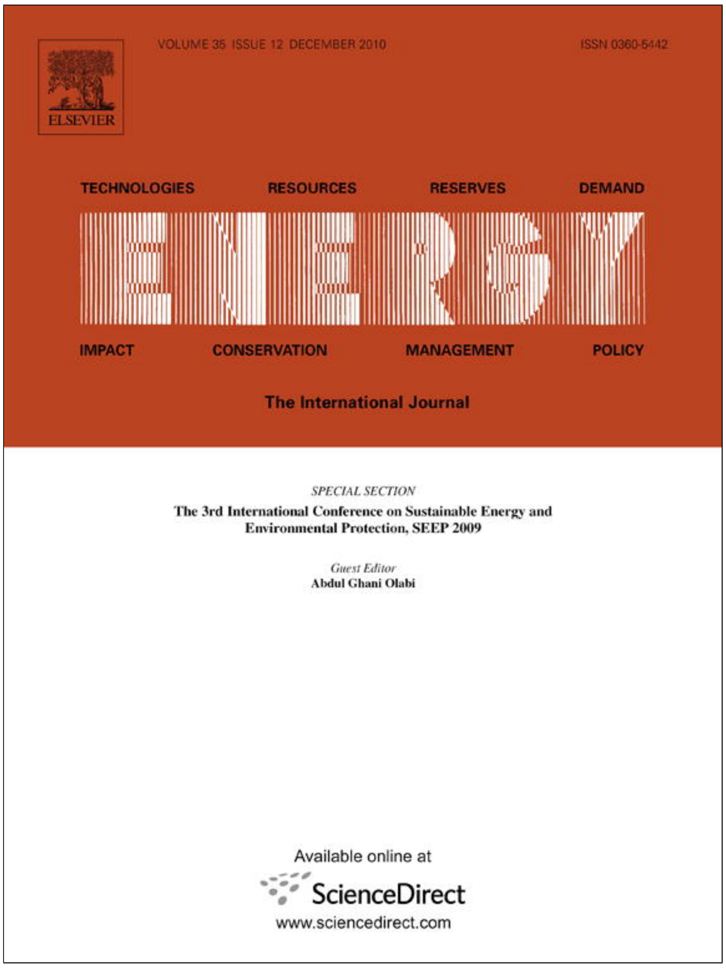
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Economic growth, CO_2 emissions, and fossil fuels consumption in Iran

Mohammad Reza Lotfalipour*, Mohammad Ali Falahi, Malihe Ashena

Department of Economics, Ferdowsi University of Mashhad, Mashhad, Iran

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A B S T R A C T

Environmental issues have attracted renewed interest and more attention during recent years due to climatic problems associated with the increased levels of pollution and the deterioration of the environmental quality as a result of increased human activity. This paper investigates the causal relationships between economic growth, carbon emission, and fossil fuels consumption, using the relatively new time series technique known as the Toda-Yamamoto method for Iran during the period 1967–2007. Total fossil fuels, petroleum products, and natural gas consumption are used as three proxies for energy consumption. Empirical results suggest a unidirectional Granger causality running from GDP and two proxies of energy consumption (petroleum products and natural gas consumption) to carbon emissions, and no Granger causality running from total fossil fuels consumption to carbon emissions in the long run. The results also show that carbon emissions, petroleum products, and total fossil fuels consumption do not lead to economic growth, though gas consumption does.

1. Introduction

During the last decade, an unprecedented state of global warming has been witnessed. Many scientists have argued that increasing levels of carbon dioxide (CO_2) emissions as a greenhouse gas, significantly contribute to the warming of global temperatures and climactic instability (IPCC [1]). Climatic problems associated with the increased accumulation of pollution affecting the world economy have been assessed intensively by researchers since 1990. The combustion of fossil fuels is the largest contributor to CO_2 emissions. During the period 1967–2007, the final fossil fuel consumption increased by about 617%, and CO_2 emissions sharply increased by about 610% in Iran.

The main reason for studying CO_2 emissions is that they play a focal role in the current debate on environment protection and sustainable development. A recent study (Bacon and Bhattacharya [2]) found that CO_2 accounts for as much as 58.8% of total greenhouse gas emissions. Since some of the growth in CO_2 emissions is attributed to economic growth, the authors conclude that reduction in CO_2 at the cost of economic growth, especially in developing countries, may not necessarily be a desirable outcome. Another reason is that CO_2 emissions are directly related to the energy consumption, which is an essential factor in the world economy, both for production and consumption. Therefore, the relationship between CO_2 emissions and economic growth has important implications for an appropriate joint economical and environmental policy.

It is presumed that income causes environmental changes and not vice versa. But it is being asserted that the nature and direction of causality may vary from one country to the other. As far as the cause–effect relationship between emission and income is concerned, there are two alternative relations. The first one regards income as the cause and may be interpreted as the *engel cure* for emission (which is regarded as a *bad* item from the point of view of *consumer preferences*). The second relationship regards emission as the *cause* and income as the *effect* variable. This may be considered as a production relation, so that emission is an *essential* input for income generation (Coondoo and Dina [3]).

Economic development is closely related to energy consumption, since more the energy consumption, higher is the economic development. However, it is also likely that expansion of economic development could result in more efficient use of energy, and thus a reduction in energy consumption. Therefore, energy consumption and economic development may be jointly determined, and the direction of causality cannot be determined *a priori*. It can be observed that energy consumption has a direct impact on the level of environmental pollution, and there is a strong correlation between fossil energy use, CO_2 emissions, and economic activities.

The above discussion highlights the importance of the link between CO_2 emissions with economic growth and fossil fuels

* Corresponding author. Tel.: +9805118813090; fax: +9805118829584.
E-mail addresses: lotfalipour@um.ac.ir (M.R. Lotfalipour), falahi@um.ac.ir (M.A. Falahi), ml.ashna@yahoo.com (M. Ashena).

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consumption. Hence, to avoid problems of misspecification, these relationships are tested under the same framework (Ang, [4,5]).

Whether energy consumption and carbon emissions stimulate, retard, or are neutral to economic activities, has motivated interest among economists and policy analysts to investigate the direction of causality among these variables. The empirical outcomes of the subsequent studies on this subject, which differ in terms of the time period, various characteristics of the considered economy, econometric techniques, and the proxy variables used in the estimation, have reported mixed results and are not conclusive to present policy recommendation that can be applied across countries. Depending upon the direction of causality, the policy implications can be considered from the point of view of energy conservation, emission reduction, and economic performance.

This study investigates the existence of causality among economic growth, fossil fuels consumption, and carbon emissions in Iran using the Toda and Yamamoto [6] approach. Three proxies of energy namely, total fossil fuels, petroleum products, and gas consumption are considered in separate models. A country-specific case study can capture and account for the complexity of the economic environment and history of an individual country. The choice of Iran as the country chosen for this study is also motivated by the fact that Iran has experienced a significant rise in fossil fuels consumption and carbon emissions in the recent decade, and no known study has been conducted to examine the relationship among output, energy consumption, and pollutant emissions in Iran. According to the human development report [7], Iran was ranked as the 13th energy-related CO_2 emitter in the world.

The paper is organized as follows. In Section 2, we present a review of the literature. Section 3 presents data description and the used econometrics procedure. The estimation results are covered in Section 4. Section 5 represents conclusions.

2. Review literature

Three research strands in the literature on economic growth, energy consumption, and environmental pollutants can be considered. The first strand mainly concentrates on the environmental pollutants and output nexus. They specially examine the environmental Kuznets curve (EKC), which is an inverted-U shaped curve and implies that, starting from low levels of income per capita, environmental degradation increases, but after a certain level of income (turning point), it diminishes. Ever since the original empirical study by Grossman and Krueger [8], an increasing body of literature has tested the nexus between economic growth and environmental pollution. Some studies have found evidence supporting the existence of an EKC for CO_2. Examples include Shafik and Bandyopadhyay [9], Seldon and Song [10], Holtz-Eakin and Selden [11], de Bruyn and Opschoor [12], Panayotou [13], Unruh and Moomaw [14], Galeotti and Lanza [15], Agras and Chapman [16], Friedl and Getzner [17], Dinda and Coondoo [18], Coondoo and Dinda [19], and Managi and Jena [20].

In contrast, other studies have found direct evidence that supports a strictly monotonic relationship between GDP/capita and CO_2. Examples include Shafik [21], Cole et al. [22], de Bruyn et al. [23], Roca et al. [24], and Coondoo and Dinda [19]. The EKC model is criticized for its lack of feedback from environmental pollutants to economic output (Arrow et al. [25], Hung and Shaw [26]). Samples of studies incorporating trade as a variable in testing the EKC hypothesis include Grossman and Krueger [8], Suri and Chapman [27], and Nohman and Antrobus [28]. Stern [29] and Dinda [30] provide extensive review surveys of these studies.

The second strand of the research is related to energy consumption and economic growth. This nexus suggests that economic growth and energy consumption may be jointly determined and the direction of causality may not be determined *a priori*. Starting with the study of Kraft and Kraft [31], an increasing number of studies have assessed the empirical evidence employing Granger causality and cointegration model, which present inconclusive evidence. Examples of this line of research include Masih and Masih [32], Cheng and Lai [33], Glasure and Lee [34], Asafu-Adjaye [35], Stern [36], Soytas and Sari [37], Paul and Bhattacharya [38], Wolde-Rufael [39], Mehrara [40], and Narayan and Smyth [41] that mainly focus on the cointegrating relationship between income and energy consumption. Additionally, some researches include Seifritz and Hodgkin [42], Yoo and Kim [43], and Lee and Chang [44] have considered the possibility of nonlinear effect of energy consumption on economic growth.

Finally, a combined approach of these two streams has emerged in the recent literature, which enables the researchers to prove the validity of the both nexuses in the same framework. This approach facilitates the examination of the dynamic relationship among economic growth, energy consumption, and environmental pollutants altogether.

The causality results of Ang [4] support the argument that economic growth exerts a causal influence on energy use and pollution growth in the long run. The results also point to a strand of unidirectional causality running from growth of energy use to output growth in the short run. Ang [5] found that output growth Granger causes energy consumption in Malaysia. Also, weak unidirectional causality was found between CO_2 emissions and income in the long run. Soytas et al. [45] found no Granger causality between income and CO_2 emissions, and no Granger causality between energy use and income in the United States. But they found that energy consumption Granger causes the CO_2 emissions in the long run. Soytas and Sari [46] found the same link between income and CO_2 emissions in Turkey. Applying the testing bounds to the cointegration procedure in a multivariate model, Halicioglu [47] found that there is a bidirectional Granger causality between CO_2 emissions and income in Turkey. This result is conflicting with the conclusions of Soytas and Sari [46].

Applying a multivariate model of economic growth, energy use, carbon emissions, capital, and urban population, Zhang and Cheng [48] found a unidirectional Granger causality running from GDP to energy consumption and a unidirectional Granger causality running from energy consumption to CO_2 emissions in the long run in China. Chang [49] used multivariate cointegration Granger causality tests to investigate the correlations between carbon dioxide emissions, energy consumption and economic growth in China. The results of the study show that Economic growth induces a higher level of energy consumption and CO_2 emissions with a feedback effect. This result is conflicting with the conclusions of Zhang and Cheng [48]. The empirical results of Gosh [50] fail to establish long run equilibrium relationship and long term causality between carbon emissions and economic growth; however, there exists a bidirectional short run causality between them. This study also establishes a unidirectional short run causality running from economic growth to energy supply and energy supply to carbon emissions.

In all the research strands, there are a limited number of examples that examine the above-considered nexuses in Iran. Zamani [51] examined the causal relationship among overall GDP, industrial and agricultural value-added, and consumption of different kinds of energy using vector error correction model for the case of Iran during 1967–2003. A long run unidirectional relationship from GDP to total energy and bidirectional relationship between GDP and gas as well as GDP and petroleum products consumption for the whole economy was discovered.

A wide range of econometric techniques and procedures have been utilized to test the validity of the relation between output-energy and output-environmental pollutants. The results and

Fig. 1. Time series plot of per capita real GDP 15.

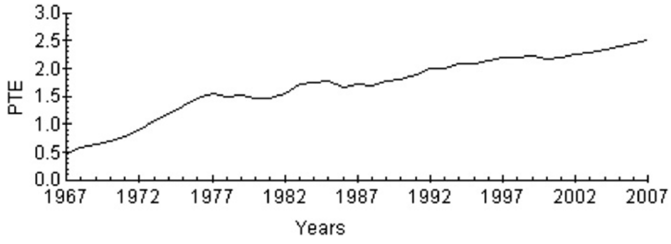

Fig. 3. Time series plot of per capita total fossil fuels consumption 15.

implications of these studies clearly depend on the underlying variables, data frequency, and the development stages of a country. The existing literature reveals that findings of the empirical studies differ substantially and are not conclusive.

3. Data and econometric methodology

3.1. Data

The annual data of per capita real gross domestic product (PGDP), per capita of CO_2 emissions (PCO_2), and per capita fossil fuels consumption are used for the period 1967–2007. Total fossil fuels consumption (PTE), consumption of petroleum products (PEN), and natural gas consumption (PNG) are used in separate models as three proxies for energy consumption. CO_2 emissions measured in metric tons are obtained from the data base of the Carbon Dioxide Information Analysis Center, Oak Ridge National Laboratory [52]. Real GDP series, measured in billions of constant 1997 prices, are drawn from the national accounts of Iran. Final consumption of the total energy, petroleum products, and natural gas in terms of million barrel oil equivalents were obtained from the Energy Balances.

Dividing by population, the data are asserted in terms of per capita, and then the series are transformed into logarithms. Figs. 1–5 show the series in natural logarithm. It is evident from Fig. 1 that the levels of per capita real GDP and per capita CO_2 emissions had been increasing, but declined dramatically in 1978. Per capita petroleum products consumption and natural gas have increased over time, though there have been some changes in their slope.

3.2. Unit root tests

Before proceeding TY process, unit root tests is required to obtain the maximal integration order of variables. The results of Augmented Dickey-Fuller (ADF) suggest that the total fossil fuel consumption and petroleum products are stationary in level in the case of Intercept and trend, and the other variables are found to be integrated of order one (Table 1).

As shown by Perron [53], tests that do not account for structural breaks may falsely fail to reject the unit root null hypothesis when the data generating process is trend-stationary with a one-time break. The figures indicate that it is reasonable to assume two exogenous structural breaks in the year 1978, due to the revolution followed by war in 1980. Therefore, Perron's model A and B were applied in order to capture a one-time change in PCO_2 and PNG and a change in the slope of PGDP.

$$y_t = c^A + \theta^A Du_t + \beta^A t + d^A D(TB)_t + \alpha^A y_{t-1} + \sum_{i=1}^{k} \gamma^A \Delta y_{t-i} + e_t \qquad (1)$$

$$y_t = c^B + \theta^B Du_t + \beta^B t + d^B DT_t + \alpha^B y_{t-1} + \sum_{i=1}^{k} \gamma^B \Delta y_{t-i} + e_t \qquad (2)$$

where y is the test variable, DU is a dummy variable having the value of 0 until the year of the structural break, and 1 from the following year onward, DT is a dummy taking the value of t for each year after the break and the value of 0 for all previous years, $D(TB)$ is another dummy taking the value of 1, one year after the break and 0 for all other years, and t is an $(0, \sigma 2)$ innovation series.

The results of Perron's unit root test for nonstationary variables (Table 2) indicate that the unit root hypothesis is rejected at the 5% level only for CO_2 emissions. Therefore, the results of the augmented Dickey-Fuller and Perron tests on each time series reveals that PGDP and PNG exhibit a unit root, while other variables are stationary.

3.3. Econometric methodology

Sims et al. [54] and Toda and Phillips [55] pointed out that in a system that contains unit roots, standard Wald statistics based on ordinary least-squares (OLS) estimation of level VAR model for testing coefficient restrictions have nonstandard asymptotic distributions and cannot be applied to mixed integration orders. Toda and Yamamoto [6] proposed a simple procedure requiring the estimation of an "augmented" VAR, even when the variables have different orders, which guarantees the asymptotic distribution of the MWald statistic. This method is applicable "whether the variables may be stationary (around a deterministic trend), integrated of an arbitrary order or cointegrated of an arbitrary order".

Therefore, the Toda-Yamamoto causality procedure has been labeled as the long run causality test of the coefficients of VAR. For this purpose, a VAR is estimated not with its "true" lag order (k), but with lag order of ($k + d$), where d is the maximum order of integration of the variables in the system. Then, the Granger causality is tested by performing hypothesis tests in the VAR, ignoring the

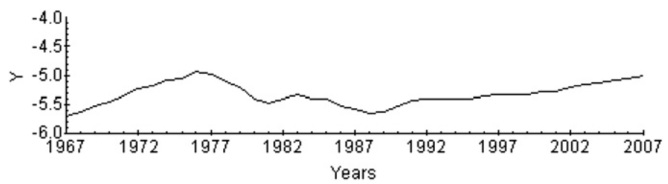

Fig. 2. Time series plot of per capita CO_2 missions 15.

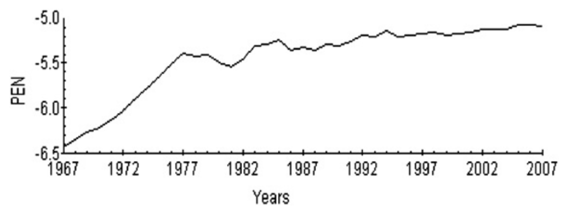

Fig. 4. Time series plot of per capita Petroleum products consumption 15.

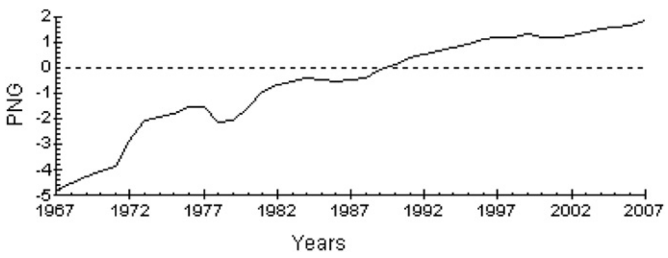

Fig. 5. Time series plot of per capita natural gas consumption 15.

additional lags. Based on this procedure, linear and nonlinear restrictions can be tested using standard asymptotic theory. The procedure is valid, since $k \geq d$. This method that avoids the low-power unit root and cointegration pretests has recently been applied in several causality studies.

Considering the augmented VAR(2)

$$\upsilon_t = \alpha + \beta\upsilon_{t-1} + \gamma\upsilon_{t-2} + e_{\upsilon t} \tag{3}$$

where Vt=$(x_1, x_2, x_3)'$, α is a (3×1) vector of constants, β, γ are (3×3) coefficient matrices, and e_{vt} denotes white noise residuals.

To affirm that x_2 does not Granger cause x_1, we will test the parameter restriction by constructing the usual Wald test based on least-squares estimates. The Wald statistic follows an asymptotic Chi-square distribution with degrees of freedom equal to the number of "zero restrictions". The augmented VAR approach (TY procedure) has a high power of testing in moderate to large samples (Zapata and Rambaldi [56]). Although, the fully modifiedVAR (FM-VAR; proposed by Phillips [57]) and ECM procedures are more powerful than the TY procedure, the actual size of the TY procedure-based test is stable for sample sizes and the FM-VAR and ECM procedures tend to have larger size distortion than TY procedure (Yamada and Toda [58]). Following Soytas et al. [42], Soytas and Sari [43], and Zhang and Cheng [45], we apply the TY procedure to examine the income–energy–environment nexus in Iran.

The TY procedure steps are as follows: (i) Finding the maximal order of integration (d) of variables by conducting unit root tests. (ii) Determining the optimum lag length (k) of a VAR. (iii) Estimating the lag-augmented VAR ($k + d$) model. (iv) Checking robustness of augment VAR($k + d$) by diagnostic tests (v). Conducting a Wald test on the first k parameters instead of on all parameters in the augment VAR($k + d$) model.

4. Empirical results of long run Granger causality

Given that all the series are not integrated of the same order, the TY procedure to test for Granger causality appears to be the appropriate method. We have determined the maximum order of integration (d) to be 1. The optimal lag length (k) based on Schwarz information criterion (SC) and adjusted LR test statistic is 1. We then estimate a system of VAR in levels with total lags of 2, employing the seemingly unrelated regression (SURE) framework as follows:

$$\begin{bmatrix} PCO2 \\ PGDP \\ PTE \end{bmatrix} = \beta_0 + \beta_1 \begin{bmatrix} PCO2_{t-1} \\ PGDP_{t-1} \\ PTE_{t-1} \end{bmatrix} + \beta_3 \begin{bmatrix} PCO2_{t-2} \\ PGDP_{t-2} \\ PTE_{t-2} \end{bmatrix} + \begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \end{bmatrix} \tag{4}$$

$$\begin{bmatrix} PCO2 \\ PGDP \\ PEN \end{bmatrix} = \beta_0 + \beta_1 \begin{bmatrix} PCO2_{t-1} \\ PGDP_{t-1} \\ PEN_{t-1} \end{bmatrix} + \beta_3 \begin{bmatrix} PCO2_{t-2} \\ PGDP_{t-2} \\ PEN_{t-2} \end{bmatrix} + \begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \end{bmatrix} \tag{5}$$

$$\begin{bmatrix} PCO2 \\ PGDP \\ PNG \end{bmatrix} = \beta_0 + \beta_1 \begin{bmatrix} PCO2_{t-1} \\ PGDP_{t-1} \\ PNG_{t-1} \end{bmatrix} + \beta_3 \begin{bmatrix} PCO2_{t-2} \\ PGDP_{t-2} \\ PNG_{t-2} \end{bmatrix} + \begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \end{bmatrix} \tag{6}$$

Two dummy variables were included due to the revolution and the war, but just the dummy for years of war (1980–1987) was significant. Since diagnostic test results do not seem to be pointing out serious violations of the common assumptions, we can proceed to the Granger causality test on the first k parameters on the other variable in the VAR ($d + k$).

The values of the adjusted R^2 are rather high and the explanatory power of all equations is robust. The diagnostic test results in Table 3 show that there are no serious violations of normality or heteroscedasticity assumptions. Only the Ramsey RESET tests for parameter instability indicate that parameter PCO_2 seems unstable for some equations. Hence, we can proceed with the Granger causality tests. The test results of Wald test statistic as well as its p-values are presented in Table 4.

The test results suggest that the null hypothesis of Granger non-causality from economic growth to CO_2 emissions in each system can be rejected. On the other hand, the hypothesis that CO_2

Table 1
Results of the Dickey-Fuller unit root test in levels and first differences.

Variables	Level		First differences	
	Intercept	Intercept and trend	Intercept	Intercept and trend
PCO_2	0.11(0)	−1.82(0)	−5.07(0)*	−5.68(0)*
PGDP	−1.7(1)	−1.66(1)	−3.25(0)*	−3.75(0)*
PTE	−0.49(0)	−5.44(2)*	−5.26(0)*	−5.13(0)*
PEN	−2.39(0)	−5.11(2)*	−6.01(0)*	−4.83(2)*
PNG	−3.35(6)*	−0.89(6)	−3.73(6)*	−7.96(5)*

Note: The number in parentheses indicates the appropriate order of lag lengths determined via SIC.
*denotes statistically significant at 5% level.

Table 2
Perron unit root test results.

Variable				
PCO_2	−3.88*	−3.85*	3.96*	−0.43
PGDP	−3	−2.69*	0.71	−0.18
PNG	−1.71	0.3	1.48	0.17

T = 40, $\lambda = 0.3$.
* denote rejection of the unit root hypothesis at 5% level, respectively.

Table 3
Diagnostic test results.

Equation	Adjusted	Serial Correlation	Functional Form	Normality	Heteroscedasticity
Model 1: economic growth, carbon emissions, and total fossil fuels					
PCO_2	0.91	0.19	14.09*	0.05	0.008
PGDP	0.89	0.64	0.79	1.54	0.003
PTE	0.98	0.008	0.17	2.65	0.73
Model 2: economic growth, carbon emissions, and petroleum products					
PCO_2	0.91	0.95	12.89*	0.85	0.16
PGDP	0.89	0.07	0.51	5.52	0.04
PEN	0.97	0.23	5.74*	2.32	0.03
Model 3: economic growth, carbon emissions, and natural gas					
PCO_2	0.92	0.03	15.66*	0.78	0.07
PGDP	0.90	3.21	0.04	1.44	0.20
PNG	0.98	1.5	2.19	15.56*	11.27*

A: Lagrange multiplier test of residual serial correlation is based on B-G test and null is no serial correlation. B: Ramsey's RESET test using the square of the fitted values is applied for functional form misspecification. Ramsey RESET test null is no specification errors and is conducted for one fitted term using LR. C: For Normality based on a test of skewness and kurtosis of residuals, J-B test null is normality. D: Based on the regression of squared residuals on squared fitted values test null is no heteroscedasticity.
* represent significance at the 5% respectively.

Table 4
Granger causality test results.

Equation	PCO_2	PGDP	PTE
Model 1: economic growth, carbon emissions, and total fossil fuels			
PCO_2	–	7.29(0.00) **	0.21(0.64)
PGDP	0.11(0.73)	–	0.11(0.74)
PTE	1.95(0.16)	9.21(0.02) **	–
Model 2: economic growth, carbon emissions, and petroleum products			
PCO_2	–	8.48(0.04) **	3.00(0.08) *
PGDP	0.56(0.45)	–	1.1(0.29)
PEN	0.67(0.42)	16.8(0.00) **	–
Model 3: economic growth, carbon emissions, and natural gas			
PCO_2	–	4.36(0.03) **	4.620.03) **
PGDP	0.24(0.62)	–	3.7(0.05) **
PNG	0.05(0.98)	0.12(0.72)	–

** and * represent significance at the 5% and 10%,.Significance implies that the column variable Granger causes the row variable.

emissions do not Granger cause economic growth cannot be rejected at the 5% significance level. Therefore, we find evidence that there is a unidirectional causality from economic growth to CO_2 emissions. This implies that the economic growth can be used as a leading indicator for future CO_2 emissions in Iran.

Furthermore, the test results suggest that we fail to reject the null hypothesis of Granger non-causality from total fossil fuels consumption to CO_2 emissions, but there is causality from natural gas and petroleum products consumption to CO_2 emissions. That is, an increase in petroleum products and gas consumption brings about an increase in CO_2 emissions. Non-granger causality from total fossil fuels consumption to CO_2 emission may be related to different emission factors of each kind of energy. CO_2 emissions associated with a certain fuel are given by the amount of fuel consumed, the average carbon content of the fuel, and the fraction of the fuel which is oxidized in combustion. This fraction in turn depends upon two factors: inefficiency of combustion plants and non-energy use of the fuel. There are differences in the computation of the above components for fuel types, and consequently aggregating emissions of all fuel types may cause emissions not to be in relation with total fuel.

Also, there is a unidirectional Granger causality running from real GDP to two energy proxies at the 5% significant level. That is, an increase in GDP will bring about an increase in total fossil fuels and petroleum products consumption, but not vice versa. Therefore, reducing energy consumption, especially the consumption of fossil fuel, seems to be an active way to reduce carbon emissions and the government of Iran can pursue conservative energy policy in the long run without impeding economic growth. This result is slightly different from that of Zamani [46] for Iran. Considering natural gas in the model, a unidirectional causality from natural gas consumption to economic growth is evident. The result of this paper is consistent with the empirical result of Ang [4] for France, Zhang and Cheng [48] for China, but differs from that of Soytas and Sari [46] for Turkey and Gosh [50] for Indea.

5. Conclusions

One option to reduce greenhouse gas emissions is through the reduction of energy consumption. However, such measure may lead to a negative impact on economic growth. Hence, depending upon the nature of long term relationship among carbon emissions, energy consumption and income, different countries may resort different strategies to fight against global warming.

This paper investigates the causal relationships among economic growth, carbon emission and fossil fuels consumption, using the relatively new time series technique known as the Toda-Yamamoto method for Iran during the period 1967–2007. Total fossil fuels, petroleum products and natural gas consumption are used as three proxies for energy.

Empirical results from Iran suggest a unidirectional Granger causality running from GDP and two proxies of energy consumption (petroleum products and gas consumption) to CO_2 emissions, but there is no Granger causality between total fossil fuels consumption and CO_2 emissions. Hence, reducing energy consumption seems to be an active way to reduce CO_2 emissions. Furthermore, evidence shows that CO_2 emissions, petroleum products and total fossil fuels consumption do not lead to economic growth, but gas consumption does. The finding of a unidirectional causality from output growth to growth of energy consumption in the long run implies that Iran is an energy-independent economy.

As a result, if in the course of development, a country is able to substitute conventional fossil fuel by alternative energy resources having less emission, since energy is not a stimulus for economic development, the implementation of energy conservation policies would not affect economic performance or retard economic development. The empirical findings of unidirectional Granger causality from real GDP to total fossil fuels and petroleum products consumption in the long run implies that the government of Iran can implement conservative energy policy and carbon emissions reduction policy without impeding economic growth in the long run. Although Iran has no commitment to reduce greenhouse gas emissions, energy-efficient investments and emission reduction policies will not hurt economic activities and can be a feasible policy tool for Iran.

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