

UNIVERSITI PUTRA MALAYSIA

PRODUCTIVITY INDICATORS AND MARKET STRUCTURE IN ENTRY AND EXIT MODELS OF IRANIAN MANUFACTURING SECTORS

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By

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Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor

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DEDICATIONS

This thesis is dedicated to my parents who always wish the best for me and to my lovely wife, Mehri, for her affectionate caring, support and encouragement throughout this study.



Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Doctor of Philosophy

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April 2013

Chairman: Suhaila Bt Hj Abdul Jalil, PhD

Faculty : Economics and Management

The decision and the timing of entry and exit are sensitive to condition and cyclical disturbances which are neglected in the Iranian manufacturing sector. The lack of entrants' paying attention to productivity conditions as main determinants of entry is resulted in wastage of resources and growth instability in the manufacturing sector. Iranian authorities of manufacturing sector do not pay much attention to the importance of entry condition; market structures, entry barriers as well as entry incentives and productivity measures. They facilitate the conditions of entry to the industry without paying attention to the ability of entrants, market potential, market structure, and scarcity of natural resource. Basically, entry is an investment behavior that involves long-term decision.



This study attempts to evaluate the structure of the Iranian manufacturing industry by studying estimations of productivity indexes, entry and exit phenomena in the manufacturing sector as a whole, as well as capital and labour intensive sub sectors during the time period of 1997-2006. This study covers five models; three of which deal with industry productivity and the other two focus on entry and exit decisions. In the first three models, variables that act as performance indicators in productivity equations are growth rate of demand, capital output ratio, investment sale ratio, advertising intensity and minimum efficiency scale (MES). The idea being, the productivity and behavior of firms is based on performance indicator, will predict whether they will be able to continue in market route or not. The fourth and fifth models take into account the impacts of incentives, barriers, economic conditions and productivity indicators on entry and exit phenomena. Moreover, it included testing on displacement and replacement effects by considering lagged entry rate and lagged exit rate in the exit and entry equations, respectively. Ultimately, we arrive at a causality relationship between entry and exit rates in Iran's manufacturing industry by adding current entry or exit rate in the exit or entry equations and estimating both equations in simultaneous equation system.

The results of this study reveal several noteworthy findings. While evaluating productivity, it was found that the productivity indexes are highly sensitive to investment sales ratio. The negative and significant coefficients of the investment sale ratio confirm that structures in the manufacturing industry are not suitable for high volume of investment. In addition, minimum efficiency scale as an entry barrier causes increases in profit which result in improvements in labour productivity and labor-capital expenditure productivity.

Analysis of the entry and exit equations, found that in the labour intensive sub sectors factors like profit, advertising, productivity indexes are significant in the estimation of the entry model. Alternatively, advertising, concentration, and productivity indexes are the only significant factors in the exit model. Furthermore, in capital intensive sub sector profit and concentration were detected as significant variables in entry model as well as significant of GDP in exit model. Finally, the one-way causality relationship is accepted in 2SLS and 3SLS models.

In conclusion, knowledge of the variables that influence the productivity indexes and entry and exit phenomena is valuable to policy makers in structuring the Iranian manufacturing sector. They should design a proper policy framework in addressing the identified problems of the industry as well as optimizing the use of capital tools. They should also pay attention to the importance of entry condition; market structures, entry barriers, entry incentives, and productivity measures. Finally, Iranian manufacturing sector will have a stable entry growth, however, this will depend on paying attention to the ability of entrants, market potential and scarcity of resource.

Keywords: Productivity, entry and exit, panel data analysis, manufacturing, market structure

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

PETUNJUK PRODUKTIVITI DAN STRUKTUR PASARAN DALAM MASUK DAN KELUAR MODEL SEKTOR PEMBUATAN IRAN

Oleh

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Keputusan dan masa masuk dan keluar adalah sensitif kepada keadaan dan gangguan kitaran yang diabaikan dalam sektor perkilangan Iran. Kekurangan memberi perhatian peserta kepada keadaan produktiviti sebagai penentu utama kemasukan menyebabkan pembaziran sumber dan ketidakstabilan pertumbuhan dalam sektor perkilangan. Pihak berkuasa Iran sektor pembuatan tidak banyak memberikan perhatian kepada kepentingan keadaan kemasukan; struktur pasaran, halangan kemasukan serta insentif kemasukan dan produktiviti. Mereka memudahkan syarat-syarat kemasukan ke industri tanpa memberi perhatian kepada keupayaan peserta, potensi pasaran, struktur pasaran, dan kekurangan sumber asli. Pada asasnya, kemasukan adalah satu tingkah laku pelaburan yang melibatkan keputusan jangka panjang.

Kajian ini bertujuan untuk menilai struktur industri pembuatan Iran dengan mengkaji anggaran indeks produktiviti, fenomena kemasukan dan keluar dalam sektor pembuatan secara keseluruhan, serta subsektor modal dan buruh yang intensif dalam tempoh masa 1997-2006. Kajian ini meliputi lima model; tiga yang berurusan dengan produktiviti industri dan dua yang lain, memberi tumpuan kepada keputusan masuk dan keputusan keluar. Dalam tiga model pertama, pembolehubah yang bertindak sebagai petunjuk prestasi dalam produktiviti adalah permintaan kadar pertumbuhan, nisbah modal kepada pengeluaran, nisbah jualan dari pelaburan, intensiti pengiklanan dan skala kecekapan minimum (MES- Minimum) efficiency scale). Idea, produktiviti dan gelagat firma berdasarkan petunjuk prestasi, akan meramalkan sama ada mereka akan dapat terus bertahan dalam pasaran atau tidak. Model keempat dan kelima mengambil kira kesan insentif, halangan, keadaan ekonomi dan petunjuk produktiviti pada fenomena kemasukan dan keluar. Lebihlebih lagi, ia termasuk ujian ke atas kesan anjakan (displacement) dan gentian (replacement) dengan mengingati kadar kemasukan ketinggalan (lagged entry rate) dan tertinggal dalam kadar keluar (lagged exit rate) dalam persamaan keluar dan masuk (exit and entry equations), masing-masing. Akhirnya, kami memperolehi kaitan causality's diantara kadar kemasukan dan keluar dalam industri pembuatan Iran dengan menambah kemasukan semasa atau kadar keluar pada nisbah keluar atau masuk (exit and entry ratio) dan menganggarkan kedua-dua persamaan dalam sistem persamaan serentak.

Hasil kajian ini mendedahkan beberapa penemuan penting. Semasa menilai produktiviti, didapati bahawa indeks produktiviti adalah sangat sensitif kepada nisbah jualan pelaburan. Pekali negatif dan signifikan nisbah jualan pelaburan mengesahkan bahawa struktur dalam industri pembuatan tidak sesuai untuk kelantangan yang tinggi pelaburan. Di samping itu, skala kecekapan minimum sebagai penghalang kemasukan menyebabkan kenaikan dalam keuntungan yang menghasilkan peningkatan dalam produktiviti pekerja dan perbelanjaan modal produktiviti buruh.

Analisis persamaan kemasukan dan keluar, mendapati bahawa faktor-faktor dalam sektor buruh yang sub intensif seperti keuntungan, pengiklanan, indeks produktiviti, adalah penting dalam membuat anggaran model masuk. Alternatif kepada itu, pengiklanan, tumpuan, dan produktiviti indeks pula adalah faktor penting dalam model keluar. Selain itu, dalam subsektor modal yang intensif keuntungan dan kepekatan dikesan sebagai pembolehubah yang signifikan dalam model kemasukan serta penting daripada KDNK dalam model keluar. Akhirnya, hubungan sebab dan akibat satu hala diterima pada 2SLS dan 3SLS model.

Kesimpulannya, pengetahuan pembolehubah yang mempengaruhi indeks produktiviti dan kemasukan dan fenomena keluar bagi firma adalah penting kepada pembuat dasar dalam penstrukturan sektor pembuatan Iran. Mereka harus merekabentuk rangka kerja dasar yang betul dalam menangani masalah yang dikenal pasti industri serta mengoptimumkan penggunaan alat-alat modal. Mereka juga perlu memberi perhatian kepada kepentingan syarat kemasukan; struktur pasaran, halangan kemasukan, insentif kemasukan dan langkah-langkah produktiviti. Akhir sekali, sektor pembuatan Iran akan mempunyai pertumbuhan penyertaan yang stabil, bagaimanapun, ini akan bergantung kepada keupayaan peserta, potensi pasaran dan perolehan sumber.

Kata Kunci: Produktiviti, Masuk dan keluar, Analisis data panel, Pembuatan, Struktur pasaran

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DECLARATION

I declare that this thesis is my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been previously, and is not concurrently, submitted for any other degree at Universiti Putra Malaysia or other institutions.

HAMID REZA MORAD POUR CHAHAKI

Date: 25 April 2013

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LIST OF ABBREVIATIONS / GLOSSARY OF TERMS

BLUE	Best Linear Unbiased Estimation
CBI	Central Bank of Iran
СР	Capital productivity
CPI	Consumer Price Index
GLS	Generalized Least Squares
GNP	Gross National Product
GDP	Gross Domestic Product
нні	Hirschman-Herfindahl index
Ю	Industrial Organization
ISIC	International Standard Industrial Classification
LCP	Labor Capital productivity
LP	Labor productivity
LSDV	Least Squares Dummy Variable
MES	Minimum Efficiency Scale
OLS	Ordinary Least Squares
R&D	Research and Development
RRI	Iranian Rial
SCI	Statistical Center of Iran
SCP	Structure-Conduct-Performance
SEMs	Simultaneous Equations Models
SFA	Stochastic Frontier Approach

- SUR Seemingly Unrelated Regression
- SURESeemingly Unrelated Regression Equations
- TFP Total Factor Productivity
- WTO World Trade Organization
- 3SLS Three-Stage Least Squares
- 2SLS Two-Stage Least Squares



CHAPTER 1

INTRODUCTION

1.1 Introduction

The first condition for competing in a market is entering that market. Markets usually have some barriers to entry that make it difficult to enter. The second condition of competing in a market is to identify entry barriers, as entry barriers are either limiting or reducing competition. The chain of causation between entry and exit phenomena and market structure begins from market structure (barriers, incentives) and affects on conduct (competition) which is determined by profit. However, high profit may not lead to entry due to entry barriers.

In the 1990s, there were many discussions surrounding the importance of entry and exit by variables which present market structure such as entry and exit barriers, but none of them were recognized as a clear favorite. Many of the arguments are unorganized and did not cover enough material, but the arguments produced many different definitions that are used as analytical tools. In recent years, the approaches have been extended, and the importance of entry and exit models is not solely based on whether barrier meets certain definition, but it focuses on when, where, and how various entries and exits are likely to occur. Regardless of whether there is a general agreement on the basic concepts, it is indisputable that the conception of entry and exit strategies and market structure play a vital role in competition.



In addition to all these, rapid changes in demand and supply models which are the byproduct of increasing competition that cause us to pay special attention when considering the conditions and environment of the competition. Studying entry and exit as an index in the context of Industrial Organization (IO) class allows one to analyze competition conditions of firms. According to Structure-Conduct-Performance (SCP) theory¹, market conduct directly affects the entry of new firms and the expansion of incumbent firms. Of course, the context of market conduct can also be introduced as motivators and impediments of entry and exit.

From financial point of view, decision to entry means new investment in the market. This decision depends on the foresight of current entrants and incumbents about the future market conditions. Entry is as proceeding that in its first step provides competitive condition forms access to the industry. A rise in industry efficiency is seen post-access. Entry and exit causes replacing of resources from inefficient firms to new and more efficient ones. In entrepreneurship discussions we can define entry as an optimum use of created opportunities that generate new employment (Kleijweg and Lever, 1996).

Productivity is a measure which presents how market structure is efficient. In practice, the relationship between productivity and entry and exit phenomena is complicated. There are two approaches to examine this relationship; first, the higher

¹ SCP theory postulates causal relationships between the structure of a market, the conduct of firms in that market and the economic performance.

productivity pushes up competitive condition which is resulted in decline of actual or potential entry as well as raise in exit. Another approach to examine this relationship is in opposite side. Entrant firms can introduce new ways of production into market which drive out poor performance and push incumbent firms to improve productivity, in a try to run away entry.

The entry and exit of competitors in the market are both important phenomena. The process of entry and exit are interesting to observe, because among other things, it is a selection process in which the market chooses from established and/or entrant firms, which is further complicated by the selection process between competing entry firms. The precise method of selection that occurs in any period affects not only the range and prices of goods offered in the current market. It also affects the number and types of firms willing to compete for a place in that market at some future date. Entry is to make change, because the performance of the market depends on how well the range and prices of goods it produces for sales mesh with consumer needs, resource scarcities, as well as how quickly the market responds to changes for those same needs or resources. Entry is the most visible manifestation of this selection process. (Geroski and Schwalbach, 1991).

1.2 The Relationship Between Productivity and Entry

Productivity and performance are the two most important concepts that have mistakenly been treated as the same in most of the studies. The productivity of a producer firm can be defined as the ratio of output to input and it is an index of performance. In fact, the relationship between these two concepts is single direction from productivity to performance. This means that productivity is dependent on other factors. In IO discussion, higher productivity is synonymous to improving competitiveness, which qualifies incumbent firms that are resulted in the decline of new entrants. Incumbents are competitive when their productivity of labor and capital grow consistently, which allow them to reduce the unit costs of their output and upgrade their profits that causes increase entrance of new firms. Higher productivity allows for funding an organization's expansion plans. In the short term, customers gain from available lower prices on the market, and in the medium term employees benefit from growth in wages in real terms. This surplus distributed as result of productivity growth will boost up country's living standard. On the other hand on macro level, higher productivity create potential places for more entry via increase in demand (prices decrease, salaries increase and contribute toward job creation), investment and higher export (Figure 1.1) (Zofia, 2003).

On the other hand, entry threat can affect on productivity growth of incumbent firms through its effect on innovative activities which is aimed to escape the entry threat. This effect is dependent on how firms are far from technological frontier. If incumbent firms are close to technological frontier, the entry threat will encourage them to expend in innovative activities. Alternatively, if incumbent firms are far away from technological frontier, they have no hope to invest against creative entrants. Therefore the only effect of raising entry threat is to decline the firms' profit from expending in innovative activities.



Figure 1.1: Relationship between Productivity and Entry

1.3 Entry and Exit

Currently, performance of firms in the market, looks as though it is from creation to death, can have a deep impact on economy. This is even more significant in the manufacturing sector. The creation of firms can help to create more jobs, new products and new technologies, increase competition in the market, develop a supply chain, and reduce social exclusion. Entry theory states that entry into an industry can facilitate adjustments to changes in demand, input prices, and put pressure on existing firms to operate as efficiently as possible. In considering the determinants of entry, it is necessary to think about factors that make entry difficult, as well as factors that increase the incentives for entry. Expected profitability and market growth rate generally are introduced as incentives of entry. Entry decisions depend on the mechanism which generates expectations about the future post-entry profit conditions. Entry may occur in spite of low average profits, if the variation of profits among entrants is high. Also, entry may be deterred even in high profit industries, if potential entrants expect a more aggressive response to entry from incumbents who have larger economic profits to protect. However, if prospective entrants expect future demand to grow faster than established firms have anticipated they may enter despite low or declining profits (Kessides, 1991).

Entry is an ongoing process that can play a creative role in markets. It does as a vehicle for the introduction of industry innovations including new products or processes that change basic conditions of supply and demand (Geroski, 1991).

Looking at the other side of the coin, the exit of firms from market is an inseparable part of the industrial revolution. The industry structure is shaped through the replacement of less efficient firms with more efficient firms. Firm exit is a part of entry process which cause improves productivity. Exiting of a firm from its market does not necessarily entail bankruptcy or failure. Some firms are driven out of the market by increasing competition power of others incumbent firms (Bernar and Jensen 2002; Silviano et al 2010).

Shutdown process of a firm is a strategic game between incumbents which due to the least efficient firms exit first. In this game incumbents are interested to encourage competitors to exit. Any incumbent may quits the industry or decrease its investment. However, it may know re-entry or re-extend is not easy and often not able to do. Also, the competitors take advantage from the reduction in competition and capacity (Fuller, 1989).

There are, at least, three kind of ways which a firm leave an industry; through bankruptcy, voluntary liquidation, or merger. Different economic outcomes are resulted from different forms of exit. With bankruptcy, in many cases, conducts permanent shutdown of production capacities and limited payments to loaners. In merging, a lot of the productivity capacities are possible to remain in an industry and creditors may receive a premium for their shares. While in voluntary liquidation, the potential of production is removed from the industry and investors are paid in full. In fact, there is no difference in exit conception, but recognizing the pattern of exit if is helpful in informing about the chance of survival (Scharly, 1991).

1.4 Overview of the Economy in Iran

Iran employed both import substitution strategies and industrial development strategies in the 1960s and 1970s. The accessibility of oil revenues and their progressive growth in the early 1970s supported active role of government. Whereas, the oil dependency increased with increasing oil price, as the oil price peaked at \$40 per barrel. Meanwhile, the agriculture GDP decreased in compare with the industry GDP. Moreover the number of industrial workers increased. In last three decades the economy of Iran has been affected by several events. Such as, the 1979 Islamic revolution, war with Iraq in 1980 to 88, and the fluctuation in oil incomes (example; decline in 1997 and raise in 1991, 2006). But the most significant changes were made due to the 8-years war.

After the revolution, the new government preferred to intervene in the economy and it made the bureaucratic system to assist in spreading its control over the economy during the 1980s. A great number of large and medium industrial companies were nationalized (for instance; insurance companies, banks, airlines) at the same time government also control foreign trade. Henceforth, the war with Iraq helped the government to further strengthen its economic control. The business and industrial activities were restricted by various regulations.

Soon after the end of the war the government declared its intention to make market reforms. The role of the government is to be reduced and the role of the private

sector is encouraged (however, the records of more than 20 years reformation shows a slow progress). The positive changes in oil price does help stabilizing national finances, and free-market enterprise and increase in domestic industrial production and agricultural. Furthermore, after the end of the war, government began to implement five-year plans, paying attention to the development needs. During the four Development Plans, the increase in GDP was largely attributable to the acceleration of manufacturing and mining activities. The review of the development plans, shows that on the average, value-added for manufacturing and mining, agriculture, services and oil sectors grew by 9.5, 5.1, 6.9 and 2.3 per cents, respectively (CBI, 2009). Industrial sector which has high potential in natural resources and cheap manpower, contributed 25.2 percent to the GDP in 4th development plan, while agriculture and services sectors accounted for 12.9 and 50.3 per cents, respectively (Table 1.1).

1.4.1 The Key Sectors in Iran's Economy

In the past years, changes of value added in the economy of Iran have been subjected to the ebb and flow of the periods economic prosperity and instability in the oil revenues. The industrial value added and its growth enjoyed a positive trend before the revolution. By taking the fixed prices of 1997 as the base year price, the growth in value added reached a staggering 287,920 billion Iranian Rial (IRR)² in 1977 from 32,874 billion IRR in 1959. According to the studies done by the World

² In 1997, 1 US Dollar equaled 1755 Iranian Rial.

Bank in 1996, the Iran's value added in the industrial sector is 0.22 per cent of the world's industrial value added.

Year	Services	Industry and mining	Agriculture	Non-oil GDP Column(1+2+3)	Oil
1995	50.6	18.2	15.2	84.0	16.0
1996	51.3	17.5	15.4	84.2	15.8
1997	50.9	19.1	14.9	84.9	15.1
199 <mark>8</mark>	51.8	19.8	14.6	86.2	13.8
1999	51.9	18.5	15.7	86.1	13.9
2000	52.9	19.9	14.4	87.2	12.8
2001	51.8	20.8	14.1	86.7	13.3
2002	53.1	22.2	13.4	88.7	11.3
2003	52.0	23.1	14.0	89.1	10.9
2004	51.0	23.6	13.7	88.3	11.7
2005	51.7	24.0	12.9	88.6	11.4
2006	51.2	25.0	13.1	89.3	10.7
2007	51.2	25.6	12.8	89.6	10.4
2008	51.1	26.2	12.8	90.1	9.9

Table 1.1: Share of Gross Domestic Product by Origin, 1995–2008 (In percentage)

Source: Central Bank of Iran, It was calculated by researcher.

In 2004, Iran's share of the industrial sector in the Gross Domestic Product (GDP) was 24 percent. Base on the published data by the Ministry of Industries and Mines, in 2005, the production of raw steel, automobile, aluminum bar and cement - which are extensively used in other productive activities - went up by 6.5, 6.3, 2.6 and 1.4 per cent, respectively, as compared with the previous year.

Figure 1.2 examines the key sectors of the Iranian economy in 2005. The services sector (Water, electricity & gas, Trade, restaurant & hotel, Transport, communication & storage, other) constituted the largest share of the country's GDP (51.6 per cent), followed by industry sector (24.3 per cent) (manufacturing, Construction, mining).



Source: Central Bank of Iran

Performance of industrial policies in Iran were significantly affected by the revolution in 1979 and the eight-years war (1980-88) which resulted in serious shocks and interruptions in the domestic economy, such as financial sanctions, flight both physical and human capital, excessive regulation over the economy, and the diversion of resources to the war effort. Also other events such as changes in oil prices have effected on industrial policies. Iran's government revenue is increased

by mark up on oil which is resulted to assist the government pursues and go on its development industrial projects. In total, the net result was an extremely distortion of the economy operation under the condition of crisis for a decade. During the last decade, existence of production capacities and financial supports ³ of the government to industrial producers increased capacity utilization in manufacturing sector.

1.5 Structure- Conduct- Performance in Iranian Manufacturing Sector

Creation of competitive conditions and elimination of monopolies are controversial issues in the economy of Iran economy. Still serious and effective actions have not been taken in the Iran's market, especially the industrial sector. Setting Anti-Monopoly Act and the consumer rights are necessary to remove non-competitive behavior. Thus, Anti-monopoly legislation and regulations is not possible without understanding the structure- conduct- performance (SCP) of markets. Structure of each market can be identified according to the degree of concentration, entry barriers and scale economies.

1.5.1 Market Concentration in Manufacturing Sector

Market concentration is identified by the form of the distribution of market among different firms. In other words, it indicates how much of the total output of a

³ Government supports industrial producers through sale exchange rate in lower prices for importing low materials and new technologies.

particular product is provided by a limited number of large firms. Concentration is one of the structural variables that measure level of competition or monopoly in market (Shepherds, 1990). In the study of market concentration, number of firms and their relative size are keys that should be mentioned. Number of firms in an industry has negative relationship with degree of concentration in industry. Also, concentration is a direct function of inequality in the distribution market between firms.

Usually, to consider market concentration, relative size of firms is measured in terms of variables such as employment, sales or output. Although, using these variables is not without difficulty. For example, capital/ labor ratio in large firms often is above-average so that the market concentration based on employment measure tends to be lower than the output or sale measure. Furthermore, the use of sale or output measure can create discrepancy if there is tendency to overstate the sale or output measure of some firms which are involved in trading products. Thus, because of existing discrepancy, it is better we compare market concentration in terms of employment and output measure.

Investigation of the evidence on market concentration can create a number of interesting questions. From the economic point of view, how profit and economic of scale are explained in high concentrated market. However, in this section we just look at immediate issues such as how concentration ratio explains market structure and why concentration increase or decrease. In this regard, we look at the structure

of Iran manufacturing sector by examining Hirschman-Herfindahl index (HHI) based on employment and output measure. The HHI changes between 0 and 1, and is near to one for a monopolistic market and is near to zero for a competitive market.

Figures 1.3 and 1.4 show an appropriate picture of concentration and monopoly in the manufacturing sector of Iran. According to the employment measure, six industries ⁴ are not highly concentrated but, based on output measure these industries decrease to four industries. Also, according to both measures, five industries ⁵ are quasi monopolized. However, other industries are highly concentrated. Moreover, comparing with HHI measures indicate that concentration based on output, has relatively more weight than employment. So, we can conclude industrial firms in manufacturing sector are relatively capital intensive. In total, concentration measures show Iranian manufacturing sector is surrounded by monopoly powers (for more detail please see Appendix 1).

⁴ Based on Stigler (1964) definition industries that have concentration ratio more than 25 percent are specified as high concentrated industries. These industries in Iranian manufacturing sector contain: Food products & beverage, Chemicals and chemicals products, Other non- metallic mineral, Fabricated metal pro & except machinery, Machinery and equipment NEC, Electrical machinery and apparatus NEC.

⁵ These industries contain: Tobacco products, Wearing apparel and Coke, refined petroleum, Office & accounting and computing and Recycling.



Source: Statistical Center of Iran, It was calculated by researcher. Figure 1.3: Market concentration in Iran manufacturing sector, Employment

Base



Source: Statistical Center of Iran, It was calculated by researcher. Figure 1.4: Market concentration in Iran manufacturing sector, Output Base

1.6 Descriptive Analysis of Entry and Exit in Manufacturing Industries

Following changes in the Iranian policy structure (Islamic Revolution, 1979) and forced war (Iran-Iraq, 1981), ministry of labor and social affairs and ministry of industry and mine (MIM) defined entry as a establishment of a firm based on International Standard Industrial Classification (ISIC code). However, misunderstanding in getting financial facilities (loans and subsidies) from governmental resources caused the entry to be redefined. In new definition entry limited to the number of permit operation not establishment number (more details about issuing license are shown in Appendix 2).

The number of yearly entries in different industries exhibit variations. We use issued permit operation as the number of entry. However, these values are different from industry to industry. In some industries like tobacco manufacturing, publishing manufacturing, printing and reproduction of recorded media, manufacture of office, accounting and computing machinery, manufacture of radio, television and communication equipments and apparatus and recycling manufacturing, variations in number of entry are low or even zero (tobacco product) that could occur as a result of high market concentration or government regulation. On the other hand, the number of entry is relatively high in manufacturing of food products and beverages, manufacturing of chemicals and chemical products, manufacturing of rubber and plastic products and manufacturing of other non-metallic mineral products. These four industries constitute more than 50 percent of entry in the period of study and this can be explained by comparative advantages of the mentioned industries in preparation of low material. Thus, the trend of entry dominantly is determined by these industries.

The numbers of unexplained exits in various industries display obscurities in the manufacturing sector. However, counting on these values is difficult because of confidentiality by the government. In fact there is not any authority responsible for registration firms' exit in the Iran manufacturing sector. So, we calculated exits based on the difference in incumbents' changes and the number of issued permit operation from industry to industry (incumbentst – incumbentst-1 = gross entryt or entryt – exitt).

Tables 1.2 and 1.3 present data on the number of entry and exit in accordance with the period under study at the two digit ISIC code. The economic activities of Iranian manufacturing sector are classified between 15 to 37 ISIC codes which are including one-hundred and twenty four 4-digit sub-sectors. In some industries like tobacco manufacturing, manufacturing of recycling, manufacturing of radio, television and communication equipment and apparatus, medical, precision and optical instrument manufacturing, and office, accounting and computing manufacturing changes in the number of exiting firms are less than other industries since this could result of monopoly power in these industries. On the other hand, the numbers of exits are relatively high in manufacturing, rubber and plastic mineral products, food products and beverages manufacturing, rubber and plastic manufacturing, manufacturing of textiles and fabricated metal pro, except machinery manufacturing.

Industry	ISIC Code	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Food products & beverage	15	645	582	636	594	591	651	651	697	759	825	833
Tobacco products	16	0	0	0	1	0	1	0	0	0	0	0
Textiles	17	314	287	244	297	253	289	368	347	315	384	444
Wearing apparel	18	150	74	87	77	165	193	210	144	125	108	115
Tanning and dressing	19	89	57	58	119		111	110	69	45	65	60
Wood products and cork	20	60	52	44	50	62	81	66	90	83	144	223
Paper products	21	112	106	83	108	130	106	112	110	113	146	168
Publishing, printing	22	11	12	12	13	19	24	21	23	38	32	28
Coke, refined petroleum	23	6	16	28	33	41	66	73	68	77	69	87
Chemicals products	24	176	185	172	272	264	332	372	349	440	522	522
Rubber and plastic product	25	287	300	324	635	484	325	387	547	724	1,169	979
Other non- metallic	26	748	691	354	331	310	407	555	761	866	1,192	1,731
Basic metal	27	103	130	54	92	76	120	125	144	153	193	208
Fabricated metal pro	28	260	176	120	248	221	267	338	336	354	353	438
Machinery and equipment	29	318	214	144	227	209	229	265	289	318	316	399
Office , accounting and	30	15	14	20	19	21	29	48	54	46	35	27
Electrical machinery and	31	121	106	112	72	71	<mark>8</mark> 7	118	100	140	127	131
Radio, TV and	32	16	14	17	17	25	16	25	18	24	17	20
Medical, precision and	33	26	16	17	26	25	25	27	44	32	40	34
Motor vehicles, trailers	34	65	29	34	100	104	114	118	133	133	133	136
Other transport equipment	35	27	37	23	20	35	51	74	91	67	55	54
Furniture; manufacturing	36	45	42	25	31	28	25	66	55	50	70	100
Recycling	37	6	5	7	5	5	10	18	13	24	30	27
	Total	3,600	3,145	2,615	3,387	3,236	3,550	4,147	4,482	4,926	6,025	6,764
Source: Statistical Contar of Jean												

 Table 1.2: Issued Permit Operations for Manufacturing Establishments by Type of Industry

Source: Statistical Center of Iran

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Industry	ISIC Code	1996	1997	1998	1999	2000	2001	2003	2004	2005	2006
Food products & beverage	15	517	569	545	899	523	691	532	786	817	809
Tobacco products	16	0	0	0	1	0	0	0	0	0	0
Textiles	17	266	199	241	611	165	321	370	391	420	552
Wearing apparel	18	147	85	90	336	180	181	219	187	135	148
Tanning and dressing	19	81	51	43	316	108	127	133	82	101	14
Wood products and cork	20	57	54	45	137	59	84	115	117	162	246
Paper products	21	102	86	69	147	125	100	107	102	147	168
Publishing, printing	22	12	0	14	103	23	33	76	80	50	28
Coke, refined petroleum	23	2	8	16	46	38	59	58	55	72	77
Chemicals products	24	146	127	150	328	241	341	321	388	486	544
Rubber and plastic product	25	269	225	295	762	445	337	489	743	1,153	852
Other non- metallic	26	701	601	295	1,233	391	487	654	877	1,262	1,673
Basic metal	27	95	103	35	156	61	110	123	147	194	240
Fabricated metal pro	28	236	186	106	518	215	288	317	428	356	392
Machinery and equipment	29	293	180	123	482	202	282	236	374	357	448
Office , accounting and	30	15	0	15	35	18	33	55	56	38	32
Electrical machinery and	31	112	83	96	121	52	79	62	172	129	161
Radio, TV and	32	19	7	15	28	29	23	13	29	18	27
Medical, precision and	33	25	0	7	47	18	28	29	38	49	43
Motor vehicles, trailers	34	53	0	13	135	70	90	43	108	150	97
Other transport equipment	35	22	39	23	27	30	38	81	39	78	69
Furniture; manufacturing	36	40	44	14	167	42	29	96	69	84	78
Recycling	37	6	3	6	13	3	11	9	24	32	27
	Total	3,216	2,574	2,256	6,648	3,038	3,763	4,138	5,292	6,290	6,725

 Table 1.3 Number of Exit in Manufacturing by Type of Industry

Source: calculated from unpublished data of statistical center of Iran.

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In details, at the 4-digit sub-sector level of ISIC classification, Textile fibre preparation; textile weaving (1711), Wearing apparel, except fur apparel (1810), Plastic Products (2520), Cutting, shaping & finishing of stone (2696), refining of Limonite, surcon & refinding of plumbago (2697), other fabricated metal products n.e.c. (2899), parts/accessories for automobiles (3430) are the main sub-sectors in the Iranian manufacturing sector. These sub-sectors contain most incumbent firms in industry. In overall, data of entry and exit showing symmetry between entry and exit means that industries with high entry are followed with high exit and vice versa.

Figure 1.5 shows the results of entry and exit changes. There are a number of points worth noting. First, both number of entry and exit move closely together over the cycle. This may suggest a symmetry hypothesis between movement into and out of an industry whereby high entry periods are followed by the entry of the lower quality entrants. Hence, it is more likely to exit more rapidly (Geroski, 1991).

When we look at the Figure 1.5 in the mentioned period (1996-2006), it shows many deviations from stability growth of entry which is planned as government objective. In order to increase investments in manufacturing sector, barriers and administrative limitations are declined and industry is reconstructed with financial assets as entrepreneurship plans. As shown in Figure 1.5 government industrial policies lead to attracting investments and increase in entry, but number of exits in industry sector that is affected from survival policies is inconsistent with government objective.



Source: Statistical Center of Iran, It was calculated by researcher.



The entry and exit numbers are displaying differences from year to year. The number of entering firms declined from 1996 to 1998 and increased in 1999, but in 2000 a declination occurred again and then a steadily growth in the number of entry happened and continued until 2006. On the other hand, the number of exits and entry moves closely together with a smooth increase over the period except for exit which suddenly showed a sharp increase at mid 1998 to mid 1999 and then had a sharp decrease between mid 1999 to mid 2000.

The declination of oil prices experienced in mid 1997 seems to have increased the number of exits in next two years, since the decrease in government income caused

the declination in financial assistances to new entrants. Afterwards, during the improvement government income, the number of entries exhibited a substantial increase, and this trend continued until 2006. It can be seen from the Figure 1.5 that in mid 1998 the number of entries decreased to its lowest level in the period studied (number of yearly incumbents firms are shown in Appendix 3).

There are some problems in the process of new firm survival in the Iranian manufacturing sector. First, the government financial assistance is not continuous. New firms need government support until they pass from infancy to maturity process. Second, availability of high unofficial interest rate (more than two times of official) and high inflation rate causes new firms do not have economic interest in continuing of their activity. As a result, the arbitrage opportunities of government's loans in informal markets cause deviation of loans to other sectors. Finally, new firms face existence of collusion in market which prevents them from real competition.

1.7 Problem Statement

In 1991, Geroski pointed out two important keys in considering the process of entry. Firstly, exhibiting a concern with the number of entrants, but overlooking the quality of entrants has shown such concern is misplaced. The second concern is the number and size distribution of firms in the market is likely to be misplaced if it neglects to consider the types of firms that enter the market. An example of this neglect can be seen in the Iranian manufacturing sector which is flooded with new firms each year and many of these new entrants do not last long enough to make much of an individual contribution to the overall industry's performance.

Indeed, Iranian authorities do not pay much attention to the importance of entry and exit condition especially productivity indicators. They facilitate the conditions of entry to the industry without paying attention to the ability of entrants, market potential, productivity indicators, market structure, and scarcity of natural resource. Basically, entry is an investment behavior that involves long-term decision and the timing of entry and exit may be sensitive to cyclical disturbances such as prosperity or poverty of economic and political changes.

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The major problem facing the manufacturing sector is the lack of entrants' paying attention to productivity conditions and market structure which cause wastage of resources and growth instability of the manufacturing industry.

Furthermore, in recent years, the Iranian industrial sector shows that there has been a higher potential for development than other existing sectors such as agriculture and service sector. The growth of industry, services and agriculture sectors is registered at 7.3, 4.4 and 3.1 percent, respectively. Also, according to the "20 Years Vision Document⁶" the industry sector (manufacturing) must operate as the engine of growth to the economy of Iran. The document of 20 years vision predicts that this sector will grow by 12 percent. However, the annual reports by the ministry of industry show that the growth in the manufacturing sector will not reach anywhere near 12 percent.

The discussions on market structure is extensive, in all literatures the importance of formation of market structure is made up based on the degree of competition in market, number of firms, entry and exit barriers as well as incentives and productivity. Therefore, there is a need to investigate the market structure through study of Iranian manufacturing structure. In this context, a consideration of the performance factors that affect productivity condition and how entry and exit decisions are affected in this condition would be addressed.

Meanwhile, based on Iranian market structure the important questions which are crucial to the discussion are: are there too many entries in the Iranian manufacturing

⁶ 20 years vision document is an Iranian ideal approved during the tabling of the 8th Iran's senate and started since 2005. The vision calls for the nation to achieve developed country by the year 2025, surrounds all aspects of life, economic, social, educational and political stability. This vision contains four five-year plans that is described growth in all sectors and it was preparing with look at Malaysian Wawasan 2020.

sector? Is fundamental structure or market structure of the Iranian industry appropriate for this volume of entry? Why are there so many exits in the Iranian manufacturing sector? Whether the benefit of entry is worth the cost involved, or the release of resources worth the cost for the firm to exit? It is important to note that, the planning, the setting up, and the running of such an industrial firm require a substantial input of resources.

Knowing the market structure, specifically on how entrants and incumbents have been affected by the existing market structure it could assist the understanding of the decision to enter or exit the market. Itemizing the conditions of entry and exit in the Iranian industrial sector by determining its productivity indicators, as well as market structure, in attracting entrants or repelling incumbents which are expected to improve the industrial sector, prevent from wasting of resources and enhance stability of growth.

1.8 Objective of the Study

The general objective of this study is to look at the productivity indicators, market structure and entry and exit decisions in Iranian manufacturing sector during the period of 1997-2006. The specific objectives of the study are as follows:

1. To estimate the role of performance indicators in structural productivity equations of Iranian manufacturing industry.

- 2. To analyse the impact of productivity, market structure and economic condition on entry and exit decisions in Iranian industrial sector.
- 3. To test displacement and replacement effects and causality relationship in entry and exit equations.

1.9 Significance of the Study

According to the "20 Years Vision Document" economic diversification in earning income and industrial independence are significant objectives for the Islamic Republic of Iran. From this view, the manufacturing sector must play a very important role. One of the methods that can be used for improvement of competition in manufacturing sector considers the determinants of entry and exit as well as productivity condition. The light information which is come from entry and exit and productivity condition will clear the Iranian manufacturing sector's needs to those policies that support entry and discourage exit.

The main reasons why this study is significant can be explained from three aspects: First, this study investigates market structure, especially patterns of entry and exit which differ significantly over space, time, as well as among industries. Consequently, this research might offer some empirical messages for modeling of entry and exit decisions in monopolistic competition structure of Iranian manufacturing sector. Second, the results of how market structure effect on entry and exit decisions and performance indicators can inspire policy makers to provide appropriate policies for improving competition structure. Third, it is hoped that this study may help investors (potential entrants and incumbents) for providing the information of how they can improve their business.

In accordance with the innovation in research, this study is the first in depth research of the Iranian manufacturing sector which has considered entry and exit. Also, for the first time the productivity are determined based on IO theories in Iran industry sector. Moreover, we making comparison between performance of the two sub sectors namely labour-intensive and capital-intensive industries.

In conclusion, the importance of this work stems from a desire to formulate industrial policy based on real empirical knowledge rather than on baseless reasons.



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