Resistive Economics
International Journal

The Open Access Journal of Resistive Economics (OAJRE)/
Volume 8, Number 3, 2020 Published Online July 01
E-ISSN: 2345-4954 http://oajre.ir

Original Article

Pages: 47-60

The Effects of Green Tax on Emission of Environmental Pollutants in Iran

Saman Ghaderi[1], Aram Feizi[2], Farhad Khodadad kashi [3] and Fereshteh Ghavam Zadeh [4]

Received: 2020/02/19 Revised: 2020/04/07 Accepted: 2020/05/24

ABSTRACT: The aim of this study is to evaluate the short-term and long-term effects of green tax on the emission of environmental pollutants in Iran. To achieve this goal, used data were related to the period of 1358-1391 and also Auto Regressive Distributed Lags (ARDL) method has been is used. Research results indicated that Green taxes have a negative effect on emissions of pollutants in Iran. Furthermore, Economic growth and population have significant and positive relationship with pollutants emissions and research and development expenditure and degrees of freedom have a negative relationship with their emissions. The findings also show that the amount of pollutants emissions of carbon dioxide, nitrogen dioxide, sulfur dioxide for each was period80, 30 and 50 percent of adjusted deviations respectively, and moves towards its long-run equilibrium.

KEYWORDS: Green Taxes, Environmental Pollutants, Environment, Bounds Test Method, Iran.

1 Assistant Professor of Economics, University of Kurdistan, Sanandaj, Iran.

2 MA in Economics, Payam Noor University, Iran.

3 Professor of Economics, Payam Noor University, Iran.

4 MA in Economics

1. INTRODUCTION

Economic growth has always been as one of the main objectives of the government of any country in the world and countries spare no effort in achieving higher growth rates. Such a goal has had irreversible environmental impacts on the countries and global environment in total. On the one hand, economic activities are damaging the environment by harvesting its resources and on the other hand, Due to manufacturing and consumption activities Environmental Quality will be reduced. The depth of this environmental disaster has already showed irreparably damaging effects on a man's life which include the destruction of the ozone layer as a result of greenhouse gases, respiratory infections, water pollution, soil erosion and deforestation and the subsequent flooding and adverse effects of economic and so on (Pezhoyan and Lashkar Zadeh, 2010). Accordingly, during numerous international meetings, including the Kyoto meeting (1997), Countries pledged to take effective measures to reduce environmental pollution factors and prevent greenhouse effect and also reduce the use of fossil fuels, which of course a significant effect has not been observed. This is at a time when USA, the country that has the world's largest economy, has so far avoided the implementation of its obligations. World environmental problems need to be solved by attention and the political authorities will. There are several tools for this purpose, one of which is to promote efficiency in production and consumption process, improved technology can also reduce pollutants. The aim of the revision of the economic growth and the depreciation of the environment in terms of national accounts can be effective in reducing pollution (moghimi et al., 2010). This is important so that in financial accounting system of the United Nations Environment depreciation is proposed in the calculation of GNP. In addition to all the above tools, taxes also take effective measures to reduce environmental pollutants emissions and this study seeks to assess the impact of green taxes on pollutants emissions in Iran. For this purpose, the data for the period 1979-2012 and ARDL method are used.

This paper is organized in four sections. After this introduction, in the second part, theoretical framework and literature review are presented. The third part is dedicated to model introduction and its estimation. Conclusions and recommendations are presented in section five.

2. LITERATURE REVIEW

External and internal Empirical studies conducted in connection with this subject are as follows:

Anonymous (2004) in a study about development of green tax stated that: Green taxes cause additional benefit in three ways: weak, medium and strong, But in general equilibrium models which he used to measure the financial impact of Green tax, Concluded that green tax does not cause strong benefit, and in fact green taxes would not cause any reduction in environmental problems and unemployment.

Eden Hofer and Kalkol (2011) have mentioned "Green opposition “in an article. "Green opposition" means that Progressive taxes on resources, accelerate global warming, because the owner of the resources, consider tax increase in the future because of extracting short-term increase. This paper also shows that this impact only occurs for a particular set of carbon taxes which faster than the speed of resource owners discounts will increase.

Oueslati (2013) in a study investigated the short-term and long-term effects of macroeconomic environment of a tax reform. The results show that the effects of environmental taxes in the long term have had a positive effect on economic growth and social welfare but these effects have been negative in the short term.

D’Haultfœuille. Et al (2013) in a study assessed the impact of environmental pollutants reduction policy in France in 2008 on carbon dioxide emissions in the short-term and long-term and their results suggest

that these environmental effects are negative and they have suggested that this policy should be adopted more accurately.

Asadi (2008) in his study "The cost of air pollution damage and the necessity of implementing green taxes" states that: Environmental taxes as one of the important foundations of tax, have been formed based on Pigou's theory assuming "polluter must pay the cost of pollution". In this study the environmental effects of pollutants and their marginal costs are taken into consideration. The investigated method in this study is “cost control method”. In this method, the final cost of a polluting unit was calculated by econometric methods on the basis of Cost function estimation. The results were presented as three scenarios of reducing air pollution and one scenario of water pollution reduction. The results of this study showed that in reviewing the effectiveness of consumer price increase caused by pollution cost transfer on consuming, price tool cannot serve as the primary means of controlling pollution and at current prices, the extensibility of the (gas) price is lower than the unit.

Abdollah Milani and Mahmmudi (2010) in the study "environmental taxes and its allocation effect (Case study: Iranian Oil)" stated that: Energy resources have been an essential factor for economic development of countries and fossil fuels, especially five main oil products, are the most important resources of the countries. According to the results: Tax price on gasoline, gas oil, fuel oil and LPG (Liquefied petroleum gas) will reduce increasing trend of their consumption. But on kerosene, taxation increased consumption of this product.

Pezhoyan and Lashkarzadeh (2010) in a study using panel data, tested the effect of economic growth, technical and political preferences changes of environmental taxes on the major pollutants of air in 56 countries with different development levels, including Iran, over the period 1995-2005. Results suggest that despite the positive impact of economic growth on pollutant emissions, improvement of the level of technology in reducing emissions of sulfur dioxide and nitrogen and improving the indices related to political influence (environmental tax) has had an important role in reducing emissions of carbon dioxide pollutants.

Moghimi et al (2010) have considered one type of green taxes indirectly (fuel taxes) and have tried to study Welfare and environmental effects and green tax in Mashhad in a general equilibrium model and in 11 tax scenarios using input - output table information of Khorasan Razavi in 2000 year and amount of greenhouse and pollutant emissions caused by the consumption. The results suggest that with the tax on fuel, Intermediate demand and consumption of fossil fuels reduces.

In all scenarios, considering environmental effects, welfare changes were positive and it increases by increase of tax rate, In other words, increasing taxes on fossil fuels is a defensible policy. But the highest growth rate of welfare, considering the environmental effects, is the tax rate of 15% (Scenario IV). In the other words, if green taxes are levied at a rate of 15%, Welfare decreases 1.0% regardless of the environmental impacts, but by reducing fuel consumption at this rate and with removing community health index Pollutants and environment heating, prosperity will increase 0/096% and %4.6 respectively.

Hassanlou (2012) in a study entitled "Estimating the green tax on environmental pollution of productive activities (Case study CO2)" states that one of the challenges which governments are facing in the last century are environmental crises. Governments and policy makers by imposing their policies and programs are trying to overcome environmental problems and reduce the negative effects and harmful practices of human actions on the environment. One of the ways to control and reduce environmental degradation, is the use of economic tools and methods. The aim of this study is to investigate economic

methods to control and reduce pollution and green tax estimates on carbon dioxide emissions (carbon tax) in the cement industry. First, methods of pollution control were investigated in three groups: economic policies based on price, based on the amount and accrual rules based. Then, to estimate the green tax, Tran slog cost function was estimated for the cement industry. The cost function and cost share equations estimated systematically and by (ISUR) method. Based on the results obtained in this study, Green tax rates on carbon dioxide emissions per ton of production in the cement industry is 15 percent.

3. THEORETICAL FRAMEWORK

The book "little is beautiful" was published few decades ago. Under the influence of this book and similar actions, many scientific and executive economic sections are increasingly considering economic goals revision and, especially, economic growth. Environmental quality on which human life is dependent, is being deteriorated by a variety of economic activities. Various recommendations are proposed to solve environmental problems and every branch of science has presented its specific solution but, undoubtedly, economic actions and policies are among the most effective tools to prevent environment deterioration. Economic solution are also varied and include a wide range of microeconomic suggestions such as pricing system reformation, elimination of comprehensive subsidies, etc, and macroeconomic suggestions such as revision in macroeconomic objectives and financial policies. Moreover, it is suggested to revise countries' macroeconomic goals and internalize negative external effects of economic activities to solve environmental problems. Among various suggestions, the present paper focuses on financial policies, and especially, tax as an effective tool to prevent environment destruction. Taxes may be enacted based on government's various goals. For example, tax may be used as a resource of government finance or to improve income distribution. Another function of tax is resource allocation adjustment. Economic practitioners only consider personal benefits and costs and neglect positive and negative effects of their activities on other consumers or manufacturers. Environment destruction, indeed, is the result of focus of economic practitioners on personal benefits and such as approach finally results in environment deterioration and pollutant emission. An effective way to correct economic practitioners' behaviors is to internalize social costs of their activities with external effects of deterioration. Among all economic tools, tax is a proper one for policymaking in this field. Such effects which, in most cases, intensify insufficiency of the economic system, are justified for the government because of sustainability and income stability. Green tax is an action to reduce destructive effects of economic activities. It is a very wide and expanded concept and is associated with a proper revenue for the government. Hence, it may replace other tax bases. This point, on one hand, reduces disorders generated by other taxes and, on the other hand, reduces pollution and is beneficial to the society (Nejadfahm nd Eghdami, 2011).

3.1. Green Tax

Mc Moran and Nelon (2003) classify suggested and implemented strategies of pollution control into three main groups.

The first group is the direct environmental tax (Pigo's Tax). The English scientist Pigo first considered pollution as an external consequent in 1920. He generally believed that effective tax regulations may eliminate any external diseconomy. He suggested that the pollution source must pay tax based on te total amount of harm it has for the environment. Pollution tax influence interests of the pollutant individual. Obviously, maintaining personal interests makes the pollutant find ways to reduce his paid tax. Hence, the pollutant agency reduces its production to lower taxes and this results in a decrease in social costs originating from pollution. Pigo's Tax is a tax with a certain rate allocated to every unit of pollutant emission or that of environmental destruction. As to employed rates, it can be said that tax rate equals

total social costs in the socially efficient level of emission. The level occurs when total interests of pollution removal for companies equal total social costs of pollutant emission.

The second group is indirect environmental tax through which tax is exerted on production inputs or consumed goods the use of which may, in different ways, harm the environment. It's advantage is the basic transmission of costs and consumption tax. This type of tax employs encouraging pricing mechanism and leads manufacturers and consumers to change their pollution removal and emission behaviors and, hence, the socially efficient level of emission may be achieved to some extent. Indirect environmental taxes may lead to pollution emission in a socially efficient level only when there is a constant proportional relationship between tax-included items and other regulatory variables. Because of considering consumption through reducing production, stirage conditions and technology improvement, this type of tax leads to better control of pollutants with higher costs than Pigo's tax. Indirect environmental tax relies on pricing system instead of using controlling and commanding policies. Indirect tax imposes higher costs than Pigo's tax and even, in some cases, it may better to prevent environmental destruction than employing indirect tax to reduce pollution level since costs of the private section may be higher than achieved social interests. This tax is used in various countries in different ways. For example, tax on energy, dues of chemical fertilizers, tax on carbon, and tax of fossil fuels are among known indirect environmental taxes.

The third class includes environmental rules and regulations which ensure establishment of environmental standards through enacting a set of rules and regulations to achieve environmental objectives without getting assistance of market based incentives. This form of environmental policy-making recognizes and declares an acceptable measure of pollutants and condemns those violating these rules to suppress their activities. The regulations may consider only a single aspect of pollution reduction and provide for social and economic inefficiency by failing to realize the objective of pollution reduction with the lowest costs.

Environmental regulations are expressed in tax on personal revenues, tax on company incomes, tax on public sales, tax on fuel and tax on cars. In tax on personal revenues, the regulations are exerted as tax patrons in expenditures concerning renewable energy and those for energy savings costs. In the system of company income tax, the regulations appear in the form of tax incentives to invest on energy saving and pollution reduction equipment, making use of increasing depreciation, tax discount on making use of recycled products and tax incentives on foresting. Tax exemption of public sales of recyclable papers, solar energy equipment, converting motor fuel to natural gas and, generally, goods and services with lower pollution are among various forms of implementing environmental regulations in tax on public sales (Paytakhti and Nahidi, 2007).

In terms of efficiency, the three mentioned groups of environmental taxes are ordered, from most efficient to least efficient, as Pigo's Tax, indirect environmental taxes and environmental regulations. But, in practice, environmental regulations in different taxes are more frequently used than indirect taxes and Pigo's Tax in achieving environmental objectives.

The conflict between the theory of environmental tax efficiency and applying such taxes may be analyzed by evaluating three effective factors on the status of environmental tax efficiency:

- It is difficult to design and implement environmentally efficient taxes. Moreover, since social costs often have wide aspects, determining the total social cost is a hard task to perform.
- Certain structural and economic conditions of a country may be considered as a serious obstacle for efficiency of environmental taxes. In macro economically instable situations, presence of

variable or high inflation rates makes it difficult to implement environmental taxes and, also, limits their efficiency.

- Status of environmentally efficient taxes may be in conflict with other policy-making objectives such as economic outcomes, employment, international competitions and social justice and may reduce them (Nejad Fahim and Eghdami, 2011).

3.2. Environmental pollutants

3.2.1. Types of pollutants

Pollutants are in different types each of which threats the environment based societies' consumption culture. Water, air, visual and audio pollutions are the most well-known ones. Respecting serious effects of air pollution on the environment and types of environmental taxes discussed in this paper, we focus on this type of pollution and its popular pollutants (Choopani, 2009).

3.2.2. Air pollutants

In general, air pollutant sources include natural and unnatural or artificial sources. Considering positive effects of interactions of natural sources (such as storm, desert dust, smoke and ash of forest fires, salts and elements available in the atmosphere, volcanos, comets and plans and animal sources) in long term, some believe that such sources result in environmental pollution in short term as a result of deteriorating obvious balance of the nature. Hence, such natural interactions are classified as natural pollutants.

In contrast, unnatural or artificial sources are created by human beings and their resulting pollution originates from human activities. Some examples are motor vehicles, industries, business and household sources, etc.

However, the most important air pollutants include:

- Carbon-containing compounds

Carbon is a nonmetallic element available in pure form or in as substances such as coal, oil, or other organic and mineral material. Carbon is widely used as fuel and its ignition results in creation of CO and CO2.

- Sulfur-containing compounds

Sulfur is found in the nature in both pure and combined (with other elements) in the nature. In combination with Oxygen, it forms sulfuric oxides such as S2O7, S2O3, SO4, SO3, SO2, and SO. In laboratory measures, all oxides above are possible, in exposure to air, SO2 and SO3 are formed.

- Nitrogen-containing compounds

Among all nitrogen oxides, NO and NO2 are more important.

NO: colorless, non-inflammable, odorless, and toxic gas.

NO2: a brownish red, non-inflammable, and highly asphyxiate (Choopani, 2009)

4. PATTERN INTRODUCTION AND ESTIMATION

As mentioned in the Introduction, the present paper aims at evaluating the effect of green tax on pollutant emission in Iran. The model used in this research to show the relationship between environmental taxes and pollutants is adopted from that of Grossman and Krueger (1993, 1995) and Torras and Boyce (1998).

Kuznets's initial model considers the relationship between environmental quality and economic growth as a reversed U, and in the extended pattern of Kuztens's second degree equation, Grossman and Krueger (1993, 1995) and Torras and Boyce (1998) used demographic, institutionalized and macroeconomic policy-making variables in addition to variables of economic growth and environmental pollutant emission. Therefore, models of this paper are as follows:

Model 1)

$$Co_2 = \alpha_0 + \alpha_1\ GT_{it} + \alpha_2\ \ GDP_{pit} + \alpha_3\,(GDP_{pit})^2$$

$$+ \alpha_4\ POP_{it} + \alpha_5\ \ RD_{it} + \alpha_6\, DF_{it} + \varepsilon_{it}$$

Model 2)

$$SO_2 = \alpha_0 + \alpha_1\ GT_{it} + \alpha_2\ \ GDP_{pit} + \alpha_3\,(GDP_{pit})^2$$

$$+ \alpha_4\ POP_{it} + \alpha_5\ RD_{it} + \alpha_6\, DF_{it} + \varepsilon_{it}$$

Model 3)

$$NO_2 = \alpha_0 + \alpha_1\ GT_{it} + \alpha_2\ \ GDP_{pit} + \alpha_3\,(GDP_{pit})^2$$

Dependent variables of this research are the most important environmental pollutants:

Table 1: Variables definition

Variables	Title	Symbol	Collection method
Dependent variables	Carbon dioxide emission	Co2	Data of World Bank software and Ministry of Energy's balance sheet to gather this information
	Sulfur dioxide emission	So2	
	Nitrogen dioxide emission	No2	
Independent variables	Green tax	GT	Information on these variables was obtained from World Bank software
	Per capita gross domestic production	GDP	
	Per capita squared gross domestic production	GDP2	
	Population of country	POP	
	Research and development expenses	R&D	Credits spent by the government on research and development statistics of which were obtained from Organization of Management and Planning
	Economy degree of freedom	DF	The ratio of total exports and imports to GDP and data of Iranian Central Bank

To experimentally analyze long term relationships and mutual effects between research variables, models are estimated using vector auto regression with distributive intervals and limit test approach presented by Pesaran et al (2001). Previously, Angel – Granger and Juhanson's methods were used to examine the relationship between variables. The problem with these methods is the necessity of aggregation of all first

degree variables. The most important advantage of limit test in examining relationships among variables, compared to previous methods, is that it explains and predicts long-term relationships regardless of aggregation of variables of the same degree (zero or one).

First, Dickey – Fuller's generalized unit root test was performed on main variables. Test results are presented in Table 2.

Table 2: Results of Dickey – Fuller's test

Variables	Calculated statistics	Critical values			Static degree
		1%	5%	10%	
Co_2	-3/62	-3/51	-2/95	-2/58	Level
So_2	-1/78	-3/51	-2/95	-2/58	1
No_2	0/59	-3/51	-2/95	-2/58	1
GT	-17/04	-3/51	-2/95	-2/58	level
$GDPp_t$	0/11	-3/51	-2/95	-2/58	1
$(GDPp_t)^2$	-2/03	-3/51	-2/95	-2/58	1
POP	-1/75	-3/51	-2/95	-2/58	1
$R\&D$	3/33	-3/51	-2/95	-2/58	1
DF	-3/31	-3/51	-2/95	-2/58	level

Based on the table above, except for Co2 emission, green tax and degree of freedom, other variables are static in first degree differentiations. Hence, it is not feasible to estimate the model using OLS method since the long-term relationship between variables is eliminated and, hence, ARDL method is used for model estimation.

4.1. Short-term model estimation

Results of short term estimation of all three models are presented in Table 3.

Table 3: Results of short term estimation

Dependent variable	CO_2		SO_2		NO_2	
Variable name	First model		Second model		Third model	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
$CO_2(-1)$	-0/301	-1/676	-	-	-	-
$SO_2(-1)$	-	-	1/024	51/5558	-	-
$NO_2(-1)$	-	-	-	-	0/4942	3/2466
GT	-0/0802	-2/1737	-0/054	-2/5734	-0/0819	-2/9377
GT(-1)	-	-	-0/1983	-3/7479	-0/1222	-3/4818
$GDPp_t$	2648/1	2/6189	1235/1	5/3260	1363/5	2/2448
$(GDPp_t)^2$	-0/6226	-2/4845	-0/3613	-5/8814	-0/3134	-2/2881

$(GDPp_t)^2(-1)$	-	-	-	-	0/4735	3/3883
POP	0/8865	3/1102	-0/3197	-4/8301	0/0139	3/5506
$POP(-1)$	-	-	0/3278	5/0028	-	-
$R\&D$	-26/094	-2/4204	-5/9422	-2/0774	4/5620	1/4851
$R\&D(-1)$	-	-	-39/244	-5/5016	-	-
DF	-37204/2	-2/2488	-15754/3	-4/0869	-3401/8	-1/3367
R2	0/7790	-	0/9524	-	0/9896	-
F	6/4521	Prob[.000]	51/1849	Prob[.000]	243/16	Prob[.000]
DW-statistic	2/1884	-	2/2586	-	1/8059	-

According to this table, in the estimated short term model, the coefficient of research main variable (green tax) is negative and it is significant statistically. Coefficient of GDP of all models is positive and significant. The same coefficient for variables of population and research and development expenses is negative and significant (in the first and second models). But, in the third model, it is not statistically significant.

4.2. Examining long-term relationship

Table 4 present results of limit test for all three models. Therefore, it can be said that in significance level of 5%, limit test indicates an assembly relationship between model variables and, hence, presence of long-term relationship between variables may not be rejected.

Table 4: Results of limit test

95%			90%	
First model				
F-statistic	Lower Bound	Upper Bound	Lower Bound	Upper Bound
5.9099	2.4210	3.8030	1.9764	3.2354
Second model				
F-statistic	Lower Bound	Upper Bound	Lower Bound	Upper Bound
6.0381	2.4210	3.8030	1.9764	3.2354
Third model				
F-statistic	Lower Bound	Upper Bound	Lower Bound	Upper Bound
8.0486	2.4210	3.8030	1.9764	3.2354

4.3. Estimation of long term equation

Based on what mentioned before, model is estimated using ARDL method. To estimate the model using this method one has to determine the number of optimized intervals first. For this sake, Schwartz – Bayesian Criterion (SBC) is employed.

Results of long term equation estimation of first, second and third models are presented in table 5.

Table 5: results of long term estimation

Dependent variable	CO_2		SO_2		NO_2	
Variable name	First model		Second model		Third model	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
GT	-0/0616	-2/2094	-0/3121	-3/2806	0/2255-	-1/9607
$GDPp_t$	2034/2	2/7376	1525/6	5/4092	997/35	5/1017
$(GDPp_t)^2$	-0/4782	-2/5827	-0/4463	-6/2355	-0/3164	-5/3928
POP	0/007	5/3923	0/010	2/8905	0/0275	8/1299
$R\&D$	-20/044	-2/3608	-55/817	-7/0556	-9/0206	-2/8029
DF	-28578/8	-2/3447	-19460/6	-4/4141	-6726/7	-1/3922

As the table indicates, in the long term model all three equations have expected signs and are of statistical significance. Main variable coefficient (GT) is negative and statistically significant. In other words, an increase in green tax will result in a reduction in pollutant emission.

GDPpt has a positive, significant effect on pollutant emission so that an enhancement in GDP based on theoretical basics increases environmental pollutants. Moreover, GDP2 has a negative significant coefficient and this indicates a revised U-shaped relationship between this variable and pollutant emission. POP in positively and significantly related to emission of Co2, SO2 and NO2. In other words, population growth acts as an environmentally destructive factor. Besides, R&D reduces pollutants and DF has a negative significant effect.

4.4. Error correction pattern estimation

Considering approval of the relationship between economic variables of the model, short term relationships are estimated using Error-correction method (ECM) results of which are presented in table 6.

Table 6: results of long-term estimation

Dependent variable	CO_2		SO_2		NO_2	
Variable name	First model		Second model		Third model	
	Coefficient	t statistic	Coefficient	t statistic	Coefficient	t statistic
dGT	-0/0802	-2/1737	-0/054	-2/5734	-0/0819	-2/9377
$dGDPp_t$	2648/1	2/6189	1235/1	5/3260	1363/5	2/2448
$d(GDPp_t)^2$	-0/6226	-2/4845	-0/3613	-5/8814	-0/3134	-2/2881
$dPOP$	0/8865	3/1102	-0/3197	-4/8301	0/0139	3/5506
$d(R\&D)$	-26/094	-2/4204	-5/9422	-2/0774	4/5620	1/4851
dDF	-37204/2	-2/2488	-15754/3	-4/0869	-3401/8	-1/3367
ecm(-1)	-0/3018	-3/7725	-0/8095	-7/3445	-0/5057	-3/3218

Coefficients of ecm (-1) indicate the rate of imbalance process adjustment in all three models (-0.80, -0.30 and -0.05, respectively). Therefore, any deviation of the dependent variable from long term path in each period may modify 80, 30 and 50 percent of deviations of the next period and move toward long-term balance.

5. Conclusion and suggestions

- Considering the negative, significant impact of green tax on emission of CO2, SO2 and NO2, the government is suggested to enhance tax bases instead of increasing tax rate. Employing direct and indirect green tax is a good revenue for the government and the environment and public health are also protected.
- Considering the negative, significant coefficient of GDP2, a reversed U shape relationship is confirmed. Therefore, increasing economic growth may prevent the nature being harmed by this growth.
- Since the effect of POP on pollutant emission is positive and significant, modifying population consumption latter may be helpful.

- Respecting the significant impact of R&D it can be said that research and development reduces mentioned pollutants. Hence, governments and organizations are suggested to spend more money on strategies of pollution reduction and support applied research in this field.
- Considering the negative, significant relationship between DF and pollutant emission, it is concluded that business freedom improves technologies and leads to production with higher standards and, consequently to reduction of pollutant gases.

Results of this paper demonstrate the positive effect of business volume expansion on environment quality. Thus, it can be said that the hypothesis of pollution shelter in Iran is rejected; business development prevents pollutant technologies from entering the country and it is suggested to enact more strict limitations for entrance of pollutant technologies and goods.

ACKNOWLEDGMENTS

None.

ETHICAL CONSIDERATION

Authenticity of the texts, honesty and fidelity has been observed.

AUTHOR CONTRIBUTIONS

Planning and writing of the manuscript was done by the authors.

CONFLICT OF INTEREST

Author/s confirmed no conflict of interest.

COPYRIGHT

THIS IS AN OPEN ACCESS ARTICLE DISTRIBUTED UNDER THE TERMS OF THE CREATIVE COMMONS ATTRIBUTION (CC BY 4.0)

REFERENCES:

Asadi, M. 2008. Costs of air pollution losses and necessity of green tax. Period 16, Issue 3. (In Persian)

Amin Rashti, N. 2005. Green taxes with an emphasize on gas consumption. Thesis for PhD in Economy. Islamic Azad University, Science and Research Branch, Tehran. (In Persian)

Paytakhti, A., Nahidi, M. 2007. Environmental taxes (Green tax): theoretical principles, experiences. 6th conference on agricultural economy. (In Persian)

Pajuyan, J., Lashkarzade, M. 2009. Investigating effective factors on the relationship between economic growth and environmental quality. Quarterly of Iranian Economic Research. Year 14. Issue 42. pp 169 – 188. (In Persian)

Choopani, M. H. 2009. . Environmental pollutants and environmental protection. Publications of human resource training and equipment of National Iranian Gas Company. (In Persian)

Nejad Fahim, R., Eghdami, E. 2011. Gren tax in the path of sustainable development. Monthly of investigating economic issues and policies, Issues 3 and 4. 91 – 100. May – June 2011. (In Persian)

Milani, A., Mahmoodi, A.R. 2010. Environmental tax and its allocative effect (case study: Iran Oil Products). Tax Research paper. Period 18. Issue 8. 153- 176. (In Persian)

Moghimi, M., Shahnooshi, N., Daneshvar, M., Danesh, S., Akbari Moghadam, B. 2011. Examining well-fare and environmental effects of green tax and reduction of fuel subsidy in Iran using computable general equilibrium. Agricultural economy. Issue 75. pp 79 – 108. (In Persian)

McMoran, Nelor, D. 2003. Tax policies and the environment: Theory and application. Translated by: Fereshteh Haj Mohammadi. College of economy.

Anonymous, B. (2004) "Developing Green Taxation", Summary of a Government Assignment Report 5390.

D'Haultfoeuille, X. and Durrmeyer, I. and Février, P., (2013), "The Effect of Public Policies on Consumers' Preferences: Lessons from the French Automobile Market," Discussion Paper Series of SFB/TR 15 Governance and the Efficiency of Economic Systems 422, Free University of Berlin, Humboldt University of Berlin, University of Bonn, University of Mannheim, University of Munich.

Edenhofer, Ottamar, and Matthias Kalkuhl. (2011), When do Increasing Carbon Taxes Accelerates Global Warming? A Note on the Green Paradox." Energy Policy, 39(4):2208–2212.

Erkki, H. and Werner, S (2000) Green Tax Reform and Competitiveness, German Economic Review, 2, 19-30.

Grossman, G. M, and Krueger, A. B. (1993). Environmental Impacts of a North American Free Trade Agreement, in the U. S.-Mexico Free Trade Agreement, P. Garber, and ed. (Cambridge, MA: MIT Press,

Grossman, G.M., Krueger, A.B., (1995), Economic growth and the environment. Q. J. Econ. 110, 353–377.

Hwan Bae, J. and Shortle, J. (1995), the Welfare Consequences of Green Tax Reform in Small Open Economies, Department of Agricultural Economics and Rural Sociology the Pennsylvania State University

Liang, C. Lovejoy, S. and Lee, J. (1998), Green Taxes: Impacts on National Income, Social Welfare, and Environmental Quality, Department of Community Development and Applied Economics, the University of Vermont, Burlington, Vermont.

Mayeres, I. And Stelf, P (2001), Marginal Tax Reform, Externalities and Income Distribution, Journal of Public Economics.

Oueslati, Walid. (2013), Short and Long-term Effects of Environmental Tax Reform, FEEM Working Paper No. 9.

Pesaran, M.H., Shin, Y., Smith, R.J., (2001), Bounds testing approaches to the analysis of level relationships, Journal of Applied Econometrics. No.16, pp. 289-326. (In Persian)