Industrialization in Iran:
Health Provider or Health Remover?

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Abstract

Despite the importance of interaction between industrialization and health, this subject has not been studied sufficiently in Iran. In this regard, the aim of this study is investigating the impact of industrialization on health in Iranian provinces during 2009-13. The used data has been collected from the Statistical Centre of Iran and the National Organization for Civil Registration. The introduced indices have been combined using Standardized Score method for measuring the degree of industrialization and the levels of health in intended provinces. The interaction between industrialization and health has been tested by econometric panel data method. The results of this paper show that the Iranian provinces are not homogenous from industrialization and health perspectives. In addition there is no significant change in heterogeneity of provinces in terms of industrialization and health during the period of study. Also, the results reveal a significant and negative relationship between industrialization and health in Iranian provinces. This means that the industrialization process has reduced the health of provinces in Iran. So, in terms of policy, in addition to advantages of industrialization, its problems and disadvantages also should be taken into account. In the other words, paying attention to the external diseconomies of industrialization is necessary for successful implementation of industrial policies.
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1. Introduction

The experience of most developed countries has shown that the industrial sector is very important in the process of economic growth. So,

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industrialization can be considered as a prerequisite of economic development. According to Najimeidani et al. (2015), the industrialization is important in terms of three aspects: Firstly, the industry, as a subset of economy, increases the income of the community with its growth and prosperity. Secondly, the industry, as a pivot of technological development, improves the income of agricultural sector, services and building through creation of methods and invention of new means of production. Thirdly, the development of industry, inevitably, depends on the development of scientific abilities and technical skills of human resources. This can lead to rise of the level of knowledge and tends to increase of income level. Therefore, industrialization not only because of its advantages for the growth and development of the industrial sector, or the creation of industrial factories, but also due of its effective influences on the other economic activities, plays an important role in economic development in the provinces (Salimifer et al., 2009). However, despite all of the positive consequences of industrialization, its potential negative dimensions could not be ignored. This topic has been explored from various aspects in economic and health development literature. The effect of industrialization on the reduction of physical and mental health indicates that this factor may be had a potential negative impact in the process of industrialization in countries, and therefore, in order to proper assessment on the performance of industry, it is necessary to focus on negative aspects, which in economic literature is called "External Diseconomies", and positive effects of industrialization together. Accordingly, the present study aims to investigate the interaction between industrialization and health in the provinces of Iran. In the other words, this research attempts to test this main hypothesis:

Industrialization has a negative and significant relationship with health in Iranian provinces.

To do this, the content of this paper is organized in five sections. After the introduction, the second part explains the literature and research background of the study. The research method is presented in third section and the fourth part is dedicated to estimated results. The main conclusions and policy recommendations are provided in the final section.

2. Literature Overview
2.1 Theoretical Framework
Although, industrialization and health are two important and valuable topics in each society, but based on the theoretical foundations, the relation between industrialization and health in each society is some paradoxical and different viewpoints have been presented on this content. In the other words, while some researchers believe that the process of industrialization reduces the health status of the provinces, but others believe that industrialization provides some opportunities for increase of health. The existent perspectives expressed in this field can be found in studies by Elliott & Knight (1975), Adegbola (1987), Sandberg & Steckel (1997), Honda (1997), Pandy et al. (1999), Lewis (2002) and Szreter (2004).

Theoretical foundations about two presented viewpoints can be observed in figures (1) and (2). As can be seen, according to the first point of view, cited in figure (1), in the course of industrial development and especially in the first stages of that, industrialization provides a basis for more pollutions as well as anxieties and psychological pressures, so, reducing health status in the society. However, according to the second viewpoint, as illustrated in figure (2), during the industrialization process the total income as well as per capita income will increase. This provides the basis for increasing in health expenditures. The increase of health expenditures in the final phase enhances the health status in the community. Accordingly and based on these perspectives, the final judgment on the impact of industrialization on health depends on the empirical studies in this area and therefore, few studies have tried to evaluate this interaction at the global level. Some of these studies are presented in following section.

2.2 Background Overview
The interaction between industrialization and health, despite its important, has been considered only in few studies. According to the findings of the researchers in this study, among the domestic studies, there is no coherent study on the relation between these two categories. Therefore, the present study can be considered as the first steps in this field. Consequently, with the emphasis on recent foreign studies, the studies of Steckel (1999), Carson (2008), Jie (2008),

Ogbiye et al. (2013) and Tang (2016) could be mentioned as the foreign studies as well.

Figure 1: The Relationship between Industrialization and Health:
The First Viewpoint

Figure 2: The Relationship between Industrialization and Health:
The Second Viewpoint

Steckel (1999) studied the relationship between industrialization and health in eight developed countries including England, United States, Australia, Japan, Netherlands, France, Sweden and Germany. The results indicate that this interaction has improved in Sweden, but it is not possible to make such a judgment about other countries. Carson (2008) focused on health status during industrialization process in Pennsylvania based on evidence from the nineteenth century. He examined individuals' height during the years 1829-1909. The results of this study showed that people born in developed industrial area were shorter than other Americans, and hence industrialization can affect even the height of people at birth. In addition, the results of this study indicated a significant correlation between industrialization and

environmental factors. Jie (2008) examined the impact of industrial SO_2 emissions on public health in China. He presented a model on the direct and indirect impact of industrial pollution on health. After that, this model was tested by the chronicle disease data in over 78 counties of China, and the results showed that continuous increase in SO_2 emission density increased the proportion of population with chronicle disease. However, due to technological advances in pollution control activities, SO_2 emissions for per unit of GDP decreased over time. Therefore, the negative effect of pollution on public health has been compensated by the positive effect of economic growth on health status. In the latest studies in this area, Tang (2016) studied the effects of industrialization and mortality in the earliest stages of Japan's development. The conclusions of this study indicated that economic development has led to improvement in health status over time, due to increase of access to treatment and income. Also, the mortality rate has increased in the earliest stages of industrialization. Therefore, as can be seen, the results of foreign studies in this field are not completely match with each other. The findings indicated that the impact of industrialization on health depends on some factors including the time period, the place and the type of industrialization. However, as previously mentioned, there is few coherent and relevant studies in this field in Iran, and according to the researchers' findings of this study, the impact of industrialization on health has not been investigated in Iran, yet. Only the study of Pajouyan and Vaezi (2011) can be mentioned as a related study. They studied the relationship between income distribution and health using pooled data method in 30 provinces during the period of 1982-2006. The results of this study showed that the relationship between health status and income inequality was negative and strong but, the correlation between average earnings and health status was estimated positive and poor.

Summing up, the interaction of industrialization and health can be considered as a paradoxical topic, since this it depends on the time as well as the type of industrialization in each country. Therefore, the present study tries to investigate this interaction in the provinces of Iran during 2009-2013.

3. Methodology
3.1 Research Data and their Features
As previously mentioned, this research attempts to examine the interactions between industrialization and health status in the provinces of Iran. Therefore, the data is collected from the Statistical Center of Iran and the National Organization for Civil Registration for the period of 2009-13. To measure the industrialization level of the provinces, three indicators has been considered as the most important indices as bellow:

- The number of industrial firms in each province;
- The number of industrial employments in each province;
- The outputs of industrial firms in each province;

The level of industrial development of each province has been calculated by combine these three indicators using the Standardized Score method. Also, based on available literature, the health sector indices can be presented in the four groups, namely: the demographic indicators and mortality, disease and risk factors, coverage of health services, human force and the structure of the health system. Also each of the group is formed from several criteria. According to the existent classification, the first group is concluded 18 indicators such as the mortality of children under the age of five, the adult mortality and disability. The second group is formed from 28 indices such as deaths due to accidents, suicide rates and the coverage of vaccination in Iran. About 51 indexes are in the third group such as the percentage of coverage of pregnancy care, the number of blood dialysis units and the prevalence of thalassemia and 6 indices are in the fourth group, namely: occupational situation of health care providers, nursing and health care units criteria.

Despite the constraints of data at the provincial level, the main emphasis of this paper is on the combining of selected data from the first three groups. These indices are included:

- Children mortality rate (under the age of five);
- Adult mortality rate (15 to 59 years old);
- Disability;
- Deaths due to accidents;
- Mental disorders;
- Venture to Suicide; and
- Accidental deaths.

It should be noted that in the present study, the data of mental disorders in the provinces of Iran have been used as a proxy for psychological disorders.

According to the presented explanations, the industrial characteristics and health features of the provinces of the Iran are presented in Tables (1) and (2) and figures (3) to (8).

Table 1: Industrial Indices in Iranian Provinces (2009 & 2013)

Province	2009			2013		
	Firms Number	Employment	Output Value (Billion Rials)	Firms Number	Employment	Output Value (Billion Rials)
Estern Azarbayejan	794	63496	71875	843	74453	251343
Western Azarbayejan	357	18601	10054	322	18981	29474
Ardebil	282	9058	4400	178	8639	15750
Esfahan	1906	146269	233272	1725	156019	767738
Alborz	857	71001	55320	671	64699	98564
Ilam	58	2047	1084	31	1324	3986
Bushehr	110	12757	61705	94	17927	316718
Tehran	2966	289773	382879	2377	268305	766516
Chaharmahal&Bakhtiyari	221	9128	5127	238	9897	20889
Southern Khorasan	127	5453	3440	80	5484	9721
Khorasan-e-Razavi	1114	85280	56758	1006	81767	109718
Northern Khorasan	78	6699	4638	67	7661	15035
Khuzestan	446	65947	212079	362	74696	778863
Zanjan	191	22484	18859	219	24484	47986
Semnan	926	36147	18244	712	30205	41217
Sistan & Baluchestan	103	4087	1872	104	4265	6911
Fars	674	42592	39012	578	40363	130191
Qazvin	721	65987	52378	710	64093	138907
Qom	463	21586	9779	431	22317	40714
Kordestan	134	4948	2478	125	4681	8262

Province	2009			2013		
	Firms Number	Employment	Output Value (Billion Rials)	Firms Number	Employment	Output Value (Billion Rials)
Kerman	148	19722	39401	324	36396	161356
Kermanshah	254	14163	20374	229	14656	51544
Kohgiluyeh&Boye rahmad	44	2323	1233	34	2915	2419
Golestan	253	10658	6826	332	14324	29818
Gilan	510	33712	20238	542	33021	62698
Lorestan	103	8390	4930	177	9734	19142
Mazandaran	713	46369	34161	684	46048	83801
Markazi	631	69196	96872	577	65853	388394
Hormozgan	175	11757	96603	151	15543	525518
Hamedan	360	13556	8127	331	14815	28784
Yazd	410	38304	28011	442	46008	92628
Mean	520	40371	51678	474	41277	162729
Standard Deviation	603	56397	83042	500	53607	235879
CV	116	140	161	106	130	145

Source: the Statistical Center of Iran.

It should be noted that Table (1) presents the industrial characteristics for the years 2009 and 2013 (years of beginning and ending of the studied period) and Table (2) shows the health characteristics of the provinces in the middle of the studied period. In addition, the amounts of mean, standard deviation and coefficient of variation are shown in Table (1) and (2). These measures indicate the provincial distinctions as well.

Table (1) as well as Figures (3) to (5) clearly explains the high heterogeneity in all three indices in terms of industrial situation in the intended provinces. For example, while the average number of industrial firms in the provinces of Iran is equal to 520, these amounts for Tehran and Kohgiloyeh & Boyerahmad provinces are about 3000 and 44 firms in 2009 respectively. Accordingly, the standard deviation of the number of firms in the provinces of Iran is more than 600 and

its coefficient of variation is more than 100 percent. Although, the intended values have decreased in 2013, the existent evidences show that there is a high heterogeneity between the provinces in terms of industrial indices. The heterogeneity of the number of employment and the value of output indices are also high.

The heterogeneity of the number of employment index is greater than the number of firm index. On the other hands, the heterogeneity of the number of employment index is less than the heterogeneity of the value of output index. The subject can be clearly seen from the distribution of the above-mentioned indicators in Figures (3) to (5).

Figure 3: The Number of Industrial Firms in the Provinces of Iran: 2011

Figure 4: Number of Industrial Workers in the Provinces of Iran: 2011

Figure 5: Industrial Production in the Provinces of Iran (Billion Rials): 2011
Source: Authors' findings

Also, Table (2) and Figure (6) to (8) show the health status of the provinces in 2011.

Although, in comparison to the industrial standards, the provinces of Iran enjoy from higher homogeneity in terms of health status, but there are still clear differences between them. This issue is also very considerable in some of health indicators. For example, the Figures (6) and (7) illustrate fairly homogeneous distribution of adult mortality and deaths due to accidents in Iran, while provinces of Iran are very heterogeneous in terms of mental disorders. Therefore subject to the wide variation in the industrial indices of the provinces as well as the relatively considerable differences in their health status, this research attempts to indicate the type of interactions between them. Nevertheless, in order to measure this relationship, it is necessary to provide a comprehensive analysis on the situation of the industry and health status of the intended provinces. This is a topic that is discussed in the next.

Table 2: Health Indicators in Iranian provinces (2011)

Province	Children Mortality	Adult Mortality	Disability	Deaths due to Accidents	Mental Disorders	Venture to Suicide	Accidental Deaths
Estern Azarbayejan	26	143	1420	580	2	1	5
Western Azarbayejan	19	124	1604	450	1	4	10
Ardebil	17	140	1700	502	1	5	0
Esfahan	20	114	1887	464	1	3	21
Alborz	6	94	1280	306	0	4	4

Province	Children Mortality	Adult Mortality	Disability	Deaths due to Accidents	Mental Disorders	Venture to Suicide	Accidental Deaths
Ilam	24	131	1888	414	1	77	6
Bushehr	23	106	1580	368	0	3	21
Tehran	16	106	1335	395	0	3	53
Chaharmahal & Bakhtiyari	45	130	1943	465	1	5	29
Southern Khorasan	37	95	2305	515	2	6	8
Khorasan-e-Razavi	20	129	1866	485	3	3	12
Northern Khorasan	23	125	1986	472	1	4	15
Khuzestan	21	132	1811	405	1	3	0
Zanjan	21	107	1531	463	0	4	0
Semnan	16	108	1408	474	1	9	18
Sistan & Baluchestan	31	182	1424	449	1	3	20
Fars	21	134	2031	496	2	4	0
Qazvin	21	110	1441	426	2	3	8
Qom	16	108	1732	422	0	3	46
Kordestan	21	135	1969	473	1	5	20
Kerman	8	100	1501	310	1	4	17
Kermanshah	27	165	1970	546	2	9	4
Kohgiluyeh & Boyerahmad	27	152	2028	479	2	5	0
Golestan	20	138	2050	440	2	7	3
Gilan	11	150	1973	607	1	5	17
Lorestan	11	160	1784	455	1	9	11
Mazandaran	16	126	1827	484	1	3	17
Markazi	12	118	1779	515	1	3	16
Hormozgan	32	125	1577	394	1	6	36
Hamedan	40	150	1836	572	5	6	1
Yazd	21	98	1853	442	0	2	28
Mean	22	127	1752	460	1	7	14
Standard Deviation	9	22	251	68	1	13	13
CV	41	17	14	15	81	195	93

Source: National Civil Registry Office and Statistical Yearbooks of Iran.

Figure 6: Adult Deaths (Per 100,000 People) in the Provinces of Iran: 2011

**Figure 7: Number of Deaths from Accidents (Per 100,000 People)
in the Provinces of Iran: 2011**

**Figure 8: Number of Mental Disorders (Per 100,000 People) in the
Provinces of Iran: 2011**
Source: Authors' findings.

3.2 The Method of Data Combining and Measuring the Levels of Industrial and Health Development

With considering to the indices of industrialization and health, it is necessary to merge these indices with together. However, there are several methods for combining the data and ranking the intended

provinces according to the intended criteria. Some of these methods are numerical taxonomy, Moris index, TOPSIS and Standardized Score methods. The Standardized Score is the simplest and accepted method for evaluating and ranking the development of the provinces (Gharakhlou & Panahandehkhah, 2009). In this method, the indices of each province have been determined in order to classification of the studied areas. To do this, in the first step, the data matrix should be formed. This matrix has m rows (the number of provinces) and n columns (the number of indices). The matrix B (m × n) can be defined as bellow:

$$
\text{в } j=1,2,\dots,n \quad i=1,2,\dots,m \begin{pmatrix} x_{11} & \cdots & x_{1n} \\ \vdots & \ddots & \vdots \\ x_{m1} & \cdots & x_{mn} \end{pmatrix} = \tag{1}
$$

In the second step, the mean and standard deviation is calculated for all of columns in the matrix B as follows:

$$
\overline{X}j = \frac{\sum_{i=1}^{m} X_{ij}}{m} \tag{2}
$$

$$
S_J = \sqrt{\frac{\sum_{i=1}^{m}\left(x_{ij} - \overline{x}_j\right)^2}{m}} \tag{3}
$$

In these relationships, $\overline{X}j$ and S_j denote the mean of values and the standard deviation of jth column in the matrix B, respectively.

In the next step, the standardized matrix Z, can be formed as bellow:

$$
z_{ij} = \frac{x_{ij} - \overline{x}_j}{s_j} \tag{4}
$$

Where:

Z_{ij} = standardized score for i^{th} province and j^{th} index;

X_{ij} = the value of the index j^{th} for i^{th} province;

$\bar{X}j$ = the mean of indices for j^{th} index

With consider to the evaluated Z_{ij}, it is possible to merge the rows of matrix Z, which are absolute and non-integer values. Then each province that have more values will locate higher in rank.

3.3 Comparison of Industrial and Health Development in the Provinces

The industrial and health development levels of the provinces have been compared together using the data presented in the research data section and standardized score method. The results are presented in Table (3) and in order to provide an appropriate image and the possibility of comparison, the Figures (9) to (11) are presented as follow.

As can be seen, the highest degree of industrialization in the early and end years of the study period is belonged to the provinces of Tehran, Isfahan and Khuzestan, while the provinces of Ilam, Kohgiluyeh & Boyerahmad and Sistan & Baluchestan are in the lowest position from this perspective. So, in terms of health status, the Alborz, Kerman, Zanjan and Bushehr provinces had the highest levels in the middle of the study period. However, the results show that with the exception of Southern Khorasan Province, which located in lowest point in terms of health status for many years, other provinces did not have a stable position during the mentioned period. Nevertheless, all of these cases indicate the heterogeneity and unbalanced distribution of industrial and health development in the provinces of Iran based on the presented indices.

Table 3: Status of the Provinces in terms of Industrial and Health Development

Province	Industrialization Degree		Health Development Degree
	2009	**2013**	**2011**
Eastern Azarbayejan	1.107	1.732	0.778
Western Azarbayejan	-1.159	-1.286	-1.663
Ardebil	-1.520	-1.825	-1.034
Esfahan	6.362	7.207	-0.466
Alborz	1.145	0.559	-9.484

Province	Industrialization Degree		Health Development Degree
	2009	2013	2011
Ilam	-2.056	-2.304	4.249
Bushehr	-1.049	-0.542	-3.466
Tehran	12.468	10.600	-2.756
Chaharmahal & Bakhtiyari	-1.611	-1.658	4.191
Southern Khorasan	-1.852	-2.104	3.548
Khorasan-e-Razavi	1.842	1.594	1.927
Northern Khorasan	-1.897	-2.067	0.481
Khuzestan	2.262	3.012	-2.279
Zanjan	-1.259	-1.311	-3.832
Semnan	0.195	-0.245	-2.059
Sistan & Baluchestan	-1.935	-2.091	2.171
Fars	0.142	0.052	1.867
Qazvin	0.796	0.797	-2.852
Qom	-0.933	-0.956	-1.236
Kordestan	-1.861	-2.035	1.840
Kerman	-1.131	-0.396	-6.715
Kermanshah	-1.283	-1.457	5.035
Kohgiluyeh & Boyerahmad	-2.072	-2.276	2.286
Golestan	-1.510	-1.351	0.981
Gilan	-0.513	-0.441	2.336
Lorestan	-1.822	-1.790	0.322
Mazandaran	0.215	0.174	-0.258
Markazi	1.238	1.622	-1.005
Hormozgan	-0.539	0.411	0.856
Hamedan	-1.266	-1.348	7.865
Yazd	-0.504	-0.274	-1.627

Source: Authors' findings.

Figure 9: Industrialization Degree of the Provinces: 2009

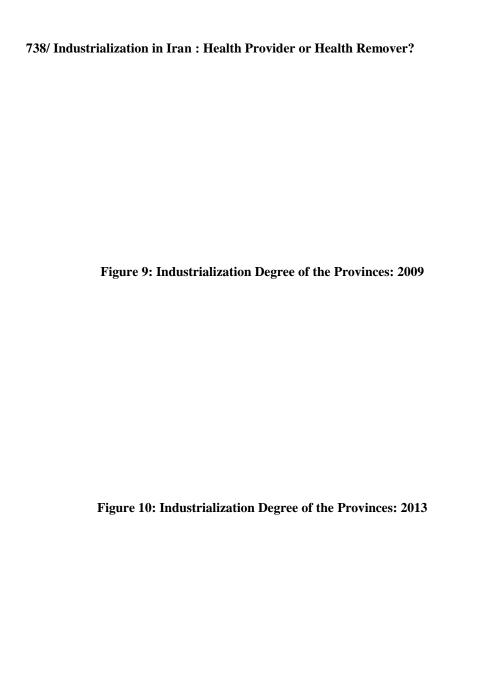**Figure 10: Industrialization Degree of the Provinces: 2013**

Figure 11: Health Status of the Provinces: 2011
Source: Authors' findings.

4. Model's Estimation and Findings

As previously mentioned, the purpose of this study is to investigate the interaction between industrialization and health in the provinces of the Iran during the period of 2009-13. Accordingly, this relationship is

evaluated in terms of two dimensions, namely: time and space. To do this, the panel data method is used. This method refers to a set of data that include N sections (such as a country, province, household, individual, etc.) and T period (Souri, 2014). With consider to the general form of panel data model, in this study, the 6 equations are introduced in order to indicate the relationship between industrialization and health in the provinces of Iran. In these equations, IND_{it}, denotes the level of industrial development in the provinces of the country which is obtained by combining the three indicators including the number of firms, the number of employees and the amount of industrial output in each province. Also, HEL_{it} is the level of health status in each province which is evaluated with the combining of seven indicators including mortality rates for children (under the age of five), the mortality rate for adults (15 to 59 years old), disability, deaths due to accidents, mental disorders, suicides and accidental deaths. In addition, according to existing literature, because of the industrialization affects the health of the provinces with time lags, the models (5) to (10) are estimated with one and two lags using STATA software.[1]

$$HEL_{i_t} = \alpha_{it} + \beta IND_{i_t} + \varepsilon_{i_t} \qquad (5)$$

$$HEL_{i_t} = \alpha_{it} + \beta IND_{i_{t-1}} + \varepsilon_{i_t} \qquad (6)$$

$$HEL_{i_t} = \alpha_{it} + \beta IND_{i_{t-2}} + \varepsilon_{i_t} \qquad (7)$$

$$HEL_{it} =_{it} + \beta_1 IND_{it} + \beta_2 IND_{it-1} + \varepsilon_{it} \qquad (8)$$

$$HEL_{it} =_{it} + \beta_1 IND_{it-1} + \beta_2 IND_{it-2} + \varepsilon_{it} \qquad (9)$$

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1. It should be noted that this study has not claim that all of changes the health can be explained by industrialization factor. In this study, as the first time in Iran, given the available data and the relatively difficult access to needed data, only the impact of industrialization indicators on health has been studied. It is natural that to carry out the comprehensive studies on the effects of other factors affecting the health is essential and valuable as well.

$$HEL_{it} =_{it} + \beta_1 IND_{it} + \beta_2 IND_{it-1} + \beta_3 IND_{it-2} + \varepsilon_{it} \qquad (10)$$

It should be noted that in panel data method, it is necessary to use the Limer test to indicate the method of evaluation, pooled or panel data, and then determine the type of panel data model (fixed effects or random effects) with the Hausman test. In addition, the model is estimated after analyzing the time correlation (according to Wooldridge test) and cross-sectional correlation (by estimating of

Table 4: Estimated Results of Research Models

Variable	Coefficient	Statistics	Prob.
Estimated Results of Model (5)			
Intercept	-0.063	-0.69	0.491
IND_{it}	-0.296	-5.71	0.000
	Wald Statistics: 32.56	Prob: 0.0000	
Estimated Results of Model (6)			
Intercept	-0.058	-0.62	0.537
IND_{it-1}	-0.287	-5.46	0.000
	Wald Statistics: 29.86	Prob: 0.0000	
Estimated Results of Model (7)			
Intercept	-0.061	-0.67	0.501
IND_{it-2}	-0.283	-5.21	0.000
	Wald Statistics: 27.17	Prob: 0.0000	
Estimated Results of Model (8)			
Intercept	-0.065	-0.71	0.475
IND_{it}	-0.244	-0.26	0.755
IND_{it-1}	-0.053	-0.06	0.955
	Wald Statistics: 33.80	Prob: 0.0000	
Estimated Results of Model (9)			
Intercept	0.159	1.42	0.156
IND_{it-1}	0.516	1.75	0.08
IND_{it-2}	-0.808	-2.79	0.005

	Wald Statistics: 47.25	Prob: 0.0000	
	Estimated Results of Model (10)		
Variable	**Coefficient**	**Statistics**	**Prob.**
Intercept	-0.071	-0.88	0.379
IND_{it}	-0.357	-0.35	0.725
IND_{it-1}	0.925	0.62	0.534
IND_{it-2}	-0.856	-0.97	0.332
	Wald Statistics: 28.72	Prob: 0.0000	

Source: Calculated by authors.

Pesaran test) and heterogeneity variance (by using likelihood test). By performing these steps, the interactions between industrialization and health of the provinces is evaluated and tested. The results are shown in the Table (4).

As can be seen, while the models (5) to (7) represent the effect of industrialization on health without and with one and two time lags separately, but, the models (8) to (10) consider this interactions with time lags simultaneously. The results indicate that the impact of industrialization variable with 2 time lags (IND_{it-2}) on health is negative in all of models. However, these influences in models (7) and (9) are significant at the 1% significant level (confidence level 99%). This means that the effects of industrialization are not immediately reflected on the health. Also, it can be implied that it takes more than one year to reveal the effects of industrialization on health and this interaction appears after two years.

5. Conclusions and Recommended Policies

Although, the literature on economics of development provides different perspectives about the path of development, but, almost all of the evidences suggest that developed countries have followed the development path through industrial development. Nevertheless, industrial development includes some disadvantages in spite of its numerous benefits. Among all of these disadvantages, the impact of industrialization on reducing of health is considered as the most important negative aspect of this area. The effect of industrialization on health with all of its important has been evaluated in a few studies. So, this paper is designed to study this effect in the provinces of Iran.

While the three indicators including the number of firms, the number of people employed and industrial output in each province have been considered as indices for industrial development, on the other parts, the seven indicators including the mortality of children (under the age of five), the mortality rate of adults (15 to 59 years old), disability, Mortality due to accidents, mental disorders, suicides and casualties have been reflected the level of health in the provinces as well. The estimation of the effect of industrialization on health has been done by combining these indices using the Standardized Score method and an econometric model based on merged data. The results of this study show the effect of industrialization with two lag on health is negative and statistically significant. This shows that the impact of industrialization on heath appears after two years. Accordingly, the findings of this study can be presented from several aspects: Firstly, the results of this study can be criticism in terms of the criteria used to measure both industry and health. Secondly, the standardized score method, which is used to merge the industrial and health indicators in this study, can be considered as improper method. However, with the acceptance of the presented indices in this study as well as the method of their combination, the results of this study revealed that the industrial policies and health status are inconsistent with each other. In other words, the industrialization of the provinces of Iran, which is expected lead to increase the per capita income, improve the health status of the provinces, has become a tool in the Iranian economy against this expectation that the expansion of industrialization lead to reduce the health. According to mentioned results, the review of industrial policies, especially industrial development policies in the provinces of Iran is necessary. Therefore, the policy suggestion of this research is to pay attention on the negative external effects of industrialization in the provinces of Iran, while judging about the industrial performance of the provinces without considering its negative influences is not correct and rational.

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