercept	163/5993	0/0001	4.252660	Positive
GDP per capita	0/026016	0/2342	1.197645	Meaningless
Square of GDP per capita	-1/05-E05	0/0832	-1.751976	Negative
The per capita deforestation rate with a lag	0/598346	0/0000	6.785374	Positive
Process variable	1/016291	0/0000	4.317415	Positive
Variable	163/5993	0/0000	4.252660	Positive
Prob(F-statistic) = 0.0000000		F = 6023. 006		
D.W. = 2.223621		R2 = 0. 996278		

Source: research findings

F-statistic is equal to 6023. 006, which was higher than the critical value and the coefficient of determination equal to 0. 996278, which is indicative of the ability of each model to estimate the dependent variable and the explanatory variables. The t-statistics for GDP per capita is less than the critical value and therefore the null hypothesis that the coefficient is zero, and then the model cannot be rejected. The GDP values do not contribute to deforestation. Square coefficient was negative, but GDP per capita is obtained by plotting the charts upside down U, which is quite consistent with the environmental Kuznets hypothesis.

DISCUSSION AND CONCLUSION

When world economic growth accelerated sharply upward took the contamination of the environment. Since Iran's economy is based on oil, gas and petrochemical industries, which are among the pollutants since Iran's economy is based on oil, gas and petrochemical industries, which are among the pollutants and also based on statistics and graphs are presented in the previous section, economic growth and environmental pollution have increased in each other's feet. This has raised environmental concerns that will increase pressure on the authorities to control the indiscriminate use of natural resources. On the other hand, there is the belief that economic growth not only increases environmental pollution is not reduced it. Seeking to increase incomes in rural areas migrate to the cities, they were familiar with the culture and economy of urban atmosphere. Also, with rising incomes, higher efficiency and less pollution increased imports of machinery. Hence, economic growth has been somewhat reduced environmental pollution .According to the Environmental Kuznets hypothesis linking economic growth and environmental pollution caused by the above two factors are such that in the early

stages of economic growth positively and in later stages , is negative . Words inverted U -shaped relationship between them is. As previously mentioned, the aim of this study was to evaluate the environmental hypothesis about the different parts of Iran. Based on the estimates in this study were conducted using ordinary least squares coefficients in the model atmosphere pollution related to GDP per capita, its square and cube respectively, negative, positive and negative. It can be said that the relationship between economic growth and environmental pollution as a negative N (И) is. И form part of this relationship can be seen as a confirmation of the Kuznets hypothesis because the second part of this equation in the form of an inverted U, which is the Kuznets curve. But here's the other aspects of the relationship also has been unveiled in the first part of the curve is negative, which indicates the relationship between economic growth and environment. This is justified by the economic growth in the early stages; there is an abundance of natural resources that cause the earth to be a better human habitat. In this time of severe economic activity, natural resources are not easily amenable to various sectors of economic power, but with the expansion of industries, consumption of natural resources and the speed will be reduced until finally the relationship between economic growth and environmental pollution at a minimum of negative to positive were later dropped. From here the relationship is positive for economic growth increases the income that their population growth will lead to increasing population demand rises commodity prices are high, and therefore the increase in supply will raise prices further, the factories began to work with higher production capacities. Setup and operation requires fossil fuels that release greenhouse gases like carbon dioxide pollution to the atmosphere. But with increasing public concern about the consequences of the pollution of atmosphere pollution spreads. Environment lovers will find more reasons to defend their beliefs. In addition to increasing the incomes of rural consumer culture is shifting to more efficient urban form. Boom, more financial power plants to import modern machines are more naturally with higher efficiency and fewer greenhouse gases work. All of these factors causes the low impact of economic growth on pollution in the atmosphere is reduced so that the relationship is negative.

Contamination of the water sector follows a similar pattern in this part of the relationship is an inverse N can be stated that the above explanations in this regard. In general we can say that the Iranian economy is based on oil, gas and petrochemical pollution of the atmosphere and water as described above will affect Iran. In groundwater contamination resulting is in an inverted U-shaped relationship that is entirely consistent with the hypothesis of Environmental Kuznets Curve. In this case, it reduces the environmental damage. Due to environmental issues can be considered as one of the conditions for economic growth, it is therefore recommended in this study may be due to more or less the size of the economic environment. Environment that provides the necessary resources to carry out economic activities can also be a good platform for continued growth. After the economic policy makers in their decisions should have paid great attention to the environment. Based on the results of this study suggest that in the course of economic growth and environmental issues to be addressed, so that in the early stages of development can be directed more attention because at this stage of the economic growth has its greatest impacts on the environment. Overall, this study suggests that the economy towards less polluting activities tend to be given to environmental concerns in different phases of economic growth reduces or abolishes the pace of economic growth. It also imports and production equipment, factory and industrial development, the factors of pollutants into the atmosphere, water and land damage is getting more attention.

REFERENCES

Clair N. Sawyer, Perry L. McCarty, Gene F. Parkin (2003). Chemistry for Environmental Engineering and Science (5th ed.). New York: McGraw-Hill. ISBN 0-07-248066-1.

Fodha Mouezan, Oussama Zaghdoud, (2010), “Economic growth and pollutant emissions in Tunisia: An empirical analysis of the environmental Kuznets curve” Energy Policy, Vol 38, PP. 1150–1156.

Goldman, Charles R. & Horne, Alexander J. Limnology (1983) McGraw-Hill ISBN 0-07-023651-8 pp.88&267.

Grossman, G.M. & A.B. Krueger, (1991), “Environmental impact of a North American free trade agreement” Working Paper 3914. National Bureau of Economic Research, Cambridge, MA.

Hamit-Haggar Mahamat, (2012), "Greenhouse gas emissions, energy consumption and economic growth: A panel co-integration analysis from Canadian industrial sector perspective" Energy Economics, Vol 34, PP. 358–364.

Magnani Elisabetta, (2001), "The Environmental Kuznets Curve: Development path or policy result?" Environmental Modeling & Software, Vol 16, PP. 157–165.

Roca Jordi, Emilio Paddi Roca, Emilio Padilla, Mariona Farre and Vittorio Galletto, (2001), "Economic growth and atmospheric pollution in Spain: Discussing the Environmental Kuznets Curve hypothesis" Ecological Economics, Vol 39, PP. 85-99.

United States Energy Information Administration, (2013), available from: http://www.eia.gov.

World Bank, (2013), World Development Indicator, available from: http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=world-development-indicators.