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Industrial Growth and Sustainable Development in Iran

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Abstract

This study aims to measure how much the industrial sector suppresses the development process to be sustainable in Iran. We employ a quadratic-log form of regression model to test the Industrial Environmental Kuznets Hypothesis. In addition, we use a Vector Auto-Regressive model to estimate the nexus among the industrial growth, income inequality, environmental pollution, and energy consumption in Iran during 1971 and 2014. The results confirm the Industrial Environmental Kuznets Hypothesis. Moreover, they show that all the three variables present the same response to the shock in the industrial growth since all the responses are increasing. It provides preponderance of evidence for the incompatibility of industrial growth with social, environmental, and resource development in Iran. This sector should be modified, improved, and reconstructed to pave the way for harmonization among the quadruple layers of sustainable development including industrial growth, environmental quality, social satisfaction, and optimal usage of resources. The policy-makers are advised to consider the sustainability properties in their development strategies as the development process evolves comprehensively.

Keywords: Industrial EKH, Sustainable Development, Environmental Pollution, Income Inequality, Energy Consumption.
JEL Classification: O14, Q56, Z13.

1. Introduction

Many researchers believe that the industrialization is a material success, albeit a social and environmental failure (Genevey, 2013; Wilkinson and Pickett, 2011). Industrialization plays a key role in the economic development of the countries through economic growth, specifically in the developing economies. Based on the Engine of

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Growth Hypothesis, there is an empirical correlation between industrialization degree and per capita income level in these countries (Kaldor, 1966, 1967; Szirmai and Verspagen, 2015; Cantore et al., 2017). Take the oil industry of Iran for example which is a hive of activity in this economy, the more it grows up, the more the economy flourishes (Taghvaee and Hajiani, 2016). In spite of these material success, industrialization can be considered as a social, environmental, and resources failure.

Since the industrial revolution, it is the level of industrialization which plays an extremely positive role in the development of countries but after many years it shows some side-effects such as income inequality, environmental pollution, and highly excessive consumption of energetic resources. In turn, they prevent the development trend to go upward since it is a fully comprehensive concept rather than merely an economic one (Antoci et al., 2018). Then "Sustainable Development" for the first time is defined in the

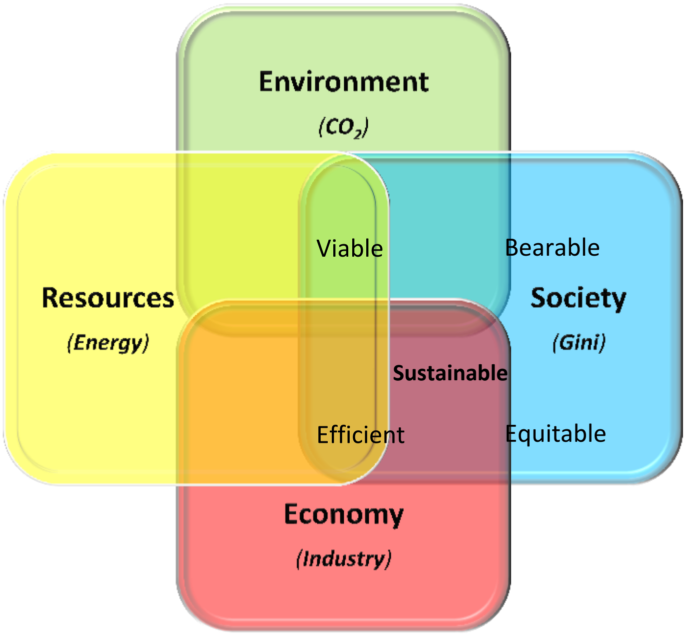

Figure 1: Quadruple-layer of Sustainable Development
Source: Cato, 2009[1]

1. The original design of the figure 1, Cato (2009) has three elements including economy, environment, and society, while we add another element, technology, to show the sustainability in a quadruple-layer form.

Brundtland Report as the "development that meets the needs and aspirations of the present without compromising the ability of future generations to meet their own needs" (Keeble, 1988). It makes the sustainability concept to rise as a genetic trait of development which covers not only the economic challenges but also the social, environmental, and resources matters.

According to Figure 1, the sustainable development is considered as a quadruple-layer of resources conservation, environmental stewardship, economic growth, and social inclusion, ignorance of which leading to inefficiency, non-viability, unbearableness, , and inequity in the development process (World Bank[1]; Ward and Dubos, 1983; Erzurumlu and Erzurumlu, 2015). Although the researchers represent the sustainability as a triple-layer of environmental, social, and economic affairs until now, we add the resources conservation as a key factor to make the sustainable development as a quadruple-layer which is the novelty of the study (Giddings et al., 2002).

By ignoring the environmentally developmental issues, a society is neither bearable nor viable. It is unbearable since people are unable to continue living without clean air, food, water, etc. It is not viable due to the climate change and global warming which are the dire warning about the environmental pollution. In case of irrespective of the warning, the environmental systems would collapse soon, ceasing the economic growth and development process. This proposes the environmental pollution as a culprit of unbearableness and non-viability in the development process. (Adams, 2006; Halati and He, 2018)

By ignoring the socially developmental issues, a society is neither equitable nor bearable. It is inequitable since the people suffer from the unfair discrimination in income, welfare, social services, etc. It is unbearable since these people with such discrimination rebel against authorities, leading to system failure. This proposes the income equality as a cause of equitability and bearableness in the development process. (Erzurumlu and Erzurumlu, 2015; Nikolaou and Tsalis, 2018).

By ignoring the issues of resources conservation in development process, a society is neither efficient nor viable. It is not efficient

1. World Bank website, Retrieved from
http://www.worldbank.org/en/topic/sustainabledevelopment/overview#1

owing to the extravagancy of the users with the resources for the increment of production and profit level, in case of no conservative policy for the resource use. Take the price increase as a conservative policy for example. It makes the economic firms to use more energy-efficient technology in order to reduce the costs. (Jafari and Baratimalayeri, 2008; Taghvaee and Hajiani, 2014) It is not viable because the environment has a limited capacity beyond which the natural resources are depleted, if not exhausted completely, especially the energy resources such as fossil fuels. This proposes the energy consumption as a cause of inefficiency and non-viability in the development process.

As a result, the sustainable development is a constitutionally quadruple framework: a) environmental, b) social, c) resources, and d) economic development, which identify environmental pollution, energy consumption, income inequality, and economic depression as the culprits of non-viability, inefficiency, unbearableness, and inequity in the development process. So the following paragraphs explain the relationship of industrial growth with environmental pollution, income inequality, and energy consumption from the sustainably developmental view point.

2. Literature Review

2.1 Income Equality and Industrial Growth

Income equality can be the social failure of the industrialization. As the social dimension of the sustainable development, it is effected by the industrial growth. Owing to the claim of Growth Engine Hypothesis for positive role of industrial growth in the economic growth, it might heighten the income inequality, especially in the developing countries, located in the left-hand-side of the Kuznets curve (Kaldor, 1966, 1967; Li et al., 2015; Szirmai and Verspagen, 2015). Further, the oil industry growth might indirectly disturb the income distribution in a society. Based on the hypotheses of “Resource Curse” or “Paradox of Plenty”, oil industry with its high income is an adequate source for the authorities to cover the governmental expenditure, ignoring the other possible income sources such as tax. Iran as an oil-exporting country can be considered as a rentier state which concentrates on the income from natural resources such as oil, gas and mineral products while it ignores taxation system as another income source, leading to inefficiency in the customs and social security systems (Bornhorst et al., 2009). Disturbance in the taxation system, in turn, causes malfunction of income distributional system. Owing to the concentration of Iran industry on the oil and gas, the industrial growth might increase the income inequality in the country. Inequality in income paves the way for differences in the other aspects of life quality such as health and education (Genevey, 2013). The countries with more unequal income show the lower level of health and life expectancy and higher rate of crime (Wilkinson and Pickett, 2009). However, Kuznets in 1955 claims that although the economic growth and income inequality nexus is positive in the earlier stages of growth, it, afterward, reverses to a negative one in the subsequent stages. In the other words, in the higher stages of growth the more economy grows the more inequality reduces (Facchini and Couvreur, 2015; Taghvaee and Parsa, 2015). Therefore, industrial growth affects the level of income inequality.

2.2 Environmental Pollution and Industrial Growth

Environmental pollution can be the environmental failure of the industrialization. As the environmental dimension of the sustainable development, it is effected by the industrial growth. Based on the Environmental Kuznets Hypothesis, industrial activities increase the environmental pollution in the developing countries, albeit the positive effects on the economic growth (Dong et al., 2016). The fossil-fuel-based economies, like Iran, are dangerous for the environment from two points of view, production and consumption. Clearly the production of fossil fuel products is extremely poisonous, for example the refinery plants emit a highly large amount of greenhouse gases; and they produce non-recyclable liquids. Moreover, the high level of fossil fuel products decreases the price level which, in turn, leads to the increase in demand (Taghvaee and Hajiani, 2014); it is how Iran economy pollutes the environment through the consumption channel. However, the Environmental Kuznets Hypothesis claims that industrial activities deteriorate the environmental pollution level in the developed countries by developing more efficient technologies with lower rate of energy consumption. Therefore, industrial growth affects the level of environmental pollution (Taghvaee and Parsa, 2015).

2.3 Energy Consumption and Industrial Growth

Energy consumption, as the natural resource dimension of the sustainable development, is effected by the industrialization. On the one hand, industrial activities increase the level of energy consumption (Shahbaz and Lean, 2012; Taghvaee, et al., 2017). Especially it can be experienced in the countries with energy-based industries such as oil industry in Iran. On the other hand, industrial growth might decrease the amount of energy consumption (Li and Lin, 2015). Since it is consistent with the higher efficiency and proficiency, it can play a positive role in reducing the energy consumption degree. Therefore, industrial growth affects the level of energy consumption. In the light of the above-mentioned facts, there might be conflicting relationship among industrial growth, on the one hand, and development in society, environment, and resource on the other hand.

Iran, as a developing country, follows the industrial activities seriously, notwithstanding the social, environmental, and resources concomitants. The industrial growth can be a threat to the social equality in Iran, based on the Kuzents Hypothesis as the more economy grows, the more income inequality grows in the developing countries (Kaldor, 1966, 1967; Szirmai and Verspagen, 2015. Moreover, the industrial growth is threat to the environment of the country. Due to the relative advantage of Iran in the fossil fuel energies like oil and gas, the price is low in these markets, raising both the demand and supply level. This relative advantage paves the way for the energy-consuming industries like petrochemical ones to grow which are extremely pollutant. Undoubtedly, energy consumption and product are pollutant, endangering the environment of Iran seriously (Jafari and Baratimalayeri, 2008; Taghvaee and Hajiani, 2014). The last but not the least important one is the resources like oil and gas reserves, being depleted rapidly which would be formidable obstacle to more economic growth. As a result, the industrial growth in Iran cannot expand in the long run, if it is not compatible with the sustainable development criteria and the development process of Iran would collapse soon, requiring serious attention from economists, environmentalists, jurists, socialists, and governors.

The main question of this study is whether the industrial growth of Iran is compatible with the sustainable development or not. In another word, this study aims to measure how much the industrial sector suppresses the development process to be sustainable in Iran. By answering this question is helpful for the policy-makers on whether they should consider the sustainably developmental issues more seriously in their comprehensive decisions or their current strategies are well adopted to keep the development as a sustainable process. This study is to analyze the question from four perspectives of environmental pollution, income inequality, energy consumption, and industrial growth.

3. Data

The period of study is within 1971-2014 due to the unavailability of data. This study employs the following databases: Energy Balance Sheet of Iran in various years for Carbon Dioxide emissions and the Time Series Database of the Central Bank of Iran for GINI coefficient, energy consumption, and value added of industrial sector. Carbon Dioxide emission is the proxy for the environmental pollution, measured in thousand tons and derived from the: Energy Balance Sheet of Iran in the various years. All the other data are come from the Central Bank of Iran. GINI coefficient as the proxy for the income inequality, is between 0 and 100. The greater the GINI coefficient is, the higher is the income inequality. Energy consumption is the proxy for the usage of resources which is measured in Kilogram of Oil Equivalent. The Value Added of Industrial Sector is the proxy for the industrial growth, measured in Billion Rial of Iran with the constant 2004 prices of Rial of Iran. All the data are transformed into the natural logarithm.

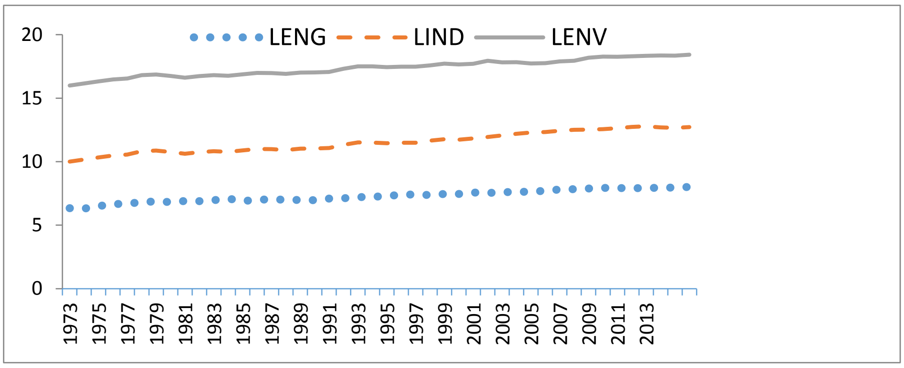

Figure 2: Trends of Value Added in Industry, Energy Consumption, and CO2 Emissions in Natural Logarithm in Iran during 1971 and 2014

Figure 2 indicates the trends of value added of industry, energy consumption, and CO2 emissions in natural logarithm in Iran during 1971-2014. The energy consumption and CO2 emissions are relatively running parallel with the value added in industry. Energy consumption is not only parallel with the value added in industry but also this is completely accorded with it mainly; as if they cover each other in the main part of the span. In the first year, they are less than 12 while they experience a slightly increasing trend, reaching around 13 at the last year of the period. Despite inconsistency of energy consumption and value added in industry, they show two relatively parallel trends. In the start point, energy consumption is just above 6 and it goes upward until the end, reaching 8. So, these three variables are extremely correlated. As a result, it can be proposed that the value added in industry is high correlated with energy consumption and CO2 emissions while this high correlation is not apparent in the Gini coefficient.

4. Methodology

This study, first, examines the Environmental Kuznets Hypothesis for the industrial sector in Iran, using a quadratic model. Then it estimates the causal relationship among the environmental pollution, income inequality, energy consumption, and industrial growth in Iran, using a Vector Auto-Regression (VAR). Finally, the Impulse response functions are derived to measure each variable's response to the changes of each of the other variables.

4.1 Environmental Kuznets Curve in Industrial Activities

Following (Xu, 2018; Adu & Denkyirah, 2018; Özokcu & Ozdemir, 2017) we investigate the Industrial Environmental Kuznets Hypothesis (IEKH) in the industrial sector of Iran. It is estimated with the following quadratic-log form of regression.

$$LnEvn_t = \beta_0 + \beta_1 LnInd_t + \beta_2 (LnInd_t)^2 + \beta_3 LnEng_t + \beta_4 LnGin_t + u_t \quad (1)$$

where Ind is the industrial value added, Env is the environmental pollution, Gin is the income distribution as the social development, and Eng is the energy consumption; Ln shows their natural logarithm; u is the residual series; and t is the year.

β_1 and β_2 play the key role in the accepting or rejecting the IEKH. In the first case, the former coefficient is positive and the latter is negative to form an inverted U-shaped relationship between the environmental pollution and the industrial growth (Xu, 2018), in other words if

$$\frac{dLnEvn_t}{dLnInd_t} = \beta_1 + 2\beta_2 LnInd_t$$

And the Second derivative of the equation (1) is

$$\frac{d^2 LnEvn_t}{dLnInd_t{}^2} = 2\beta_2$$

Table1: Industrial Environmental Kuznets Hypothesis Regression Results

Variables	Coefficients	t-statistics	Prob.
$LnInd_t$	2.30	3.17	0.00
$(LnInd_t)^2$	-0.07	-2.47	0.01
$LnEng_t$	0.23	2.76	0.03
$LnGin_t$	-0.4	-2.43	0.01

Then if $\beta_2 < 0$ it means that the Second derivative is negative and the Industrial Environmental Kuznets Curve is U-inverse shape and

IEKH accepted. Table 1 shows the Industrial Environmental Kuznets Hypothesis regression results.

Table 1 displays the results of the quadratic-log form of model for testing the IEKH. Based on the coefficients signs, it is accepted. The coefficient of the variable in level is positive, 2.30 and that of the quadratic one is negative, -0.07. Both the estimated coefficients are statistically significant at 0.01 levels. It is, strongly confirming an inverted-shaped relationship between the environmental pollution and industrial growth in Iran. The remaining control variables are reported in the table. In addition to this hypothesis testing, we estimate the relationship among the environmental pollution, income inequality, energy consumption, and industrial growth in Iran and employed the vector autoregressive model and Impulse response function to investigate the effects of industrial growth shocks on the other variable. For this purpose we first employs the unit root test then if the variables are integrated of degree one the co-integration test are employed to identifying the long run relationship between variables.

Table 2: Unit Root Test Results; Augmented Dickey Fuller (ADF) and Phillips Perron (PP)

Variables	Test Level	ADF		PP		Integration degree
		Intercept	Trend & intercept	Intercept	Trend & intercept	
Ln Ind	Level	-1.50	-2.31	-1.48	-2.42	I(1)
	1st difference	-6.11*	-6.08*	-6.11*	-6.08*	
Ln Env	Level	-0.89	-2.42	-0.88	-2.52	I(1)
	1st difference	-6.35*	-6.28*	-6.30*	-6.28*	
Ln Gin	Level	-1.74	-3.11	-1.55	-3.11	I(1)
	1st difference	-7.49*	-7.40*	-9.83*	-9.05*	
Ln Eng	Level	-9.49	-3.28	-1.50	-3.20	I(1)
	1st difference	-8.27*	-8.52*	-8.09	-8.31	

4.2 Unit Root Test

To investigate the stationary of the variables, a unit root test is used which is called Augmented Dickey Fuller (ADF) and Phillips Perron

(PP). It is performed in three modes: 1) intercept, 2) intercept and trend, and 3) none of them. Firstly, the variables are tested in their level and results show that none of them are stationary at level. Then stationary test is employed in first difference and the result indicate that all variables are integrated of degree one. All results displayed in table 2.

Table 2 shows the results of unit root tests including Augmented Dickey-Fuller (ADF) and Philips-Peron (PP) including intercept, and intercept and trend to find the integration, suggesting the one degree of integration for all the variables. Both the ADF and PP represent the same results for all the variables. The null hypothesis of unit root presence can be accepted in the level of variables while it can be rejected in their first difference. It implies that all the variables are integrated with the same degree of one.

4.3 Engel-Granger Co-integration Test and Long-run Relationship

Since all variables are integrated of degree one I(1), there is probability that the long run relationship among the variable exist. In order to investigate the long run relationship between the variables of the model, the Engel Granger test is employed. To do this, first we estimate the below regression then the stationary test is employed for residual.

$$LnEvn_t = \beta_0 + \beta_1 LnInd_t + \beta_2 LnEng_t + \beta_3 LnGin_t + U_t \qquad (2)$$

After estimating the model, residuals are obtained and if residuals are stationary at level then there exists the long run relationship or co-integration in the model. To test the co-integration in the model the Engel-Granger test are done as below:

$$\Delta U_t = \theta U_{t-1} + \varepsilon_t \qquad (3)$$

If U_t isn't unit root, it shows that U_t is stationary and implied that the co-integration between variable exists. After estimating the model and obtaining the residual the unit root test on the residual data is done and the results shown in table (3).

Table 3: Engel- Granger Test: Augmented Dickey Fuller Unit Root Test on Residual

Augmented Dickey Fuller	Test critical values	prob
-2.94-	0.049*	
-2.93(5%)	-3.59(1%)	2.60(10%)

According to the results, Augmented Dickey Fuller statistic is larger than t-statistic critical value at 5% and it shows that a co-integration between variables exists and long run relationship between variable is approved. As a results we estimate the long run model and the results show in table 4.

Table 4: Long Run Model: Estimating Results of Model 2

Variables	Coefficients	t-statistics	Prob.
intercept	7.78	31.79	0.00
$Lnind_t$	0.52	4.72	0.00
$LnEng_t$	0.39	2.01	0.05
$LnGin_t$	-0.7	-2.43	0.01

According to the long run estimation of the model industrial activities have a positive effect on environmental pollution, energy consumption have a positive and significant effect on environmental pollution in long run. In the next section, due to proving the integration of variables in first differences, vector auto regressive (VAR) model with the first differences of variables are employed to run the model and by using the impulse response function the effects of exogenous shocks are examined.

4.4 VAR Model and Impulse Response Function

The Vector Auto-Regression (VAR) is employed to estimate the causal relationships among the proxy of industrial growth (industrial products) and the proxies of sustainable development (income equality, environmental quality, and energy demand). It is as follows:

$$V_t = \alpha_0 + \sum_{i=0}^{p} \alpha_p V_{t-i} + U_t \tag{4}$$

Where **V** is the vector of variables ($n \times 1$); $\boldsymbol{\alpha_0}$ is the vector of intercept ($n \times 1$); $\boldsymbol{\alpha_p}$ is the matrix of coefficients ($n \times n$); $\boldsymbol{U}$ is the vector of residuals ($n \times 1$); t is year; i = 1, 2,…, p which shows the lags of variables. The optimum lag length is determined using Akaike Information Criteria (AIC), Schwarz Bayesian Criteria, and Likelihood Ratio as follows:

$$AIC = TLog|\delta| + 2N$$

$$SBC = TLog|\delta| + NLogT$$

$$LR = (T - C)\left(Log\left|\delta_p\right| - Log\left|\delta_{p+k}\right|\right)$$

where $|\delta|$ is the variance-covariance matrix of the residual series, N is the number of estimated parameters in all the equations of system, T is the number of observations, C is the number of estimated parameters in each equation of the system.

We expand the above mentioned model as below to describe it in more details.

$$\begin{bmatrix} \Delta\, Ln\, Ind_t \\ \Delta\, Ln\, Env_t \\ \Delta\, Ln\, Gin_t \\ \Delta\, Ln\, Eng_t \end{bmatrix} = \boldsymbol{\alpha_0} + \sum_{i=0}^{p} \boldsymbol{\alpha_p} \begin{bmatrix} \Delta\, Ln\, Ind_{t-p} \\ \Delta\, Ln\, Env_{t-p} \\ \Delta\, Ln\, Gin_{t-p} \\ \Delta\, Ln\, Eng_{t-p} \end{bmatrix} + \boldsymbol{U}_t \tag{5}$$

where Δ shows the first difference of the variables and the remaining symbols were described previously.

Finally, based on the results of Vector Auto-Regression (VAR), we will use the impulse response function in order to study the effect of an exogenous shock or innovation in one of the variables on one or some of the other variables. Impulse response function is shown as follows:

$$V_{t+n} = \sum_{i=0}^{\infty} \varphi_i\, \epsilon_{t+n-i} \qquad \{\varphi_n\}_{i+j} = \frac{\partial V_{i,t+1}}{\partial \epsilon_{jt}}$$

The response of $V_{i,t+1}$ to a one-time impulse in one variable with all other variables dated t or earlier held constant. The response functions are estimated and delineated in the graphs.

4.5 Impulse Response Function Result

As mentioned in the past sections we use the Impulse Response Function to show the effects of one standard deviation shock of one variable on the other variables. Since the all variables are I(1), the first difference of variable are used in the model. The following graphs depict the response of variables to impulse in industrial value added growth:

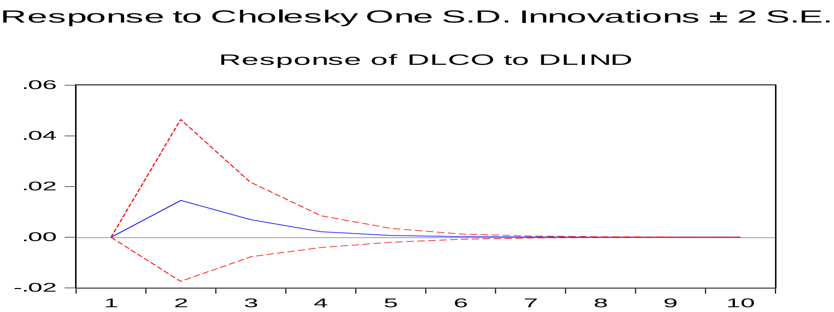

Figure 3: Response of First Difference CO2 Emissions to Cholesky One Standard Deviation Value Added in Industry

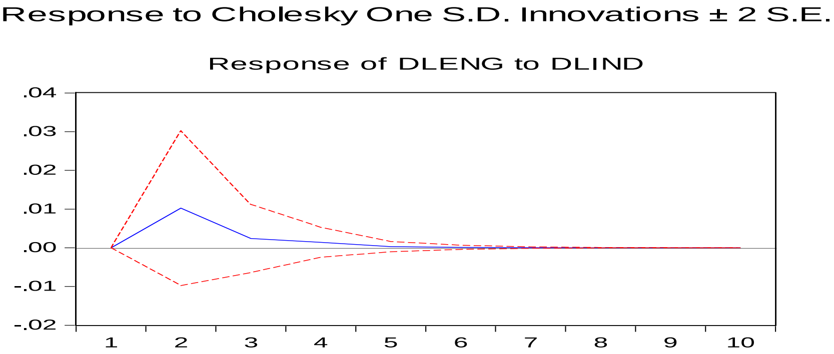

Figure 4: Response of First Difference Energy Consumption to Cholesky One Standard Deviation Value Added in Industry

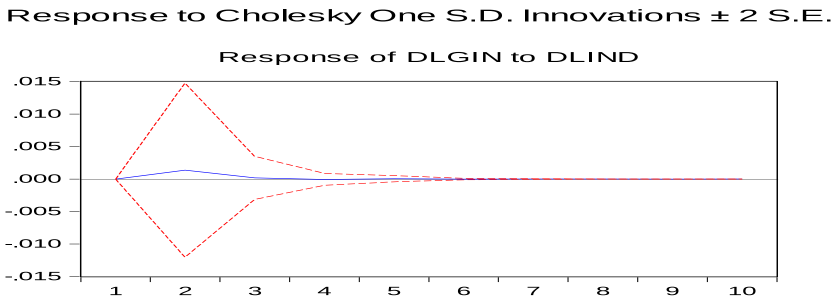

Figure 5: Response of Gini Coefficient to Cholesky One Standard Deviation Value Added in Industry

Figures 3, 4, and 5 display the responses of CO2 emission, energy consumption, and Gini coefficient to the shock to value added in industry in Iran.

Regarding figures 3, 4, and 5, an increasing shock to the growth of value added in industry has raised the CO2 emission, energy consumption, and Gini coefficient. All the three variables show the relatively same response to the shock to the value added in industry. As the shock is felt, it fades its effects in suddenly and the effected variables rise considerably as a response. After a while they start falling gradually and time fades the shock effect out gradually as they are disappeared at the end, reaching to the equilibrium point.

Figure 3 shows the positive response of CO2 emissions to the shock to growth of value added in industry. It implies the inconsistency of industrial growth with the environmental quality, criticizing the environmentally strategic decisions of policy–makers in the industrial sector. It supports the Environmental Kuznets Hypothesis since Iran is a developing country. In addition to environmental pollution, it is the energy consumption, based on figure 4, shows an increasing response to the shock to growth of value added in industry which can be rooted in the exclusion of technologically developmental considerations in the managers' strategies in the sector of industry. It implicates the energetically inefficient growth in the sector of industry. Similarly, Gini coefficient, based on figure 5, indicates an increasing response to the shock to value added in industry. It suggests that the more the industry grows, the more the income distribution becomes unequal, disparaging the taxation system and the mechanism of income distribution. It accedes the Kuznets hypothesis.

Therefore, the industrial growth in Iran is inconsistent with the elements of sustainable development such as the efficiency in energy consumption, degradation in environmental pollution, and equality in income distribution. It can be rooted in the industry sector whose structure has not been established on the basis of sustainable development considerations.

5. Conclusion and Discussion

This study employs a quadratic-log form of regression model to test the Industrial Environmental Kuznets Hypothesis. In addition, we use a Vector Auto-Regressive model to estimate the nexus among the industrial growth, income inequality, environmental pollution, and energy consumption in Iran during 1971-2014. After estimating the model, the results confirm the Industrial Environmental Kuznets Hypothesis and the response functions are derived and analyzed in details. Relatively, all the three variables show the same response to the shock in the industrial growth since all the responses are increasing. It provides preponderance of evidence for the incompatibility of industrial growth with social, environmental, and resource development in Iran. The policy-makers are advised to consider the sustainability properties in their development strategies as the development process evolves comprehensively, including all the developmental dimensions such as social, environmental, and resources perspectives.

Industrial growth leads to the environmental pollution in Iran. Industrial activities in Iran are pollutant due to their energy base, especially fossil fuel ones. Although the nature provides a relative advantage for the industrial growth in the energy field, the environmental quality is in danger with growth of these kinds of activities. In long-term, both the industry and environment are being damaged by the industrial growth without the environmental considerations. It stimulates the environmentalists to suggest the economists for deflating the industrial growth; is it the optimal solution?

In the environmental field, the governors are advised to boost the industrial growth, respecting the environmental aspects. By the strong industrial-growth, the governors accelerate the velocity of industry sector to reach the turning point in Environmental Kuznets Curve, where the nexus of industrial growth and environmental pollution becomes negative. From this point onward, the growth of industrial sector not only does not increase the environmental pollution, but also it improves the environmental quality. However, in this expansionary strategy, they should include the highly-careful environmental-considerations to reduce the environmental hazards. An approach is the promotion of the cleaner industries such as financial, tourism, and IT, rather than focusing on merely the oil industry.

Industrial growth leads to the social deprivation in Iran by increasing the income inequality. Despite the fact that industrial growth is stimulating the economic activities, it endangers the income distribution system indirectly. The oil industry has deteriorated the tax system which in turn damages the income distribution mechanism as the more the oil industry grows, the more the income inequality raises in Iran. Although the industrial growth boosts the economic development, it disturbs the social development. It is another evidence for the governors to work on the other economic sectors, rather than oil industry, for the economic development.

In the social fields, the policy-makers are advised to improve the tax system and to support the economic activists in the other sectors to reduce the inequality in the income distribution. To protect the Iranian society from the concomitant sufferings of economic development, the monopoly of oil-industry in the economy should be broken down to pave the way for sharing the economy more equally among the other sectors. Moreover, they should improve the taxation system from customs regulations, tariffs, and procedures, to the financial, income, sale and any other taxation mechanisms to control the income distribution and decrease the gap between low income people with high income people.

Industrial growth leads to the depletion acceleration of the resources in Iran. The more the industry grows, the more the energy consumption increases which is rooted in the energy inefficiency of the technology employed in this sector. Owing to the abundancy of the energy, especially the fossil fuel ones, and their low price in Iran, the managers of industrial sectors are not concerned with the high energy consumption of their plants since they only consider the accounting costs rather than the economic, environmental, and social ones. Again, it is another evidence for the policy-makers to focus on the other economic activities rather than merely the oil industry for a simple reason: it would be vanished out soon.

In the field of energy and natural resources, the policymakers should break down the monopoly of fossil-fuel energy not only in the economy as a whole, but also in the energy sector as an economic subdivision.

Just like the remedy for the environmental and social disturbances, the first suggestion of improvement in the energy and resource sector is the development of other economic activities. Furthermore, the authorities are recommended to invest on the other sources of energies especially the renewable ones such as solar energy in which the sunny Iran has tremendous potential for energy production due to its high sunny hours.

All in all, the industrial growth in Iran is not consistent with the sustainable development process. This sector should be modified, improved, and reconstructed to pave the way for harmonization among the quadruple layers of sustainable development including industrial growth, environmental quality, social satisfaction, and optimal usage of resources. The key suggestion for the governmental strategists is the development of the other economic sectors as the fossil-fuel energy loses its dominance over the economy. This is a single strategy for improving all the four studied dimensions of the sustainability including economy, environment, society, and resources. Moreover, the policy-makers should broaden their own views in the economic development as it stimulates the other dimensions of development process, rather than blocking them. As a future study, resource can be examined in the other countries as a pillar of sustainable development.

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