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The Impact of Good Governance on Environmental Pollution in South-West Asian Countries

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Abstract

Over the past few decades, good governance has become an important issue in public administration. One key reason behind this reality is the paramount role of government in promoting sustainable development and protecting the environment. Therefore, evaluating the impact of good governance on the quality of the environment could be taken into consideration by both the economic researchers and the policy makers. This paper dealt with the impact of good governance on the environmental pollution in Iran and its competitors in the 2025 vision document (i.e. south-west Asian countries, SWAC) over the period of 2002 to 2015. The results revealed that accountability, political stability government effectiveness, quality of law, rule of law and control of corruption (as representative indicators of good governance) has significant effects on the environmental pollution. The degree of the economic openness does indicate negative and significant relations with the environmental pollution as well. The paper suggests that economic growth and value added industry have a significant positive effect on environmental pollution in the countries studied. Therefore, improving good governance indices in selected countries including Iran could potentially reduce the pollution.

1. Introduction

Today, and due to the market failure, the necessity of government intervention in the environmental issues is obvious. Most of the times the price of resources does not reflect all expenditures of their uses. In addition, there is no ordinary price for many environmental resources, despite their significant values. The maximizer institutes do not pay the real price for the exploitation of environmental resources and impose extra costs on the society. Not surprisingly, many environmental goods are more "public goods" than private ones. Consequently, market system alone cannot help to preserve the environment (Stiglitz, 2015; Hall, 2017; Dadgar, 2013; Creny, 2000). Hence, the governments by pricing the resources, internalization of environmental costs and benefiting from the legal instruments can reduce the pollution. Nevertheless, in

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contrast to the theory of market failure one can talk about government failure too. According to this theory, bad governance causes economic distortion (including environmental damages). In addition, some studies argue that the officials of public sector are maximizing their self-interest (Gilpin, 2001; Shaanan, 2017). This can be construed as another element of government failure. Many experts of environment suggest that the structure and the form of the political system are determining factors for the environmental situation. For instance, undemocratic governments do not provide sufficient public goods such as pollution control (AshrafiPour and Barshod, 2012; Bryant and Bailey, 1997; Garcia, 2017; Alexandra, 2006). Several developing countries precede the developmental process at the cost of environmental destruction. Thus, through the growth and development in these countries, the environmental circumstances become worse (Morita and Zaelke, 2007; Michel, 2017; Yabuta and Nakamura, 2003).

Governance (a term that became popular in the early 1990s) refers to accountability in policymaking and execution of policies (including environmental processing). It also focuses on the relationship between civil society and government, between the rulers and the ruled and so on. Promoting good governance in many cases is a necessary condition for development (Carney et al, 1995; Sen, 1999). According to the World Bank (2017), main elements of good governance include: 1. voice and accountability, 2. political stability, 3. government effectiveness (government effectiveness in performing the duties), 4. Regulatory burden, 5. Rule of law and 6. Control of corruption. Evaluating the impact of indices in question on the quality of the environment is very important. This paper examined the impact of good governance on environmental pollution in Iran and other Southwest Asian countries. These countries include some of Iran 2025 Vision Document competitors. Comparing the situation of Iran with those competitors in question at one hand and with the targets of 2025 Vision Document at the other, could be accounted as the difference of this work with similar works. However, updating the related data is another contribution of this paper in this regard.

2. The environmental indices in Iran and other South-West Asian countries

In this section, we compared Iran's position in environmental indices with that of other south-west Asian countries (SWAC). Two types of index were considered: The first one was the Environmental Performance Index, which is a method for rating the performance of the countries in terms of their measures to sustainable maintenance and modification of their ecosystems. Environmental performance index is based on the goals of environmental protection. These include: 1) reducing the environmental pressures on human health and 2) promoting the ecosystems and proper management of the environmental. These two components are measured by 16 indices in six areas of environmental health, air quality, water quality, productive natural resources quality, habitat

and biodiversity, and sustainable energy. Iran's rank is 17 among SWAC for this index.

Table 1. Environmental indices in Iran and other SWAC

Country	Environmental Performance Index		Country	Ecological Footprint index			Bio-capacity index	
	Rank	Score		Rank	score		Rank	Score
Azerbaijan	1	83.78	Qatar	1	10.8	Kazakhstan	1	3.41
Armenia	2	81.6	Kuwait	2	8.13	Turkmenistan	2	2.79
Israel	3	78.14	Oman	3	7.52	Oman	3	1.92
Kazakhstan	4	73.29	Bahrain	4	7.49	Turkey	4	1.52
Kyrgyzstan	5	73.13	Israel	5	6.22	Kyrgyzstan	5	1.3
Tajikistan	6	73.06	Saudi Arabia	6	5.61	Qatar	6	1.24
Jordan	7	72.24	Kazakhstan	7	5.55	Georgia	7	1.17
Turkmenistan	8	70.24	Turkmenistan	8	5.47	Uzbekistan	8	0.92
Bahrain	9	70.07	Lebanon	9	3.84	Iran	9	0.9
Qatar	10	69.94	Turkey	10	3.33	Armenia	10	0.89
United Arab Emirates	11	69.35	Iran	11	2.79	Azerbaijan	11	0.85
Lebanon	12	69.14	Uzbekistan	12	2.32	Syria	12	0.6
Saudi Arabia	13	68.63	Azerbaijan	13	2.31	Bahrain	13	0.58
Turkey	14	67.68	Armenia	14	2.23	Egypt	14	0.56
Syria	15	66.91	Egypt	15	2.15	Kuwait	15	0.55
Egypt	16	66.45	Jordan	16	2.1	Tajikistan	16	0.53
Iran	17	66.32	Kyrgyzstan	17	1.91	Afghanistan	17	0.5
Georgia	18	64.96	Iraq	18	1.88	Saudi Arabia	18	0.5
Kuwait	19	64.41	Georgia	19	1.58	Yemen	19	0.5
Iraq	20	63.97	Syria	20	1.51	Israel	20	0.35
Uzbekistan	21	63.67	Yemen	21	1.03	Pakistan	21	0.35
Oman	22	60.13	Tajikistan	22	0.91	Lebanon	22	0.33
Pakistan	23	51.42	Afghanistan	23	0.79	Iraq	23	0.29
Yemen	24	49.79	Pakistan	24	0.79	Jordan	24	0.21
Afghanistan	25	37.5	United Arab Emirates	-	-	United Arab Emirates	-	-
Average (Southwest Asian countries)	-	67.03	Average (Southwest Asian countries)	-	0.95	Average (Southwest Asian countries)	-	3.68
Average (OECD Countries)	-	84.25	Average (OECD Countries)	-	5.65	Average (OECD Countries)	-	4.44

Source: Hsu et al (2016) and Lin et al (2016)

The second index was ecological footprint and bio-capacity, which is a sustainability index that measures human consumption and the effect of this consumption on the environment. This index indicates the amount of consumption (people's demands for natural goods and services) and it is equal to the amount of land or water that fulfils the needs of the society. In this sense, the ecological footprint reflects the effects that each community leaves in nature as the result of its lifestyle. In a more accurate sense, this index calculates the rate

of land and water needed to produce all resources (consumed by an individual population). By comparing the per capita bio-capacity and footprint in Iran with that of other countries, it is realized that Iran's per capita footprint is much larger than its bio-capacity. This indicates the overconsumption of resources in Iran. According to the methodology of the ecological footprint, Iran has unstable ecological situation. Table 1 compares the environmental indices of Iran with that of other SWAC.

According to the table 1, one can conclude that there is an environmental crisis in Iran because the consumption of resources in Iran is three times more than the global bio-capacity. In these circumstances, earth cannot make self-purification to restore its sources and thus, the waste is accumulated. These indicate that Iran is moving towards environmental instability very fast. For improving its environmental position, Iran has to use new technologies, changing crop patterns, implementing the land use plans, moving to green economy and so on. While seeking for employment, economic growth and the perseverance of the natural resources should be considered seriously. One way to achieve the green economy is to develop green jobs such as beekeeping, organic farming, recycling and so on.

3. Literature review and empirical studies

The subject of the state and environmental management has evoked much pessimism amongst the scholars. Johnston (1989) argued that some governments have failed to do their responsibilities in connection with environment. Walker (1989 p.32) added, "Explicit state responsibility for management of the biological and physical resource base, though effectively unavoidable, has never been accepted". After all, the state is an actor that is supposed to be dedicated to the promotion of collective goods, of which the environment is a leading issue. In practice, however the state behavior as much as the environment was concerned has been disappointing. Unfortunately, environmental conservation was in a low priority following the Second World War, for most states in Africa, Asia and Latin America (Bryant and Bailey, 1997). Consequently, concerns about environmental conservation were absent from the most official development plans during the 1950s and 1960s (Peet, 1991; Elliot, 1994). As the experiences of China (Smil, 1984; Hershkovitz, 1993) and Vietnam (Beresford and Fraser, 1992) and the like illustrate, the role of government in developing countries has often led to more deterioration in environmental quality (Bryant, 1997; Muldavin, 1996). Some studies have indicated that by improving institutional environment, good governance can facilitate the minimization of environmental degradation (Gani, 2012; Jalilian et al, 2006). Various aspects of governance can impose direct as well as indirect effects on the extent of CO2 emissions. For instance, bad governance including excessive red tape, bureaucratic inefficiency and financial mismanagement can have negative impacts on CO2 emission (Fischer et al., 2001). In their study, Pushak et al. (2007) found that there could be a higher growth payoff from macroeconomic

stability and public expenditure in countries characterized by relatively better public sector governance.

An influential dimension of governance is the rule of law. Acemoglu et al. (2005), and Bhatarai (2004), have demonstrated a positive relationship between rule of law and good institutions at one hand and better CO2 control at the other. Aron (2000) has noted that institutions may become weak because rules simply are absent. Regulatory quality can also affect environmental outcomes (Esty and Porters, 2005). Safavian et al. (2001) and Djankov et al. (2002) argued that heavy regulation is associated with less democratic government, greater corruption and larger unofficial economies. In their work on pertaining to environmental regulation and economic growth, Makdissi and Wodon (2006) have shown that it is theoretically possible that good environmental regulation increases economic growth. Control of corruption, (as another good governance index) usually affects revenues and expenditure side of government budget (Mauro, 1998; Tanzi and Davoodi, 2001). Wihardja (2010) showed that corruption in public procurement auction could hurt the national welfare. Hwang (2002) argued that corrupt governments might use their authority on the activities in which collecting bribes is easier. Dietz et al (2007) found that reducing corruption had a positive impact on genuine savings in interaction with resource abundance. Welsch (2004) revealed that a number of indicators of environment are monotonically increased with corruption while the relationship was very strong.

There are several variables and indices for measuring the governance. Hall and Jones (1999), Knack and Keefer (1995), Acemoglu et al. (2001) and Glaeser et. al (2004) have used political risk index and trade openness (Sachs and Warner 1995). Dollar and Kraay (2003), and Kaufman et al. (2002), have used institutional quality index. According to Deacon (1999), Matsuo (1998), Rentz (1998) and Rose (1990), good governance and institutions do have influential role in diminishing pollution. Kaufman et al. (1998), Arrow et al. (1995), Grossman and Krueger (1995) and Panayoto (1997) argued that there is a significant relationship between environmental quality at one hand and institutions at the other. Similarly, some dimensions of governance do have impact on CO2 diffusion. Halkos and Tzermes (2013) proved a nonlinear relationship between governance indices at one hand and CO2 diffusion at the other. Based on Kerekes (2011) property rights do have a negative relationship with soil destruction. Mugableh (2013) and Akpan and Abang (2014) indicated a positive relationship between energy consumption and GDP on CO2 diffusion. According to Heidari et al. (2015), Almulali et al. (2015), Arouri et al. (2014), and Begum et al. (2015) economic growth would trigger CO2 diffusion. Jalalian and Pajooyan (2009) have proved that green tax has affected CO2 for OECD countries. According to Fotros and Barzegar (2013) studies economic growth has increased the pollution. Shahab et al. (2014), and Behboodi, and Barghi (2014) have demonstrated positive relationship between government polices of Iran and Syria and the increase of air pollution. Dadgar and Nazari (2015) have

proven a negative relationship between government regulation of MENA countries and the environmental pollution in countries in question. Nazari et al. (2015) have tested the factors behind Iranian environment pollution. Finally, Alizade and Bayat (2016) have tested the effect of good governance on CO2 gas emissions in middle-income countries for the 2002-2011 periods. Their research indicated the negative relationship between good governance and pollution.

Table 2. Statistical Indices for the Model Variables

Variable		Mean	Std. Dev.	Minimum	Maximum
LCO2	*overall*	10.86	1.65	7.54	13.38
	between		1.69	7.87	13.18
	within		1.78	10.31	11.31
LGDPPER	*overall*	8.27	1.08	6.19	11.02
	between		1.09	6.55	10.70
	within		0.21	7.48	8.81
LIND	*overall*	3.50	0.37	2.70	4.27
	between		0.35	2.83	4.08
	within		0.15	3.03	3.99
LOPEN	*overall*	-0.26	0.42	-1.29	0.59
	between		0.39	-1.12	0.34
	within		0.17	-0.90	0.25
LVAR	*overall*	2.64	1.03	-0.76	4.04
	between		0.95	0.67	3.79
	within		0.45	-0.36	5.74
LPSR	*overall*	2.90	1.08	-0.75	4.40
	between		1.003	0.58	4.32
	within		0.46	1.40	4.37
LGER	*overall*	3.38	0.89	-0.02	4.52
	between		0.83	0.64	4.39
	within		0.38	1.85	4.76
LRLR	*overall*	3.12	1.03	-0.74	4.34
	between		1.005	0.54	4.20
	within		0.32	1.18	4.34
LRQR	*overall*	3.22	1.10	-0.02	4.42
	between		1.10	0.64	4.28
	within		0.27	1.17	4.005
LCCR	*overall*	3.07	0.96	0.38	4.47
	between		0.93	1.25	4.42
	within		0.32	1.23	3.94

Source: Results of the Research

4. Model and analysis of the results

One goal of 2025 vision document, 25 VD, in Iran is converting Iran to a country at the top of SWAC from the economic and the scientific standpoint. Thus, selected countries for this paper include the Iranian competitors of 25 VD. In this document economic progress is concerned and Iran is supposed to be the

best among Azerbaijan, Jordan, Armenia, Saudi Arabia, Uzbekistan, Georgia, Pakistan, Egypt, Turkey, Turkmenistan, Iraq, United Arab Emirates, Lebanon, Kirgizstan, Kazakhstan and Tajikistan. We obtained the required data from the World Bank, US energy information administration, SWAC, bureau centers, and Iranian central bank ICB (2017). Our model and the variables affecting the pollution are:

$$LCO2= f (LGDPPER, LIND, LOPEN, LGGI) \quad (1)$$

where, LCO2 is logarithm of per capita CO2 diffusion and, LGDPPER is GDP per capita. LOPEN is logarithm of openness (Export + import/ GDP proxy for openness of economics). LIND, is the value added in industry (constant 2005 US), and LGGI that of good governance indices (based on VAR as accountability, PSR, political stability; GER, government effectiveness; RQR, quality of law; RLR, rule of law, and CCR, control of corruption). Some statistical analyses for variables in question are indicated in Table 2.

As it is seen, means start from -0.26 to 10.86. The highest belongs to industry and the lowest to the openness. The results of Pesaran cross dependence test (Pesaran, 2004 and Baltagi & Moscone, 2010) are shown in Table 3. So cross dependence is confirmed for all the variables.

Table 3. Pesaran (2004) CD Test

Variable	CD.Tes t	Probability
LCO2	22.26	0.000
LGDPPER	27.26	0.000
LIND	3.72	0.000
LOPEN	2.09	0.037
LVAR	1.65	0.098
LPSR	3.67	0.000
LGER	3.19	0.010
LRLR	3.88	0.000
LRQR	5.25	0.000
LCCR	3.52	0.000

Source: Results of the Research

By indicating the result of CADF test, Table 4 shows that all variables were in stationary position.

In order to determine the existence or non- existence of distance from the origin we used Leamer test for each country and for all the models. According the findings of both the Hausman test and that of Breusch and Pagan as the related tables indicate all models function stochastically. Table 5 indicates the estimation of all models.

Table 4. Unit test of CADF

Variable	CADF Test	Critical Values at 1%	Critical Values at 5%	Critical Values at 10%
LCO2	-2.62	-1.89	-1.65	-1.52
LGDPPER	-2.89	-3.01	-2.78	-2.67
LIND	-1.52	-1.89	-1.65	-1.52
LOPEN	-2.67	-3.01	-2.78	-2.67
LVAR	-2.85	-3.01	-2.78	-2.67
LPSR	-2.36	-2.47	-2.26	-2.14
LGER	-3.002	-3.01	-2.78	-2.67
LRLR	-2.69	-3.01	-2.78	-2.67
LRQR	-2.88	-3.01	-2.78	-2.67
LCCR	-2.78	-3.01	-2.78	-2.67

Source: Results of the Research

Table 5. Estimation of Models

Variable	Model (1)	Model (2)	Model (3)	Model (4)	Model (5)	Model (6)
$cons\tan t$	2.88 [3.44]*	-0.63 [-0.78]	1.08 [1.18]	0.34 [0.40]	1.25 [1.47]	0.25 [0.28]
LGDPPER	0.98 [14.43]*	0.96 [12.70]*	1.05 [13.01]*	1.06 [13.41]*	1.05 [14.47]*	1.03 [12.49]*
LIND	0.20 [0.95]	1.17 [6.27]*	0.53 [2.32]**	0.67 [3.18]*	0.51 [2.51]**	0.69 [3.07]*
LOPEN	-2.33 [-15.33]*	-1.85 [-9.69]*	-2.47 [-16.08]*	-2.44 [-16.76]*	-2.21 [-14.39]*	-2.40 [-15.89]*
LVAR	-0.60 [-8.45]*					
LPSR		-0.37 [-3.86]*				
LGER			-0.50 [-5.12]*			
LRLR				-0.43 [-5.21]*	-	-
LRQR	-	-			-0.52 [-7.35]*	-
LCCR	-	-	-	-		0.37- [-4.36]*
R^2	0.69	۰.61	۰.63	۰.63	۰.67	۰.61
F	40.19 (0.0000)	38.53 (0.0000)	32.70 (0.0000)	38.35 (0.0000)	37.44 (0.0000)	32.98 (0.0000)
$Root\quad MSE$	0.97	1.08	1.07	1.06	1.004	1.09
$F(Limer)$	559.79 (0.0000)	706.70 (0.0000)	671.93 (0.0000)	670.44 (0.0000)	593.09 (0.0000)	728.76 (0.0000)
$hausman(\chi^2)$	3.51 (0.4771)	2.14 (0.5677)	2.47 (0.6496)	2.38 (0.6669)	4.52 (0.3397)	1.91 (0.7518)
Breusch and Pagan (x^2)	538.97 (0.0000)	753.98 (0.0000)	648.59 (0.0000)	637.39 (0.0000)	626.10 (0.0000)	646.81 (0.0000)

The t statistics are reported in the parenthesis, *, ** Significance at the level of 1, 5% respectively

Source: Results of the Research

As table 5 shows, the distance from origin is not equal for different countries. According to this table, all variables are significantly consistent with the theoretical foundations. Relying on Grossman and Krueger (1991), Seldom and Song (1994), Sebri and Salha (2013) and Muhammad et al. (2013), economic growth at the beginning of industrialization, leads to increase of environmental pollution. In addition, economic growth does have positive and significant impact on air pollution. Table 5 also shows that there was a negative and significant relationship between openness and environmental pollution. This implies that if openness increases, the probability of diffusion of the gas and pollution will decrease. Some studies (including Dadgar and Nazari, 2015) prove the influential impact on the openness on environmental pollution in Iran and some other selected countries. Existing studies revealed that many of the pollutants emanate from the processes related to the manufacturing sector. However, the level of production of waste and hazardous substances depends, to some extent, on the type of technology used. Thus using technological innovation can bring down the pollution levels. Estimation of our models indicates that there is a positive relationship between industrial value added and environmental pollution in Iran and its competitors of 25 VD. These results are consistent with findings of some similar studies as well Cheng (2011). It is demonstrated that the greater the size of the industrial sector, the higher will be the level of pollution.

The coefficients of LVAR, LPSR, LGER, LRLR, LRQR and LCCR in our models carry the expected negative sign, thus, confirming that these variables were inversely related with CO2 emissions. The coefficient of government effectiveness was negative and statistically significant. The coefficients of LVAR, LPSR, LGER, LRLR, LRQR and LCCR were statistically significant at the 1 percent level. The findings indicated that improvements in accountability, political stability, government effectiveness, rule of law, the regulatory quality, and control of corruption can mitigate the CO2 emissions. This result is compatible with findings of Pelegrini and Gerlagh (2006), Cole (2007), AshrafiPour and Barshod (2012), and Halkos and Tzeremes (2013). These and similar studies maintain that there is a strong relationship between the performance of legal system at one hand and reduction of environmental pollution on the other. Thus, improving and applying good governance indices can decrease the environmental pollution.

5. Conclusion

The following lines present the concluding remarks of this study.

1. Industrial value added in southwest Asian countries, SWAC, Iranian competitors of 25 VD, does have positive impact on environmental pollution. This is much more obvious in Iran.

2. Economic growth and degree of openness have affected environmental pollution negatively in selected countries.

3. Negative coefficient of accountability index in SWAC means that the more people and the environment-supporting groups of a society have the rights to comment and the more the accountability of the government and authorities of that society, the better would be the environmental quality. In other words, when the people of a country do have more freedom of speech to express their opinions for opposing the environment polluters, and when the government is accountable and responsible, the environmental indices will be in a better situation.

4. The governments in SWAC have not been able to consider the environmental issues sufficiently because of the lack of political stability. In addition, government effectiveness among the members of SWAC is very weak. Rule of law and quality of law as other proxies of good governance have shown negative impact on the environmental pollution. An obvious factor behind pollution in developing and less developed countries, including the selected countries in this paper, is the governmental structure itself.

5. The negative relationship between the index of corruption control at one hand and the index of environmental quality on the other is another signal for significant impact of good governance on environmental pollution in SWAC.

6. The findings of this paper demonstrated the negative relationship between the indices of governance and the level of carbon dioxide polluter. Thus, the hypothesis of this paper (that is the improvements of the government indices reduce the pollution) is confirmed. In other words, "good governance" can improve the environmental quality. Accordingly, one political implication of this paper could be reforming public sector structure and reinforcing good governance indices in Iran.

7. Imposing green tax, increasing the accountability and reinforcing democratic institutions are some instruments, which possibly reduce CO2 diffusion. The governments of the developed nations, through the imposition of the environmental laws such as environmental taxes have been able to reduce carbon dioxide significantly.

8. The south-west Asia countries (especially Iran) have to bear responsibilities in mitigating the extent of CO2 emissions by collaborating with international institutions such as the United Nations, Environmental Programs, and World Trade Organization in adopting guidelines and measures designed for sustainable production.

9. Iran can start developing sound and coherent policies not only to bring about improvements in various dimensions of governance but also to foster environmental sustainability at industry level. Governments can regulate industrial production through developing a framework where firms are required to use cleaner forms of energy as well as adopting technology that minimizes the environmental destruction.

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