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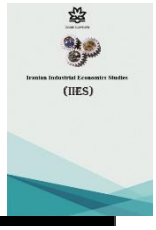

An Evaluation of Monopoly Power of Manufacturing Sector in Iran

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A B S T R A C T

This paper investigates the market structure in the manufacturing sector of Iran from 1995 to 2013. There are a number of competition measures that can be calculated. Due to the limited scope of this study, we employ a non-structural measure of competition, namely the Panzar-Rosse H-statistic. This is a widely used measure of competition which has a relatively modest data demand. As a complement, we have also calculated the value of two structural competitions indices: CR4 and HHI. The results obtained from the Panzar-Rosse test indicated a monopolistically competitive market structure for the manufacturing sector in Iran. On the other hand, the results obtained from HHI and CR4 showed a high level of concentration in Iranian industries with a decreasing trend and a high level of market concentration. Thus, half of the industries in Iran utilize effective monopoly structure. However, in general, the decline in concentration trend indicates that the monopoly reduced during the study.

1. Introduction

Iranian economy and the financial system have experienced major changes over the past decades. Iran is working to build up various industries within its manufacturing sector. In terms of the importance of monopoly power in industrial sector of Iran, it is believed that industry, especially in developed countries, devoted a big share to production and added value and employment among domestic economic activities. In fact, manufacturing industries are considered as the engine of economic growth and development. Due to the governmental economy of Iran and its reliance on crude-oil revenues, limited reserves, specific rules, high cost of legal contracts, international sanctions, and market restriction, there has been a low level of competition in industrial activities, and therefore there are not enough opportunities to rebuild the competitive structure. Previous research showed that nearly 50% of Iranian industries had monopoly structures, which was an obstacle to the active participation of industries in the field of international competition. However, competitive advantage enables the firms to offer products with a suitable price, quality, and high efficiency (Khodadad Kashi, 2001). Iranian industrial units rely on imported intermediary goods and services from Europe. Access to imported intermediate goods has been complicated since European banks have scaled down financial transactions with Iranian businesses.

Estimating and analyzing monopoly power are the main and basic discussions in industrial organization. Designing and exercising the anti-monopoly laws are the key concepts. On the other hand, monopoly power is considered to be important due to its various impacts on the market. Hamza (2011), Iwata (1974), Khodadad Kashi (2000, 2001), Lau (1982), Panzar & Ross (1977), Saving (1970) and Schroeter (1988) have examined the market structure and power in different countries.

The literature on the level of competition can be divided into two approaches: structural and non-structural methods. The structural approach consists of S-C-P and efficiency hypothesis as well as a number of formal approaches having roots in industrial organization theory. Different approaches such as Iwata (1974), Bresnahan and Lau's models (Bresnahan, 1982; Lau, 1982), and Panzar Rosse's Models (Rosse & Panzar, 1977; Panzar & Rosse, 1987) are included in non-structural paradigm, which is known as New Empirical industrial aspect. Structural models investigate whether a highly concentrated market leads to collusive behaviour among large firms, or it is the efficiency of larger firms that leads to higher concentration. The basic premise of the non-structural approach is that firms within an industry behave differently depending on the market structure in which they operate (Baumol, et al., 1983).

The latter method has found particularly widespread application in the literature due to its modest data requirements, single-equation linear estimation, and robustness in market definition (Shaffer, 2004a, 2004b).

This paper investigates market conduct and performance through employing a non-structural model in the tradition of the NEIO. The so-called Rosse-Panzar test is based on the reduced revenue function of the firm and determines market structure based on the comparative statics of the total revenue function with respect to cost via a theoretical perspective. Although these reduced-form models are generally less powerful than structural models are, they inflict less demanding data requirements and reduce the risk of employing an ill-specified model. Reduced-form approaches are often nonparametric and rely on the comparative statics of some economically relevant? Furthermore, the level of concentration in the manufacturing sector of Iran is measured by several commonly used indicators, namely four-firm concentration ratio (CR4) and Hirschman-Herfindal index (HHI), as reported in Table 4. It should be noted that the correlation between concentration and competition is extremely low.

The aim of the article is to evaluate the degree of competition in the manufacturing sector of Iran during the period of 1995–2013. Due to the limited access to data at the firm level, the author has assigned a time interval of 1995–2013. General structure of the research has been prepared in a five-part structure. Section two briefly reviews the empirical studies on market competition. Section three focuses on research methodology. In section four, the data and empirical results are presented, and the last section is devoted to conclusions.

2. Theoretical background

There are two main approaches in the literature analyzing the effects of market structure and competition on efficiency, namely structural and non-structural approaches. The SCP hypothesis and efficiency hypothesis (EH) are parts of the structural approach. The SCP hypothesis establishes a direct link between market share and concentration to market power and concludes that market power would result in higher prices and profits and social efficiency losses (Berger, et al., 2004; Berger & Hannan, 1989; Bikker & Haaf, 2002; Casu & Girardone, 2006; Duncan & Langrin, 2002). The efficiency hypothesis, EH, which stems from Demsetz (1974) and Peltzman (1977), states that efficient firms increase in size and therefore in market share due to their ability to generate higher profits, which leads to higher market concentration (Berger, et al., 2004; Evanoff & Fortier, 1988; Smirlock, 1985).

Following the efficiency hypothesis, the discussions on the need to endogenize the market structure into the models have resulted in non-structural models. Iwata (1974), Bresnahan (1982) Lau (1982) and Panzar & Rosse (1987) are the three separate applications of non-structural models using a distinct feature of competition measurements via estimating deviation from competitive pricing (Gutiérrez de Rozas, 2007). For example, Bresnahan (1982) and Lau (1982) presented a short-run model for the Empirical determination of the market power in an average firm. Based on time-series of industry data, they estimated a parameter which can be interpreted as a conjectural variation coefficient or the perceived marginal revenue. This parameter represents the behaviour of firms and the degree of competition (Bresnahan, 1982, 1989; Lau, 1982; Alexander, 1988). Among these three models, the Panzar-Rose model is probably known as the most commonly used way to evaluate the competition-efficiency issues in both developed and developing economies.

With regard to Panzer-Rosse test, Acikalin & Sakinc (2015) evaluated competitive condition and scale of concentration in Turkish banks using Panzar-Rosse model, CR3, CR4, and HHI. Hamza (2011) explored market structure in banking section of Tunisia using Panzar-Rosse non-structure model and panel data during 1999-2008. The results indicated the competition structure via statistics H=0/67.

Moreover, rejection of hypothesis test of competitive and monopolistic market structure is another confirmation on the premise that the income of the banking section in Tunisia will be obtained by monopolistic competition structure. Bikker, et al., (2009) evaluated competitive behaviour in banking industry using Panzer-Rosse test and 110.000 annually banking observations on 18,000 banks in 67 countries during 1986-2004. Mkrtchyan (2015) employed the P-R test to estimate the empirical evidence on competitive structure in Armenian banking industry during 1998-2002. Her findings showed a reduction in bank numbers, a simultaneous increase in concentration, and a decline in competition conditions, which confirm monopolistic competition.

The P-R model has been applied more often to the banking industry sector, and some studies include Park (2013) on South Korean and Chinese commercial banking markets, Memic (2015) on Bosnia and Herzegovina's banking, Pestana Barros & Mendes (2016) on Angola's banking, and Simatele (2015) on South African banking sector. The applicability of the P-R model is much wider and not limited to banks. For instance, Panzar and Rosse (1987) and Savage (1995) applied the P-R test to assess Market structure in the U.S. Motor carrier industry. Fischer &Kamerschen (2003) employed the P-R test to assess competition and market structure in U.S. Airline Industry in selected originating from Atlanta. Their findings showed that conduct in most airport-pairs was consistent with a range of conduct deviating from the Cournot oligopoly both to more and less competitive behavior. Tsutsui & Kamesaka (2005) applied the P-R test to assess the competitive conditions in the securities industry. Using the Panzar and Rosse model, Kasman & Turgutlu (2008) examined market structure in the Turkish insurance industry during 1996-2004. Their results indicated that in the insurance firms in Turkey earned revenues under the monopoly or conjectural variations of short-run oligopoly, and insurance market was neither monopolistic nor perfectly competitive.

3. Research Methodology

The Rosse-Panzar test (1987) belongs to the tradition of the New Empirical Industrial Organization. It is based on the comparative statics of a reduced form revenue equation, offers patterns for testing monopoly condition in industry, and has been widely applied to assess competitive conduct. In their model, gross revenue was regressed to price and exogenous factors. It should be noted that in Panzer-Rosse test; the behavior of firms in the market is observed based on comparative static features of the reduced form equation. In Panzer-Rosse model, it is hypothesized that price elasticity of demand is more than one, and according to this assumption, the profit of firms and industrial levels is maximized to reach the determined equilibrium product and the number of equilibrium firms. In fact, in the sample firm I, equating the marginal cost and marginal revenue will maximize its profit. Panzer-Rosse considers two exogenous elements in the function of cost and revenue to provide ability to shift the two functions. Secondly, in long-run, the profit is equal to zero, and the degree of competition depends on the way revenue reacts to changes in input prices in the long-run. Panzer-Rosse offered an index which was obtained via summing of revenue elasticity (in reduced-form equation of revenue) in terms of the changes in input prices (Bikker & et al., 2009). The value of the index is located between infinite negative to one.

$$\log(TR) = \alpha + \sum_{i=1}^{n} \beta_i \log(Wi) + \sum_{i=1}^{n} \gamma \log(CF_i) + \varepsilon_{it} \qquad (1)$$

In equation 1, (CFi) is the vector of exogenous effective factors on total revenue, (wi) shows the price of production inputs, and (TR) represents the total revenue of gross. Panzer-Rosse (1987) showed that H-statistic is the sum of input price elasticities:

$$H = \sum_{i=1}^{n} \beta_i \qquad (2)$$

Consider the competitive structure of the market. As in a competitive market, H is equal to unity (H=1), between zero and one for a monopolistic competitor and is negative for a neoclassical monopolist (Bikker & Haaf, 2002). Some studies including Bikker & Haaf (2002), Claessens & Laeven (2004), and Smirlock (1985) provided evidence on the (none) relationship between concentration and profitability in banking. The Journal of Money, Credit, and Banking has interpreted the H statistic as a continuous monotonic index of conduct.

This section will describe the relationship between concentration and competition. This paper employs two-frequently applied types of such indices as a proxy of market concentration. The first index is Herfindahl- Hirschman index, It is the sum of squares market share of the whole industry firms, $HHI = \sum_{i=1}^{n} S_i^2$ (Bikker & Haaf, 2000). After calculating HHI, if value is under 1000, it is concluded that the market is on competitive condition. However, if it is higher than 1800, we should be concerned that anti-competitive forces are active, and if its value approaches 10000, market is close to monopoly .The second index is called N-firms concentration ratio (CRn), which takes the market shares of k biggest firms in the market, while ignoring the remaining firms:

$$CR_n = \sum_{i=1}^{i=N} Si \qquad i = 1,\ldots\ldots, k, \quad k > n \ (3)$$

For example, The CR4 is the sum of the market share of four largest firms, whatever the value of the four-firm concentration ratio is closer to one, we conclude that market is close to monopoly and is remote from competition.

4. Empirical Results

In this study, a reduced form equation related to gross revenue is used in order to estimate the econometric pattern in (P-R) test:

$$\log TR = \alpha + \sum_{i=1}^{4} \beta_i \log W_{it} + \sum_{j=1}^{2} \gamma_j \log CF_{it} + \varepsilon_{it} \qquad (4)$$

$$\log TR = \alpha + \beta_1 \log RC_{it} + \beta_2 \log Pm + \beta_3 \log Pe_{it} + \beta_4 \log W_{it} + \beta_5 \log CR4 + \beta_6 \log Q_{it} + \varepsilon_{it} (5)$$

As if (TR) is total revenue, (Wit) is the unit price of production inputs including rental rate of capital (RC)1, the unit price of raw materials (Pm), the unit price of energy (Pe)2, and the unit price of labor (w), (CFit) is control factor for firms including concentration of four superior firms (CR4) and output value (Q), and εit is error term. In this pattern, H-Statistic is equal to sum of elasticity of total revenue to changes in price of production inputs and is calculated as follows (Bikker, Shaffer, & Spiderijk, 2009).

$$H = \sum_{i=1}^{4} \left(\frac{dR_{it}}{dW_{it}} \cdot \frac{W_{it}}{R_{it}} \right) = \sum_{i=1}^{4} \beta_i \qquad (6)$$

One of the basic specifications of H-Statistic is that the tests shall be applied in long-term equilibrium. This was the case in previous studies (Molyneux et al., 1994; De bndet & Davies, 2000; Yu Sun, 2011; Massood & Aktas, 2010). Empirical P-R studies have long applied a separate test for market equilibrium, in which a firm's return on assets (ROA)3 replaces total revenue, as the dependent variable in a reduced-form regression equation using the same explanatory variables as the standard P-R revenue equation (that is input prices and usually other control variables) (Bikker et al., 2009). A large body the existing literature uses a regression that relates the return on assets (ROA) with input prices.

$$\log(ROA) = \alpha + \sum_{i=1}^{4} \beta_i \log W_{it} + \sum_{j=1}^{2} \gamma_j \log CF_{it} + \varepsilon_{it} \qquad (7)$$

[1].The neoclassical approach is used to calculate the rental rate of capital $pv = w^n l + p_c k + \Omega$

Where p is the index of the wholesale price, v value added, capital stock, l labor force, w wages, p_c rental rate and Ω profits.

[2].The raw material and energy prices are derived using the Hal and Jorgenson simplified approach, with the discounting of the raw materials and energy of each firm or industry adjusted by the index of industrial disinflation.

[3].The ROA ratio is calculated by comparing net income to total assets (Bikker, Shaffer, & Spierdijk, 2009).

E=β1+β2+β3+β4, E=0 indicates long-run equilibrium, while E<0 reflects disequilibrium (Panzer & Rosse, 1982, 1987; Molyneux et al., 1994) (Table.1).

Table1. Summary of the Discriminatory Power of H statistics

Parameter Region environment	Competitive
H ≤ 0 short run	Monopoly or conjectural variations
	Oligopoly
$0 < H < 1$	Monopolistic competition
H = 1	Perfect competition or natural monopoly in a Perfectly contestable market or sales maximizing firm subject to a break even constraint
Parameter Region	Market Equilibrium Test
E = 0	Equilibrium
E ≠ 0	Disequilibrium

Source: Panzar and Rosse (1982, 1987), Molyneux et al. (1994)

Empirical Analysis

As noted previously, in the present study, Panzer-Rosse (PR) test was used in order to estimate the degree of competition in industry of Iran, as previous studies (Claessens & Laeven 2003) estimated the degree of competition in banking industry. The data collected from the annual reports of Statistical Centre of Iran during 1995-2013.

Before estimating the total revenue equation in Panzer-Rosse model, in order to prevent from spurious regression estimates and results, it is necessary to apply unit-root test statistic and cointegration test. The results of unit root test using Levin, Lin, & Chu (2002) test showed that the variables are stationary with the 1st difference. Besides, Pedroni cointegration test Statistics (2004) rejected the assumption of no cointegration among variables, which shows that the variables are cointegration in long-term. On the other hand, after the test [FLeamer Test (129,2174)= 9.6308, Prob=0.000], panel data method was chosen. Based on the Hausman test [Hausman Test (20.4412, prob=0.000)], the random effects model was rejected in favour of fixed effects.

Table2. Competitive Conditions Test Results for Iran Industry in 1995-2013(The dependent variable (TR))

Variable	Coefficients	t-statistics	prob
Constant	0.4469	8.8526	0.0000
Log of capital rental rate	0.0018	0.9780	0.3282
Log of raw materials price	0.0851	9.8858	0.0000
Log of energy price	0.0101	3.4625	0.0005
Log of price of labor	-0.0024	-2.3470	0.0190
concentration of four superior firms log of output value	0.0087	3.0032	0.0027
	0.8947	90.768	0.0000
R-squared	0.9994		
D.W	1.7245		
Prob	0.0000		
H=0.0946	The Wald test rejects H=0 at the 1% significance level The Wald test rejects H=1 at the 1% significance level		

Source: current research
Comment: Examining the p-values corresponding to the appropriate t-value shows that all coefficients are significant at 1% or a better level

Table 2 presents the coefficient estimates along with their t-statistics. H-statistic of Panzer-Rosse test was obtained to be H= 0.094, which it is located between zero and one and shows that the dominant structure on Iran's Manufacturing sector was monopolistic competition during 1995-2013. The Wald test rejects the hypothesis of monopolistic market structure (H=0) at a 1% significance level. It also rejects the hypothesis of perfectly competitive market structure (H=1) at a 1% significance level. The estimates of H-statistics for the long-run equilibrium, which use the return on assets (ROA) as the dependent variable, are reported in Table 3. The estimated values of H for the long-run equilibrium test are not statistically different from zero. Hence, the long-run equilibrium condition appears to be established in each of the sub-period , and therefore the above interpretation of H-statistics is meaningful. Finally, we test long-run equilibrium using ROA (ratio of net profit to total asset) as the dependent variable. After testing,

[F Leamer (129, 2174) = 9.6308, Prob= 0.000 & Hausman Test (189.1413, prob= 0.000)] fixed effects method was chosen. The results of this estimation are presented in Tables 3. The Wald test does not reject the null hypothesis E= 0. (Long-run equilibrium exists over the period).

Table 3. Equilibrium Test Results for Iran industry in 1995-2013 (Dependent variable –ROA)

Variable	Coefficients	t-statistics	prob
Constant	-3.5913	-2.9691	0.0030
Log of capital rental rate	0.3571	3.0359	0.0024
Log of raw materials price	-0.2610	-2.2565	0.0241
Log of energy price	-0.0194	-0.4705	0.6380
Log of price of labor	--0.0744	-2.7410	0.0062
concentration of four superior firms log of	-0.0014	-0.1844	0.8537
output value	1.8226	8.9392	0.0000
R-squared	0.9875		
D-W	1.8633		
Prob	0.0000		
	The Wald test does not reject the null hypothesis E=0 at a conventional significance level. (F-statistic=1237,79 Prob=0.000)		

Source: finding research
Comment: Examining the p-values corresponding to the appropriate t-value shows that all coefficients are significant at the 1% or better level.

According to the Tables above, our results are consistent with the results obtained by Hamza (2011), Mkrtchyan (2015), Fischer and Kamerschen (2003), who used a similar the Panzer-Rosse method.

In this part, the Average Herfindhal-Hirshman Index (HHI) and four-firm concentration ratio (CR4) are calculated between 1995 and 2013 (Table 4). Due to the simplicity of the calculation, in experimental works, the share of four-firm concentration ratio (CR4) shows better market conditions. This index is

used more frequently in articles, and some economists have sought to provide more theoretical support for it (Saving, 1970).

In the following section, the changes of concentration in manufacturing sector of Iran in terms of CR4 and HHI during 1995-2013 are depicted in Table 5.

Table 4. The Average HHI and CR4 -values during 1995-2013.

year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
HHI	0/21	0.21	0.19	0.19	0.22	0.21	0.21	0.16	0.17	0/18
CR4	0/60	0/60	0/59	0/59	0/61	0/61	0/60	0/54	0/54	0/55
year	2005	2006	2007	2008	2009	2010	2011	2012	2013	-
HHI	0.19	0.19	0.18	0.17	0.17	0.17	0.16	0.15	0.13	-
CR4	0/56	0/55	0/53	0/52	0/52	0/51	0/52	0/51	0/50	-

Source: finding research

Table 5. Changes of concentration in Iranian industry in terms of CR4 and HHI during 1995-2013

CR4			HHI		
The Average CR4-value At 1995	The Average CR4-value At 2013	The total average CR4- value during 1995-2013	The Average HHI-value At 1995	The Average HHI-value At 2013	The total average HHI-value during 1995-2013
0.60	0.50	0.56	0.21	0.13	0.18

Source: finding research

According to Table 5, based on the average total industry in 2013 compared to 1995 in relation to both indices of HHI and CR4, it can be concluded that concentration ratio in Iran's Manufacturing reduced. During this period, the second, third, and fourth development programs emphasized the abolition of monopoly and the promotion of competition space, and a privatization program was introduced. This has led to an increase in entry of the firms into industries and a decrease in their market share. Consequently, the concentration indicators have also declined somewhat. The average HHI-value reduced from 0.21 in 1996 to 0.13 in 2013, and CR4 decreased from 0.60 to 0.50.

In the following, the average concentration indices for each industry are presented in Table 6. According to the relevant index, the status of each industry can be characterized as competitive or monopolistic.

Thus, according to the classification in Table 7, it can be claimed that in half of the Iranian Manufacturing, effective monopoly structure was dominant. In terms of HHI index, almost 49 industries out of 131 industries and in terms of CR4, 54 industries had a high concentration rate and were remote from a competitive arena. Therefore, based on the results obtained from HHI and CR4, it can be claimed that more than half of Iran's industries dominate the monopoly structure, and the Monopoly almost reduced during this years. The most concentrated industries are production Malta and beer code (1553), production tobacco code (1600), carpet and handy Jajim code (1725), panting furry skin code (1820), and jewel and related articles code (3691). Additionally, the most competitive Iranian Manufacturing sectors are preparation and sowing textiles code (1711), production carpet and moquette code (1726), production plastic excluding shoes code (2520), cutting, shaping and completing stone code (2696), and production concrete code (2697).

Table 6. The Average HHI and CR4 –values for each industry

Industry	HHI	CR4	Industry	HHI	CR4
Processing and protection of fish and seafood	0/04	0/30	Manufacture of wooden containers and containers	0/13	0/57
Production of edible oils and fats	0.09	0/50	Other wood products and ozone production	0/13	0/60
Slaughter of livestock and poultry	0/02	0/20	Manufacture of pulp and paper and paperboard	0/20	0/77
Processing and protecting meat from corruption	0/03	0/29	Carton boxes and paper packaging	0/04	0/29
Clear date palette	0/05	0/34	Manufacture of other paper and paper products	0/05	0/34
Clear the pistachio packaging	0/23	0/74	Publishing a booklet and music booklet	0/26	0/70
Processing and protection of fruits and vegetables from corruption	0/02	0/26	Publishing newspapers and periodicals	0/13	0/50
Manufacture of dairy products	0/03	0/29	Other Publications	0/59	0/99
Preparing and grinding cereals	0/11	0/54	print	0/08	0/43
Production of starch and starch products	0/22	0/69	Printing service activities	0/30	0/68
Livestock feed production	0/03	0/24	Production of coke oven products	0/68	0/99
Production of sugarcane	0/04	0/29	Production of refined petroleum products	0/14	0/62
Waco Cocoa Production	0/11	0/56	Production of chemicals except nitrogen compounds	0/12	0/56
Pasta production and flour products	0/07	0/31	Production of fertilizers and nitrogen compounds	0/30	0/92
Bakery	0/02	0/21	Production of plastic material in the form of elastic	0/28	0/80
Vake cookies and biscuits production	0/05	0/39	Agricultural chemical pesticide poisoning	0/19	0/73
Tea Maker	0/22	0/60	Polished oils and similar coatings	0/03	0/22
Other unclassified products elsewhere	0/02	0/30	Medicines and herbal medicine	0/02	0/22
Production of ethyl alcohol	0/22	0/77	Soaps, detergents and cosmetics	0/08	0/47
Malta and Ashma production	0/94	0/99	Other unclassified chemical products	0/05	0/35
Manufacture of carbonated soft drinks	0/06	0/42	Synthetic fiber production	0/45	0/91
Production of inorganic hydrocarbons	0/28	0/77	Vent tire and refill	0/14	0/62
Production of azototene and tobacco products	0/80	1	Rubber products other than shoes	0/06	0/38
Preparation and Degradation of Textile Fibers	0/01	0/09	Manufacture of non-shoe plastic products	0/01	0/15
Finishing textiles	0/17	0/72	Glass Cup Production	0/09	0/47
Manufacture of textile goods excluding apparel	0/06	0/39	Manufacture of glass products except glass	0/08	0/44
Production of rope, string, yarn, and sugar	0/32	0/92	Manufacture of non-construction ceramic goods	0/05	0/31
Manufacture of rugs and handmade rugs	0/19	0/53	Manufacture of ceramic refractory products - heat insulation	0/20	0/80
Production of handmade Vizilo carpet	0/71	1	Production of cement and lime and gypsum	0/04	0/28
Manufacture of carpets and carpets	0/24	0/22	Manufacture of products made of concrete and plaster	0/02	0/20
Other unclassified textiles elsewhere	0/14	0/61	Cut and shape and finish the stone	0/00	0/09
Knitwear and knitting	0/06	0/40	Brick production	0/00	0/06
Weaving socks	0/15	0/57	Manufacture of other non-combustible ceramic and clay products	0/03	0/27
Manufacture of apparel with the exception of fur	0/03	0/27	Other nonmetallic mineral products	0/01	0/11
The action of dyeing the furry skin	0/62	0/60	Production of iron and steel raw materials	0/14	0/65
Tanning and leather finishing	0/05	0/31	Manufacture of basic copper products	0/67	0/95
Manufacture of disposable bags and luggage	0/21	0/76	Manufacture of basic aluminum products	0/23	0/76
Manufacture of shoes	0/03	0/32	Precious metals except iron, copper and aluminum	0/13	0/61
Sawing of wood working machine	0/31	0/76	Cast iron and steel	0/06	0/42
Laminated sheets, varnishes and other materials	0/09	0/57	Manufacture of metal construction products	0/04	0/29
Manufacture of commercial and wooden artifacts	0/07	0/39	Manufacture of electric lamps and lighting equipment	0/11	0/52

Industry	HHI	CR4	Industry	HHI	CR4
Production of tanks and similar metal utensils	0/14	0/54	Other non-classified electrical equipment	0/30	0/78
Hammering and molding of metals and metallurgy of pollens	0/18	0/77	Lamps, tubular lamps and other electronics	0/13	0/55
Metal cladding and mechanical engineering activities	0/11	0/53	Television transmitter and communication system	0/30	0/81
Winning tools and general editing tools	0/06	0/36	TV receiver, audio recorder and audio player	0/19	0/75
Other non-classified metal products	0/03	0/25	Orthopedic medical and surgical equipment	0/05	0/38
Manufacture of motor turbines other than motor vehicles	0/32	0/88	Measuring, control, testing and navigation equipment	0/13	0/64
Manufacture of pumps and compressors and syringes	0/03	0/34	Industrial Operation Control Equipment	0/58	0/99
Manufacture of gear bearings and differential gears	0/18	0/73	Manufacture of optical instruments and photographic equipment	0/50	0/90
Production of stove oven and burner	0/12	0/60	Hours and other hours	0/29	0/87
Manufacture of lifting equipment	0/06	0/35	Manufacture of motor vehicles	0/27	0/78
Manufacture of other machinery by general application	0/05	0/39	Body, room for vehicles and motorcycles	0/30	0/82
Production of agricultural machinery and forests	0/40	0/79	Parts and accessories for motor vehicles	0/41	0/78
Machine Tool Manufacturing	0/07	0/46	Manufacture and repair of all kinds of ships	0/17	0/28
Manufacture of metal-melting machinery	0/37	0/81	Manufacture and repair of all kinds of boats and floats	0/66	0/89
Manufacture of mining and extraction machinery and construction	0/39	0/82	Manufacture and repair of railway equipment	0/08	0/60
Manufacture of machinery, food processing and tobacco processing	0/04	0/32	Manufacture of motorcycles	0/21	0/95
Manufacture of textile and clothing making machinery	0/34	0/80	Manufacture of disabled bicycles and wheelchairs	0/45	0/48
Manufacture of other special purpose machinery	0/06	0/37	Other transportation means not classified	0/08	0/88
Uncategorized Home Appliances Elsewhere	0/04	0/32	Manufacture of furniture	0/73	0/43
Manufacture of office machines and calculators	0/09	0/50	Manufacture of jewelry and related goods	0/28	0/99
Manufacture of electric motors and generators of transformers	0/16	0/62	Manufacture of sporting goods	0/30	0/88
Manufacture of power distribution and control devices	0/06	0/39	Production of gaming and gaming devices	0/04	0/87
Production of insulated wire and cable	0/06	0/40	Casting of nonferrous metals	0/18	0/56
Production of storage and cell and primary batteries	0/33	0/87	Other artifacts not classified	0/27	0/30
			Recycling of scrap metal	0/18	0/78

Source: finding research

Table7. The number of industries and market structure in terms of concentration degrees in Iran

Market structure		Effective Monopoly		Effective Competition
		High concentration	Mid concentration	Non concentrated
Number of industries	HHI	49	24	58
	CR4	54	31	46

Source: finding research

5. Conclusion

This paper examined the evolution of market structure and revenue behavior of Iran's manufacturing industry over a17-years periods (from 1996 to 2013). Revenue behavior of manufacturing industry is studied using Panzar-Rosse model for both the return on assets (ROA) and total revenue-based market. The results of PR model estimate indicate monopolistic competition in Iran's Manufacturing sector. The rejection of monopoly market and perfect competition confirms this finding. The test results indicate that the market is in equilibrium. Furthermore, Concentration ratios including Herfindahl-Hirschman (HHI) and the four firms (CR4) Indices show a high concentrated structure of manufacturing industry. It can be concluded that in half of Iran's Manufacturing, effective monopoly structure is dominant, and monopoly elements in Iranian economy play vital roles. However, in general, focusing on the concentration declining trend, we found that the monopoly reduced somewhat during the period of study. The results are supported by different model specifications and different estimation techniques. Nevertheless, as indicated via the value of H-statistic, economic agents and statesmen improve competitive behaviour of the Manufacturing sector. Hence, the regulators should give continuity to the ongoing financial sector liberalization and reformation, which can help in enhancing competitive market behavior among industries. Supportive medium and small industrial firms and control industrial holdings are extremely important in increasing competition.

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