Demonopolization or Decompetition of Manufacturing Industries in Iran

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Abstract

The vast bodies of studies in the word and recently in Iran have attempted to investigate the manufacturing industry structure (indicating the level of industries in terms of monopoly or competitiveness) and its trend using the various indices and methods. Despite the importance of Lorenz Curve and Gini Coefficient in indicating the market structure, these methods, capabilities have been neglected in determining the structure of manufacture industries in Iran by the way. Therefore, this paper attempts to indicate the structure of main manufacturing industries in Iran (including manufacture of food and beverages, manufacture of textile and production of none-metallic minerals industry) using the mentioned methods. The results of this study indicate that in the intended three years and with respect to the employment, output amounts and value added indices, these industries have concentration ratio more than 0.6. This means that they enjoy from none competitive structure. Therefore and in terms of policy, the results indicate the necessity of more consideration of policies that focus on elimination of monopoly and encourage the more competitiveness in the industrial sector.

Keywords: Industrial Structure, Lorenz Curve, Gini coefficient, Monopoly.

JEL Classification: L11, L12, L16.

1. Introduction

The study of manufacturing industry structure in order to making policies which tend to the increase of efficiency, output and price reduction, is one of the main topics in the industrial economics. The market structure represents the organizational characters of the market. Using them, the relationship between market's parts can be indicated such as the relationship between suppliers (producers), buyers, the relationship between suppliers and consumers and the interaction between potential

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and active sellers. Indeed, the market structure includes some of market's organizational characters that the pricing identity and market competition can be determined by them (Khodadad Kashi, 1998). The market has different structures which begins with competition and tends to monopoly structure. The level of competition and monopoly is highly related to market's structural elements. The high level of concentration is one of them. The more concentration rate leads to the more unequal distribution of market between intended firms and vice versa.

The senior documents of Islamic Republic of Iran have always emphasized on prevention of monopoly and dictatorship. For example, the constitution of Iran, as the most important document, has focused on prevention of monopoly. So, because of the important of investigation the structure of manufacturing industries of Iran, this study attempts to illustrate the concentration in manufacturing industries of Iran. This topic is evaluated for three industries including the production of foods and beverages, textile and the other of none-metallic minerals, which conclude about 50 percent of total manufacturing industries of Iran, in terms of employment, value added and output amounts in 1995, 2000 and 2005. To do these, this paper is organized as follow: after the introduction section, the theoretical fundamentals are presented in section 2. Section 3 is allocated to background of this study. The analyzing process of data is provided in section 4. Finally, the main results of the study are presented in section 5.

2. Theoretical fundamentals

According to the industrial economics literature, the analysis of market has been based on three patterns namely structure, conduct and performance and then the relationship between them. According to the viewpoints of Structuralism school of economics, the conduct of firms can be affected by their structure and their performance can be influenced by their conduct. By contrast, the proponents of Chicago school of economics believe that behavior is a function of performance and the structure is affected by conduct of firms. In fact, the difference of these schools is related to Direction of causality.
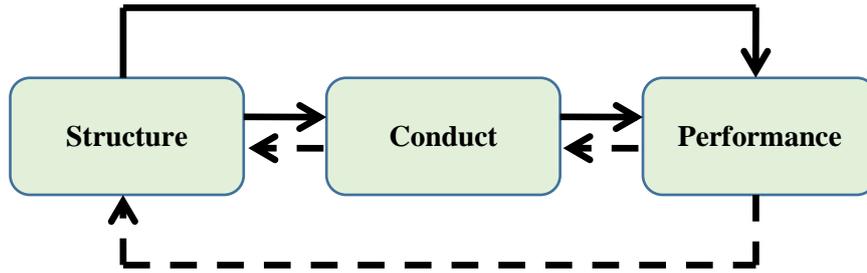
Figure 1: the relationship between structure, conduct and performance of markets

In a general classification, the market structures can be divided into four groups, namely: Perfect Competition, Monopolistic Competition, Oligopoly and Monopoly Market Structure. The competitive market is a criterion that other markets structures can be analyze by it. A more competitive market has the higher efficiency. According to the neoclassical thought, the competition is estimated by the size of firms in comparison to the market size. In practice, the markets are less coincidence with complete market structure. So, the other criteria are needed to determine the market structure (Pourebadollahan Covich et al., 2013). In this context, the concentration ratio is a key index in determining the market structure. The amount of competition and monopoly can be determined by this index as well. According to the industrial economics literature, there are different indices in order to determine the concentration ratio of an industry. So, Lorenz curve and Gini coefficient are useful methods to do that. The Lorenz curve is an important tool for calculation of inequality that can be shown as bellow:
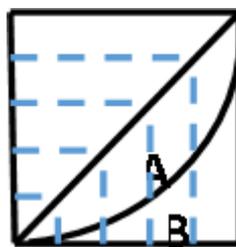
Figure 2: the Lorenz curve and calculation of inequality

As can be seen, in the Figure 2, the horizontal axes denotes cumulative ratio of firms and the vertical axes indicates the cumulative ratio of intended variables (employment, value added and output) and the line $45°$ shows the perfect equality. The Gini coefficient can be estimated with Lorenz curve. The amount of this statistical index is between 0 and 1. The zero indicates the perfect equality and the complete inequality is shown with 1. According to the fig. 1, the Gini coefficient is equal to the portion of A on A+B.

According to the theoretical foundations, there is a direct relationship between monopoly and industrial concentration so that the more concentration ratio shows the high degree of monopoly as well as more unequal distribution of market power between the firms. The application of these methods has been neglected in determining the industrial structure in Iran. Therefore, using Lorenz curve and Gini coefficient this paper tries to investigate the market structure of three main industry of Iran (including the production of foods and beverages, textile and the other of none-metallic mineral products).

3. Background Overview

Although, the industrial structure has been investigated by using the concentration ratio and Herfindahl-Hirschman methods in several studies, but, there are a few studies that indicate the industrial structure by Lorenz curve and Gini coefficient. Specially, this topic is most regular in the manufacturing industries sector. Therefore, this study attempts to present the existent study by classification them into domestic and foreign studies. In addition, the foreign studies have been presented for developed and developing countries separately. It would be noted that, according to the awareness of the authors of this study, there is only one study that has used the Lorenz curve in order to indicate the industrial structure in Iran, So, the most of presented researches in this section are allocated to foreign studies.

3.1. Foreign Studies

Guth (1971) for the first time indicated the structure of manufacturing industries in developed countries. Hence, by comparison his study with the presented studies in developing countries, the 30 years delays are considerable. In line with Guth, some studies have focused on the concentration of markets. These studies can be presented as follow:

3.1.1. Developed Countries
Australia

Hanson and Simmons (1995), about two decades after Guth, analyzed the market concentration to examine the buyer competition in wool market between 1974 and 1992. In this study, three measures of concentration have been used namely concentrations ratios, Herfindahl-Hirschman index (HHI) and Lorenz curve. The conclusions indicated that the buying sector in the Australian wool market was relatively concentrated.

UK

Campos (2012) examined both the geographical concentration of industries and the industrial specializations of local authority areas in UK. The degree of geographical concentration of industries was measured using three indicators: the Herfindahl-Hirschman index, the locational Gini coefficient and the Maurel and Sedillot index. The results for the Gini coefficient showed that sixteen of the thirty industries listed are manufacturing industries with high levels of concentration.

USA

In a recent study, Henly and Sanchez (2009) investigated the size distribution of establishments in manufacturing and service sectors using Lorenz curve during the period of 1974–2006. In this study, the number of workers has been considered as a proxy for size of firm. The results revealed that Service establishments became larger and service labor became more concentrated in large establishments while opposite trends were observed in manufactures.

3.1.2. Developing countries

Although, the industrial structure, firstly, has been evaluated using Lorenz curve and Gini coefficient by Gute (1971), but, as mentioned before, this subject is new in developing countries yet. The most bodies of literature on this topic have been provided after year 2000.

Albania

Kanyenga and Mangisoni (2007) studied the market concentration of Malawian tobacco industry in order to determine the size distribution of firms and concentration intensity. To do this, the purchase data was used for the period of 1996-2006. The results revealed that about 60 percent of firms had only 20 percent of cumulative frequency of market share. This indicated that the big size firms have controlled the market. Also, the numbers of firms have decreased from 9 in 1998 to 6 in 2006. This reduction was because of the merging the firms. The amounts of

concentration ratio, Herfindahl-Hirschman index and Gini coefficients were evaluated 0.98, 3.119 and 0.57 respectively. This means that all of three indices are more than their threshold levels. According to the estimated results, the increase of space between Lorenz curve and line 45° indicated the high concentration in tobacco industry.

Pulaj and Kume (2013) studied the structure of construction industry in Vlora region during the years 2003-2013. They applied the concentration ratio (CR4) method, HHI and Gini Coefficient to analyze the absolute concentration ratio and relative concentration ratio as well. The results revealed that the construction industry is a low concentrated industry.

India

Singh (2012) analyzed the concentration trends in Indian manufacturing sector using Gini coefficients and Herschman Herfindal index. For computing concentration levels among different states, six alternative variables namely, i) Numbers of Factories; ii) Fixed Capital; iii) Total Persons Engaged; iv) Fuel Consumed; v) Material Consumed; and vi) Gross Output, have been used during the period of 1979-2009. Also, the sensitivity of the results has been checked using two indices, Mann whitney U test and Wilcoxon rank-sum test. The comparison of concentration indices showed that there were no significant differences between them. Based on intended indices, the results revealed that the average of Gini coefficient was between 0.56 and 0.6 for the states. Therefore, the inequity between Indian manufacturing industries was high.

Kenya

Nambiro et al. (2001) analyzed the organization of the market and assessed the degree of competition in maize hybrid seed production and retailing in four aspects, namely: market concentration, product differentiation, market integration and conditions for entry in the hybrid maize seed business. The analysis of the market structure revealed that maize hybrid seed market had imperfect competition structure. This was due to several factors such as unequally distributed shares of transactions among traders, product differentiation, and barriers to entry. But, the structure of market, with a Gini Coefficient of 0.6 in the district, was categorized as oligopolistic, with 61.67% of the market share going to the 4 largest firms. The results showed that the first five decimals had only 10 percent of market shares. While, the 10th decimal had 60 percent of maize hybrid seed retails, solely.

Malaysia

Sing (2004) analyzed the structure of the food manufacturing industry in Malaysia. The data used in this study was based on secondary data collected from various firms registered under the Company Commission of Malaysia. This study covered a period of 10 years, i.e. from 1992 to 2002. The Concentration Ratio (CR) and Herfindahl-Hirschman Index (HHI) and Gini Coefficient (GC) are used to measure the market structure. The results indicated that the Malaysian food manufacturing industry tended to have low concentrated market throughout the study period.

Nigeria

Ali and Sani (2015) have studies the Sesame market structure in Jigawa state of Nigeria during the period of 2000-2012. Using a simple random sampling procedure, four sesame markets (Two of the markets were rural and the other two were urban) were selected in which 117 traders and 39 selling agents were interviewed as well. The concentration degree has been indicated by Lorenz curve and Gini coefficient. The market structure analysis revealed that urban selling agents and rural traders command greater influence.

South Africa

Fedderke and Naumann (2005) explored the trends in industry concentration of the South African manufacturing industry over the period of 1972-2001, with a primary focus on developments post 1996. Across all sectors of the manufacturing industry, concentration was found to have decreased.

The Gauteng treasury (2009) in a research study analyzed the effect that a high degree of industrial concentration could have on employment, investment and productivity with focus on the manufacturing sector. The results indicated that a higher degree of industrial concentration does not necessarily lead to lower employment. Also, higher concentration was positively related to investment and negatively related to productivity.

3.2. Domestic Studies

There are a body of literature that studied the structure of Iranian manufacturing industries. Although, some studies has attempted to indicate the structure of manufacturing industries in Iran using various methods, but, according to the findings of the authors of this study, only Pourebadollahan Covich et al. (2013) have investigated the concentration of Iranian cement industry using Gini coefficient and Lorenz curve during the period of 2001-2008. The data population of this study was all of

producers of cement in Iran. The number of these firms was 36 in 2001 and increased gradually to 54 firms in 2008. The results of this study showed that the concentration of the cement industry has decreased according to the absolute indices, but has increased based on inequality indices, Lorenz curve and Gini coefficient. This indicates that despite the increase of inequality in cement industry, the increase of the number of firms has caused to decrease the concentration and monopoly power. Accordingly, if the inequality between firms be more important to emphasis, some indices such as the Gini coefficient and the variance of logarithm of firms' size will more preferable. On the other hands, if the number of firms is important for consideration, the comparative anthrophy will more suitable. Finally, if two factors be important, the Herfindahl-Hirschman index and concentration ratio can be used as well.

Therefore, the performed studies on determining the structure of industries using Lorenz curve and Gini coefficient in both developed and developing countries show that:

1. The advertizing expenditures could be increased the Gini coefficient significantly.

2. While, some of studies have shown the decrease in Gini coefficient and the tendency to competitiveness in some industries, but, various findings have indicated the increase in Gini coefficient and propensity to monopoly.

3. There are partial and significant differences between the structures of industries based on Gini coefficient.

As noted in the background overview sections, the Gini coefficient is one of the indicators used to determine the concentration rate and the degree of monopoly in each industry. However, a few studies in Iran have used this method to determine the rate of industrial concentration. Also, this study tried to use this method to determine the degree of concentration of three main manufacturing industries in Iran. Therefore, this research is temporally and spatially different from other studies in this area.
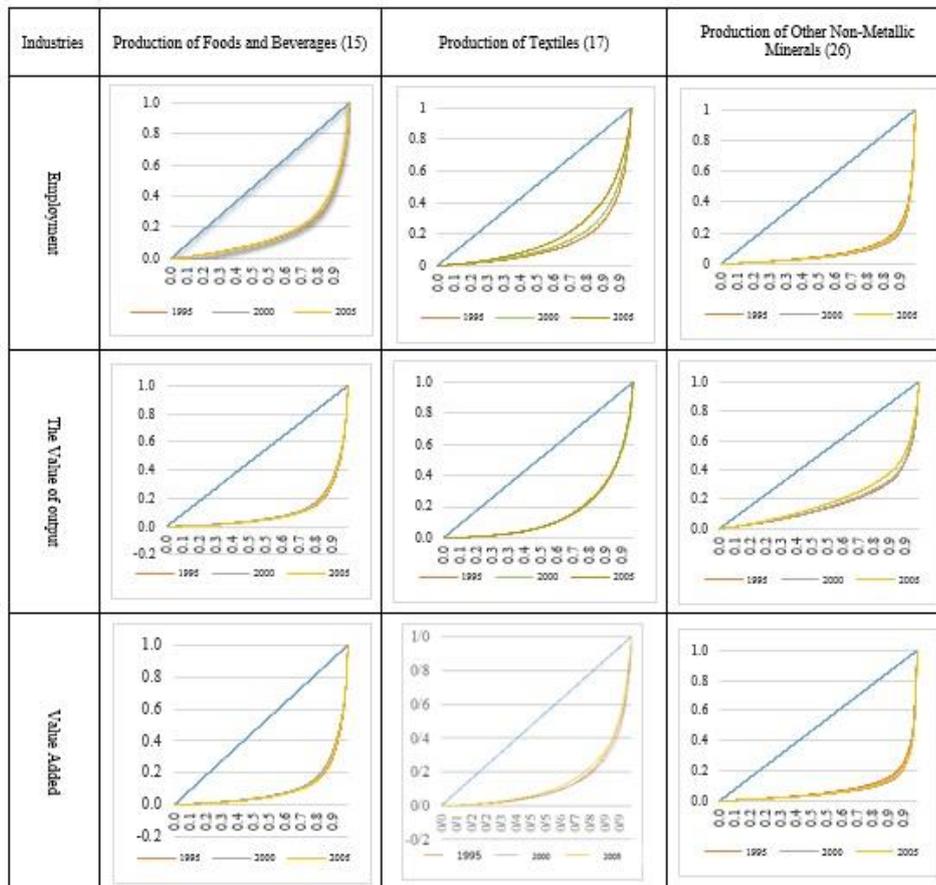
4. Findings

In this study, the needed Data is provided using the census of industrial factories with 10 workers and more in order to investigate the concentration ratio in three Iranian industries including food and beverages products, production of textiles and non-metallic minerals products. These industries had 17, 10 and 22 percent of the number of

firms in 2005, respectively. Indeed, about 50 percent of all of firms can be classified in these industries. The analysis of industrial structure using Lorenz curve in terms of employment, value added and the value of output variables is presented in Table 1 for 1995, 2000 and 2005.

As can be seen, all of these industries have high concentration ratio in terms of introduced criteria. Therefore, they have non-competition structure. Also, the degree of monopoly in these industries has not decreased significantly. Nevertheless, subject to the presented graphs in Table 1, the intensity of monopoly and its changes during the time is not equal in three intended indices.

**Table 1: The analysis of industrial structure using Lorenz curve:
1995, 2000 & 2005**

Source: Authors, Finding

To present a better explanation about the changes in these industries, the estimated equations by MATLAB software is used and presented in Table 2. These equations will provide the estimation of Gini coefficient or the space between the Lorenz curve and line $45°$. The estimated results of Gini coefficient is provided in Table 3. Table 3 shows that the industries had the concentration ratio more than 0.6 in all of studied years. In other words, all of these industries has a monopoly structure but with different degree. For example, the Gini coefficient amounts have decreased in these industries in terms of employment variable from 1995 to 2005, but about the production of food and beverages industry, at first the amount of Gini coefficient has declined from 1995 to 2000 and then increased in 2005 in terms of value added variable. Also, the amount of Gini coefficient in other industries (production of textiles and Production of other non-metallic minerals industries) has increased until 2000 and then decreased in 2005 in terms of both employment and value added variables. Summing up, the concentration ratio of food and beverages industry has declined in terms of value added and output during the studied years. But the intensity of monopoly in both production of textiles and Production of other non-metallic minerals industries has increased by contrast.

Table 2: Calculation of industrial structure using Lorenz curve

indices	year	Production of Foods & Beverages (15)	Production of Textiles (17)	Production of Other Non-Metallic Minerals (26)
Employment	1995	$0.807X^2 - 0.299X + 0.051$	$1.110X^2 - 0.061X + 0.075$	$1.032X^2 - 0.509X + 0.068$
	2000	$0.813X^2 - 0.290X + 0.050$	$1.158X^2 - 0.609X + 0.074$	$1.033X^2 - 0.503X + 0.069$
	2005	$0.835 - 0.254X + 0.048$	$1.207X^2 - 0.561X + 0.068$	$1.113X^2 - 0.548X + 0.071$
output value	1995	$0.725X^2 - 0.421X + 0.053$	$1.202X^2 - 0.700X + 0.078$	$1.008X^2 - 0.625X + 0.073$
	2000	$0.691X^2 - 0.421X + 0.053$	$1.108X^2 - 0.637X + 0.074$	$1.072X^2 - 0.659X + 0.077$
	2005	$0.639X^2 - 0.370X + 0.047$	$1.244X^2 - 0.699X + 0.078$	$1.055X^2 - 0.662X + 0.076$
Added Value	1995	$0.802X^2 - 0.476X + 0.059$	$1.288X^2 - 0.711X + 0.076$	$1.064X^2 - 0.676X + 0.077$
	2000	$0.749X^2 - 0.459X + 0.057$	$1.260X^2 - 0.700X + 0.076$	$1.116X^2 - 0.712X + 0.082$
	2005	$0.762X^2 - 0.457X + 0.056$	$1.244X^2 - 0.728X + 0.079$	$1.150X^2 - 0.754X + 0.086$

Source: Authors, Finding

Table 3: Calculation of Gini Coefficient in intended industries

indices	year	Production of Foods & Beverages (15)	Production of Textiles (17)	Production of Other Non-Metallic Minerals (26)
Employment	1995	0,683	0,726	0,658
	2000	0,676	0,688	0,647
	2005	0,662	0,610	0,600
output value	1995	0,811	0,698	0,822
	2000	0,803	0,700	0,845
	2005	0,815	0,696	0,836
Added Value	1995	0,804	0,742	0,829
	2000	0,789	0,752	0,852
	2005	0,805	0,714	0,850

Source: Authors' Finding

5. Conclusions

Despite the importance of determining the structure of manufacturing industries using Lorenz curve and Gini coefficient, there are a few studies that use this method in Iran. Accordingly, this study attempts to investigate the structure of three Iranian industries namely: production of food and beverages, production of textiles and production of other non-metallic minerals. The findings show that all of these industries have high concentration ratio and a structure near to monopoly. Also, the intensity of monopoly has not changed considerable in the studied years. Therefore, these industries always have enjoyed from a concentration ratio more than 0.6 in terms of three variables namely: employment and value added and output variables. Also, with emphasis on the value added as one of the most important indicator for profitability, the concentration of the production of food and beverages has decreased but this amount for other industries has increased during the studied years. Summing up, despite a few changes in the trend of concentration, these industries have a structure near to monopoly. Therefore and in terms of policy, in line with the other studies, the performing of policies that eliminates the monopoly in the studied manufacturing industries of Iran is needed in order to provide the competition situations. Considering that the concentration of two intended industries, manufacture of textile and production of other non-metallic minerals, have been increased; therefore, the serious efforts should be

performed to reduce concentration rates in these industries. As if, these industries have the highest production and exports levels in the country; hence, the lack of planning to strengthen the competitiveness of these industries will further undermine their structure. Also, the growth of competition in international markets has increasingly signaled the importance of planning to reduce the concentration in these industries. Although, the manufacture of food and beverages industry has experienced the monopoly structure but, this change has not been dramatic and the concentration of this industry is still high. Therefore, the adoption of appropriate policies to improve competitiveness in these industries is the most important policy recommendation of this research.

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