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Studying the Effect of Green Tax on Fossil Energies Consumption (Gasoline, Natural gas and Oil gas) in Iran Using Recursive Dynamic Computable General Equilibrium Model (RDCGE)

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Extended Abstract

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Introduction

Recently move to economic development without energy is impossible. Energy is a source of national income while a key production factor in developing countries. Therefore, energy has a key role in development of these countries (Wesseh and Lin, 2018). On the other hand, irregular energy consumption especially fossil fuels in order to reach the economic growth and weak efficiency of energy consumption causes to environment pollution (Oueslati, 2015 and Moller, 2017). According to World Health Organization (WHO) statistics, air pollutants cause to 3.7 million persons morality which 65% is related to Asia (WHO, 2017). Also, according to Health Effects Institution (HEI) report, more than 90% of world's population lives in regions with non-health air (HEI, 2017). In addition, greenhouse gas and air pollutants emission increased from 535.31 million tons in year 2008 to 598.96 million tons in 2016 (Iran's energy balance sheet, 2016). According to above issues and due to the increasing negative external effects of fossil energy consumption such as air pollution and its hazardous effects on economy, environment and social health, it is necessary that government reduce these harmful damages trough the economic motivations such as green taxes. This type of tax which levied on various environmental pollutants doesn't damages the efficiency and increase social benefit due to pollution cost reduction. Therefore, this type of taxes called green tax. In addition, green taxes levied on cost base, hence have vast range and could provide suitable revenue for government, thus could substitute with other tax bases (Torki and Dahmardeh, 2018). On the other hand, green taxes have vast socio-economic effects, hence studying and predicting probable effects of levying tax policies is essential.

Objectice

In this research the effects of levying environmental tax through the various scenarios (base, 5%, 10% and 20%) on Iran's fossil fuels consumption will study using RDCGE approach. The rest of this paper is arranged as follows: Section 2 provides a survey of the related literature. Section 3 represents the method. Section 4 presents the results. Finally, section 5 concludes.

Data/Methodology

In this study we model the effects of positive shock of economic growth on Iran's fossil fuels consumption (oil gas, natural gas and gasoline) through the various scenarios of levying environmental taxes (base (0%), 5%, 10% and 20%). For this purpose we apply a Recursive Dynamic Computable General Equilibrium (RDCGE) model. Figure 2 represents a conceptual framework of CGE model:

Results/Findings

According to last report of International Energy Agency (IEA), the world's energy consumption has been totally 9383.6 MT crude oil equivalents and between various sectors and various energy resources, industry sector (28.91%) and oil processes (40.71%) have the highest share (IEA, 2017). Table 2 indicates the World's energy consumption separated by sectors and energy resources:

In addition, according to last report of International Energy Agency (IEA), the world's air pollutants have been totally 554437.7 MT CO_2 equivalents and between various regions and various air pollutants resources, Asia and Ocean region (43.47%) and CO_2 (75.84%) have the highest share (IEA, 2017). Table 3 indicates the World's pollutant gases emission separated by different regions:

Also, according to last statistics of Iran's energy balance sheet, Iran's energy consumption has been totally 187.4 MT crude oil equivalents and between various sectors and various energy resources, residential sector (29.62%) and natural gas (55.10%) have the highest share (Iran's energy balance sheet, 2016). Table 4 indicates the Iran's energy consumption separated by sectors and energy resources:

Furthermore, according to last statistics of Iran's energy balance sheet, the Iran's air pollutants have been totally 598.96 MT CO_2 equivalents and between various sectors and various air pollutants resources, power generation (28.85%) and CO_2 (97.80%) have the highest share (Iran's energy balance sheet, 2016). Table 5 indicates the Iran's pollutant gases emission separated by sectors and pollutants:

Also, world's average energy intensity which indicate that how much energy have been used for producing a certain value of goods or services and calculate through marginal consumption divided by GDP, is equal to 0.11 ton crude oil equivalent per thousand dollars, while Iran's energy intensity is 3 times of world's average energy intensity (IEA, 2017). Figure 2 indicates the Iran's energy intensity trend in during 2008-2016:

Finally it is concluded that the situation of energy consumption and environment are not suitable which causes to drop the Iran's environmental performance index (EPI) from 83 in the year 204 to 105 in the year 2016 between 180 countries. Therefore, environmental tax levying could be a useful instrument for managing the energy and environment in Iran.

Implications

Observations indicate that the situation of energy consumption and environment are not suitable which causes to drop the Iran's environmental performance index (EPI) from 83 in the year 204 to 105 in the year 2016 between 180 countries. Hence, environmental tax levying could be a useful instrument for managing the energy and environment in Iran. Therefore, in this study the effect of environmental taxes on Iran's energy consumption was studied. For this purpose, the effects of positive shock of economic growth on Iran's fossil fuels consumption (oil gas, natural gas and gasoline) through the various scenarios of levying environmental taxes (base (0%), 5%, 10% and 20%) was modeled using a Recursive Dynamic Computable General Equilibrium (RDCGE) approach. In order to calibrating RDCGE model, the Iran's SAM (2011) and base scenario (levying 0% environmental tax) was used. Results indicate that in scenarios of levying 0%, 5%, 10% and 20% environmental tax on natural gas (NG), a positive shock of economic growth (1%), increases the NG consumption up to 1.21%, 1.09%, 0.97% and 0.81%, respectively. Therefore, levying environmental tax more than 10% on NG, makes its consumption efficient (energy intensity<1). Also, in scenarios of levying 0%, 5%, 10% and 20% environmental tax on gasoline (GA), a positive shock of economic growth (1%), increases the

GA consumption up to 1.18%, 1.10%, 1.02% and 0.91%, respectively. Therefore, levying environmental tax more than 20% on GA, makes its consumption efficient (energy intensity<1). In addition, in scenarios of levying 0%, 5%, 10% and 20% environmental tax on oil gas (OG), a positive shock of economic growth (1%), increases the OG consumption up to 1.12%, 1.07%, 0.98% and 0.88%, respectively. Therefore, levying environmental tax more than 10% on OG, makes its consumption efficient (energy intensity<1). Finally it is suggested to Iran's energy and environment respondents to levy the calculated environmental tax rates of present study on fossil fuels.

Key words: Energy consumption, Impulse Response Functions (IRF), Recursive Dynamic Computable General Equilibrium model (RDCGE)