Determinants of New Firm Formation: Evidence from Iranian Manufacturing Industries

Mohammad Ali Feizpour[1] and Mahvash Moradi[2]

While the importance of entry has been recognized in many studies, attention has focused almost on quantifying barriers to them, rather than investigating the determinants of entry and measuring the magnitude of this process. This notion has got less attention in Iran as a developing country. Present paper is concerned with deliberating a complete picture of the determinants of firms start-up in Iranian manufacturing industries at 4-digit industry level during the period of 2002-2006. Using the structure-conduct-performance paradigm, results of this study shows industry's barriers to entry such as capital intensity, MES and concentration affect the ability of potential entrants in negative direction. Also, industry size, price cost margin and industry growth turn out to induce entry. In addition, entrepreneurs prefer to enter in industries where advertising expenditure, business risk and small firm presence is low and skilled labor is high.

1. Introduction

In 1934 Schumpeter's "creative destruction" hypothesis made a potential revolution in economics. He commented that creative destruction is the key driver of changes in technology and industrial landscapes in a market economy. In this process, entering entrepreneurs introduce new technologies, products or services to markets and force the exit of incumbents whose offering become obsolete (Pe'er and Vertinsky, 2008). This phenomenon is also important for another reason. Entry of new entrepreneurs helps to maintain competition and hence increasing efficiency (Ilmakunnas and Topi, 1999) and represents a changing pool of potentially strong competitors, viz, the seedbed of new activities from which will emerge the successful business and industries of the future (Carree and Thurik, 1999). Thus, entry may be considered as highly

---

[1] Department of Economics, Business School, Yazd University Iran
[2] Department of economics, Shahid Chamran University, Ahvaz Iran
E-mail: moradi.mahvash67@gmail.com

important in increasing competitive room and consumer welfare. Nevertheless, entry rates of firms differ strongly across industries and over time (Herck 1984, Dunne, Roberts and Samuelson 1988). There has been a long-standing interest in determining features which explain these differences. In empirical studies this variation in the intensity of the selection process by which incumbents are displaced by new entrants is explained by variation in profitability and variation in the height of entry and exit barriers (Carree and Thurik, 1996). In fact, entry has been found to be positively related to growth in many studies (Orr 1974, Gorecki 1975, Duetsch 1984, Khemani and Shapiro 1986 and Highfield and Smiley 1987). Most of these studies also found lagged profits to exert a positive influence on subsequent entry, with the exception of Orr (1974). Following the recommendation of Sleuwaegen and Dehandschutter (1991) export share which is an indicator for the ability of industry in competition with foreign markets, has positive impact on entry. While the role of capital intensity as a barrier to entry is well recognized in the studies by White (1982), Duetsch (1984) and Khemani and Shapiro (1986), no such effect was specified in a survey conducted by Highfield and Smiley (1987). As a consequence, these conflicting results have not only created confusion among scholars about the response of the question "What determines entry?" but they have also made it difficult for policy makers to look at these emerging literature for policy guidance (Sutaria and Hicks, 2004). For an entrepreneur who consider to start a business it is important to know where to locate. Industrial factors can change the decision to enter or not. Furthermore, cognizance of entry determinants to shed some lights on the way of politicians is a valuable effort that has got less attention in Iran. This paper intends to give a deeper understanding of the factors affecting entry in Iranian manufacturing industries during 2002-2006.

The setup of this paper is as follows: Second section as usual refers to some previous related literature. Section III is used to provide an overview of the data set and industry selection process. In section IV, the empirical model and variables are introduced. Section V describes the results of estimation. Section VI concludes and recommends policy and suggestion for future research.

2. Literature survey

The basic valuable effort on entry can be attributed to Bain's (1949) pioneering study, who shaped the foundation for large body of research. Although, from the early 1950s up to now, investigating the relationship between entry and economic factors have received a great deal of attention but as Mansfield (1962) argued "Because there have been few econometrics studies of the birth, growth and death of firms, we lack even crude answers to the following basic question: what are the effects of various factors on the rates of entry?"

Despite this critic, evidence show many authors investigate the entry determinants and their effects. A quick glance on literature guides us to the fact that, this notion has received a great deal of attention in developed countries. The most popular remaining are for Canada by Orr (1974) and Baldwin and Gorecki (1991), Finland by Ilmakunnas and Topi (1999), Germany by Wagner (1994) and Fritsch and Falck (2007), Greece by Fotopoulos and Spence (1999), Italy by Vivarelli (1991) and Garofoli (1994), Netherlands by Kleijweg and Lever (1996), Portugal by Mata (1994), Mata and Portugal (1994) and Mata and Machado (1996), Spain by Callejon and Segarra (1999) and Arauzo-Carod and Segarra-Blasco (2005), Sweden by Davidsson, Lindmark and Olofsson (1994) and Brannas and Berglund (2001) and United States by Dunne, Roberts and Samuelson (1988), Acs and Audretsch (1989), Scott Morton (2000) and Elango and Sambharya (2004). In this part, we investigate some relevant studies in this context by details.

One of the earliest empirical studies of determinants of entry, examining Canadian manufacturing industries, was that of Orr (1974). He uses data from the 1967 CALURA (Corporations and Labor Union Returns Act) report. The entry variable is based on annual changes in the number of corporations in each of 71 three-digit industries for 1963-1967. Using a log-linear estimation method, he finds strong barriers to entry are capital requirements, advertising intensity and high industry concentration, while research and development intensity and risk are also barriers but less so. The profit and growth rate appear to be only mild incentives to enter, while the industry size had a consistently positive impact on entry.

Shapiro (1983) in his discussion of entry within the context of the theory of the multinational corporation closely follows the models of Orr that

mentioned above. In his model, Shapiro uses births and deaths of domestic and foreign manufacturing establishments in Canada from 1972-76. He estimates the model using OLS with the most success in explaining domestic entry. Deterrents to domestic entry include concentration and cost disadvantages associated with smaller scale firms, but the same is not true for foreign entry. Advertising was found not to be a deterrent to entry by either type of firm. The research and development variable, shows no significant impact on domestic entry and a positive impact on foreign entry.

Carree and Thurik (1994) use panel data of 36 Dutch retail shops from the 1977-88 period to model changes in profit and the number of new firms. They find that demand growth has a stronger effect than profitability on net entry. However both variables, as well as unemployment, have positive effects on entry. Another study in that year was yielded by, Reynolds, Storey and Westhead (1994) in which explanatory characteristics for firm formation were modeled using cross-sectional data, demand growth was the most important process explaining firm formation in five European countries and the USA. Further, the presence of small firms and economic specialization, as well as urbanization and agglomeration appear to have a consistent positive effect. Personal household wealth has a weak positive effect; the presence of a liberal political ethos and unemployment has a mixed effect; and local government spending is found to have no statistically significant effect.

Roberts and Thompson (2003) examined the entry in a transition economy. They estimated entry equations across 152 3-digit industry levels in Poland across 1991-92 and 1992-93. According to the estimation results, concentration exhibits a highly significant large negative impact on entry. Capital intensity is negative but significant only in the 1991-92. The consumer goods binary variable was insignificant in many cases. Industries with high proportion of state-owned and foreign-owned firms would also experience lower levels of entry. Among the industry incentive variables, growth shows a generally positive sign but not significant. Profitability carried largely insignificant coefficient in entry equations in 1991-92.

Arauzo-Carod and Segarra-Blasco (2005), explained that the determinants of entry are not independent of firm start-up size. Using

Spanish manufacturing industries data during the period of 1990-96 and applying OLS and Quantile Regression (QR), they examined how the entry inducing factors and the barriers to entry determine the size distribution of the new cohort. According to OLS, industry growth as an incentive has positive effect on entry but based on QR it has ambiguous effect. Price-cost margin has a negative effect on entry and the coefficient does not have increasing effect. The R&D sign is negative for OLS and there are mixed results for QR. The results show the presence of newcomers with a suboptimal scale size. It means the fewer the suboptimal size firms, the greater the effect.

As can be seen, although there are numerous studies for developed countries but this proposition has been tested in only a few studies in developing countries. Among notable studies, we can accentuate on Akram (2002) in Bangladesh who just reported the net entry of manufacturing industries at 3-digit industry levels for five census years and classified new firms in terms of ownership (e.g. public, private and joint venture). Lay (2003) in Taiwan investigated the interaction between entry and exit rates across industries namely replacement and displacement. The results show that the entry of new plants has a moderate effect to facilitate the displacement but no significant replacement effect was found. Another study in the same year was by Gaygisiz and Koksal (2003) in Turkey who used a cross-section and panel data analyses to explore the determinants of regional characteristics that are influential on new firm formation. To the best of our knowledge only one empirical study has been carried out to give an explanation on entry and it's determinants in Iran[3]. Therefore the necessity of investigating this subject in a developing country such as Iran is obvious.

3. Data and industry selection process

The data used in this paper is collected by Statistical Center of Iran (SCI) which is the most valid source for reporting data. Our sample is derived from a combination of two different databases. The first database is used for the entrepreneurial entries which count the annual new firms in each industry. Second database compute annual incumbent firms in each industry and is used to calculate control variables.

---

[3] Beheshti, Senoubar and Farzaneh Kojabad (2009)

Our sample covers plants in 16 selected 4-digit Iranian manufacturing industries for the duration of 2002-2006. First of all, for selecting the sample, we include the entry of all industries at 4-digit levels. By looking at the entry of these industries, many industries have small entry. Since, industries with ten or more entry in each year are selected; hence many were omitted from further analyses. Among remained, we seek for those which have continuous entry during the five years. Accordingly, 16 industries were remained. By looking at the share of these industries in total entry, as Figure (1) shows, during the period under estimation these industries constitute near 50 percent of new entrants. They are comprise of manufacture of dairy products (1520), manufacture of bread and bakery product (1545), confectionery (1546), other food products (1548), preparation and spinning of textile fibers; weaving of textiles (1711), handmade carpet and rugs manufacturing (1724), carpet and rugs manufacturing (1726), manufacture of wearing apparel, except fur apparel (1810), manufacture of plastics products except footwear (2520), manufacture of articles of concrete, cement and plaster (2695), cutting, shaping and finishing of stone (2696), brick manufacturing (2697), manufacture of other non-metallic mineral products (2699), treatment and coating of metals; general mechanical engineering on a fee or contract basis (2892), manufacture of other fabricated metal products (2899), manufacture of parts and accessories for motor vehicles and their engines (3430).

Figure 1: Share of the 16 selected industries among all entries
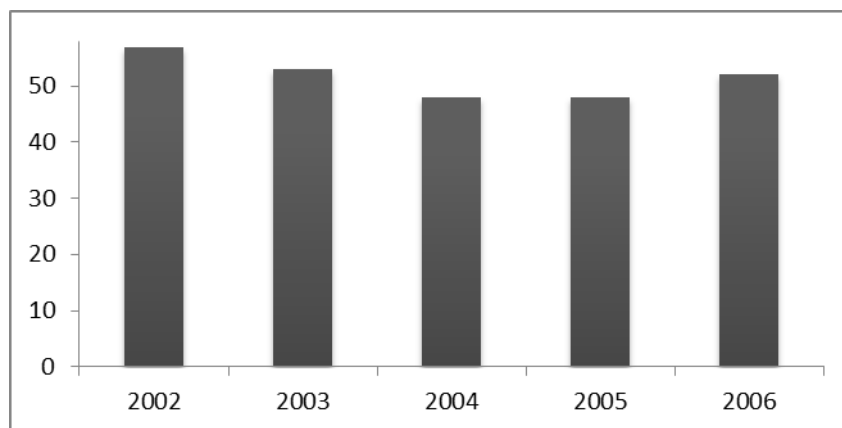
4. Empirical model and variables

Various definitions are used to identify entry but all of them implicit similar concept. To get a complete picture of entry, it is necessary to introduce entry at first. Entry happens if an establishment reports some employee in the year *t* but no employee in *t-1* (Wagner, 1994) or it is defined as the number of new firms that attain some minimally effective size in a typical year (Orr, 1974). Briefly, entry occurs if a firm manufactures some products in the year *t* but no products in year *t-1*.

Entry can be modified in two notions, gross entry and net entry. One can simply count the number of new firms entering during period (gross entry) or can compute the net change in the number of firms from beginning to the end of the period. Gross entry rate is a well-established subject. For instance, Siegfried and Evans (1994) defined entry rate as the number of entrants during the period divided by the initial stock of firms in the industry, times 100. Geroski (1995), explained entry rate as the number of new firms divided by total number of incumbents and entrant firms producing in that year, although the right choice of method depends on the purpose of the study and data at hand. In this paper gross entry rate is standardize as the ratio of the number of start-ups in any industry to the total number of new entrants.

Literature on new firm formation identified wide range of models to explain entry phenomenon. The work of Orr (1974) is usually referred to as the first stylized formulation of a model of entry. According to Orr's model, entry rates in a given industry will have a positive relationship with the expected profits, and a negative relationship with the height of entry barriers specific to the industry. The size of the profit rate in the long term serves as a measure of the barriers to entry. The model takes the form:

$$ENT_{it} = f(\pi_{it} - \pi^*_i) \qquad (1)$$

Where ENT_{it} is the gross rate of entry in industry *i* at time *t*, π_{it} is the industry expected rate of profits and π^*_i represents the rate of long term profits of the industry. The higher the difference among expected profits and long term normal profits, the higher the incentive to enter. It has been argued that Orr's model is only a partial explanation of entry behavior, given that empirical evidence shows that entry rates are fairly high even in

periods where no extraordinary profits are expected. Baldwin (1995) argues that entry may occur even in a zero profit industry if entrants expect to displace less efficient incumbents. So, the poor explanatory power of this regression results imperfect picture of entry.

The present research takes the view that entry is influenced by variety characteristics of an industry in the framework of Structuralism School. The linkage among industry structure, firm conduct, and performance has been well articulated in the structure–conduct–performance (S-C-P) paradigm. Stated briefly, the S-C-P paradigm is based on the following logic: An industry's structure is comprised of technical and economic dimensions within which firms compete and influences the types of strategic choice that firms within the industry use to compete against each other. For example, entry barriers in an industry protect all firms in an industry from new entrants. Even though firms in an industry will vary in terms of resources, capabilities, size, etc., all firms in an industry face the dynamics of a particular market (e.g., competition, product differentiation costs, market demand). This industry-specific confluence of dynamics, to a large extent, influences the response of all companies within an industry. Therefore, the structure of an industry and its underlying economics influence ''competitive rules of the game as well as the strategies potentially available for a firm in an industry'' and consequently the profitability of all firms in that industry (Elango and Sambharya, 2004).

The entry model developed here presumes that entry of firms is determined by industry characteristics. To facilitate discussion, the explanatory variables have been categorized into three groups: Structure (concentration, capital requirement, minimum efficient scale, industry size and small firm presence), Conduct (skilled intensity, average wage rate, advertising as well as research and development intensity) and Performance (price-cost margin, industry growth, business risk and labor productivity). The model to be estimated is as follows:

$$E_{i,t} = \alpha_i + \beta_1 CON_{i,t} + \beta_2 CAP_{i,t} + \beta_3 MES_{i,t} + \beta_4 ISIZ_{i,t} + \beta_5 SFP_{i,t} + \quad (2)$$
$$\beta_6 SI_{i,t} + \beta_7 AWR_{i,t} + \beta_8 AD_{i,t} + \beta_9 RD_{i,t} + \beta_{10} PCM_{i,t} + \beta_{11} IGRO_{i,t} +$$
$$\beta_{12} BR_{i,t} + \beta_{13} LP_{i,t} + \varepsilon_{i,t}$$

The dependent variable $E_{i,t}$, is gross entry rate and the symbols of explanatory variables are as follows:

CON for concentration, CAP for capital requirement, MES for minimum efficient scale, ISIZ for size of industry, SFP for small firm presence, SI for skilled intensity, AWR for average wage rate, AD for advertising intensity, RD for research and development intensity, PCM for price-cost margin, IGRO for industry growth, BR for business risk and LP for labor productivity. α_i is the fixed effect of each industry, β_i displays the coefficient of explanatory variable that should be estimated, $\varepsilon_{i,t}$ is the error term of each industry at time *t* which is distributed with zero mean and σ_ε^2 variance, *i* represents industry and *t* shows time. The description of the variables is as follows.

Concentration: Number of firms operating in an industry and the distribution of market shares among them reflect the key structural characteristics of the industry. More concentrated industry leads to fewer entrants because it makes collusion easier and predatory behavior more feasible and potential entrants also consider the possibility that the established firms may collude to thwart their entry (Orr, 1974). Market concentration appears to deter entry in gross entry studies as well (Shapiro 1983, Chappell, Kimenyi and Mayer 1992 and Mayer and Chappell 1992). Concentration is measured by Herfindahl-Hirschman index regarding to output. This index varies between 0 and 1, which take value 0 if the market is competitive. In perfectly competitive markets, larger number of firms makes entry easy for entrants.

Capital requirement: It is well-known that for new firms it is more difficult to obtain funds than for existing firms, especially for small entrants capital requirements can be quite severe. Entry is not a cost less process, capital intensity is closely related to entry costs, because if the industry uses capital-intensive technology, the cost of the initial investment could be substantial (Kaya and Ucdogruk, 2002). Industries with higher capital intensity were, for example, found to have lower gross entry rates in studies by Dunne and Roberts (1991) and Chappell, Kimenyi and Mayer (1992). So, it may appear as a barrier to entry. It is calculated as capital output ratio. Since, equipment preparation and acquire funds occurred before starting a business, this variable take into account with one lag.

Minimum efficient scale: With high fixed costs, the scale of operation required to operate efficiently increases in order to cover the fixed costs

and to keep long run average cost at the lowest level. Existing firms operating at the efficient scale can erect barriers for entrants because of cost disadvantages of operating scales below the efficient scale. Firms operating at scales below the efficient scale are at a cost disadvantage compared to those operating at the efficient scale (Basant and Nath Saha, 2005). Also, in industries where MES is large, firms will start their activities on a greater scale as compared to industries where the MES is small. Operating at large scale requires the ability to raise amount of capital required to operate a minimum efficiently scaled plant (Mata and Machado, 1996).While Armington and Acs (2002) reported the negative impact of MES on new firm formation, Sutaria and Hicks (2004) found larger MES generate relatively faster rates of new firm formation. It is expected that MES carry negative coefficient in the entry equation. In this paper the Comanor[4] approach is used to calculate MES.

Industry size: Given MES, larger the size of the industry, better the scope for more players to enter and operate at an optimal scale and even for existing players to expand and diversity (Basant and Nath Saha, 2005). Also, the size of the sector affect the replacement effect-i.e. the larger the sector size, the more firms enter and leave sector (Louri and Anagnostaki, 1995). It is expected larger industries induce more entrants for entering and this opinion was demonstrated in a survey by Roberts and Thompson (2003). It is defined as the logarithm of employees in an industry.

Small firm presence: It seems entrants do not tend to enter industries which small firms play a dominant role. If the number of small firms increases, the degree of competition will rise. In fact, the change in small business share is the result of the height of entry barriers. In an effort by Acs and Audretsch (1989), it was suggested that firms do not tend to enter industries that are dominated by small firms and this is measured as the share of industry sales accounted for by firms with fewer than 500 employees. But in this paper it is calculated as industry output accounted for by firms with fewer than 50 employees. Since, the data for sales were not at hand, so we use output as a proxy for sales. Moreover, based on the definition of SCI, industries with fewer than 50 employees are introduced as small firms in Iran.

---

[4] For more information about the index see Comanor (1967)

Skilled intensity: It might be more attractive for firms to produce in industries which the share of skilled workers is high. Based on product life cycle theory, firms need a high share of skilled labor to be able to handle the high degree of uncertainty connected to the early stage of production and develop the product (Karlsson and Nystrom, 2003). This notion is also a confirmation on the results of Armington and Acs (2002).It is defined as the number of skilled, technician and engineers workers as a percentage of total employees.

Average wage rate: It is expected to be negatively correlated to the entry rate. The average wage rate reflects the demand for industry-specific skills. In high wage industries, new firms will face problems in hiring the workers they need (Taymaz, 1997). However, the reverse result was visible in Kaya and Ucdogruk (2002) effort. The average wage rate is defined as the ratio of the sum of total payments made to wage earners to the average number of employees.

Advertising intensity: High advertising expenditures make entrants less desirous. This is possible through three channels. First, high levels of advertising create additional costs for new entrants to break buyer loyalty. Secondly, the effect of advertising on firm revenues and therefore profits is subject to economies of scale, which result from the increasing effectiveness of advertising per unit of output sold and decreasing costs for each advertising exposure. Thirdly, advertising requires funds and since the returns are in the form of intangible assets formation, the certainty of returns is low (Bsant and Nath Saha, 2005). Also, advertising raise the fix cost of operating in the industry, therefore for a new entrant it is hard to overcome these expenditures. It is calculated as total expenditures on advertisement to total output.

Research and development intensity: Higher R&D expenditure discourages potential firms from entering. Mueller and Tilton (1969) suggest two reasons for R&D as a barrier, first, the existence of economies of scale in R&D process and second, accumulation of patents and know-how on the part of incumbent firms. On the other hand, R&D can be served as an indicator of product innovation which induces entry. Basant (2000) stated that firms can purchase foreign technology and product licenses rather than developing it in–house. In such cases the process of entering a market by purchase of technology and know-how may actually help entrants rather than erecting barriers. While, Orr

(1974) did not find R&D to be significant, Highfield and Smiley (1987) find it to have a positive impact. This variable is measured simply by total expenditure on research and development divided by total output.

Price-cost margin: Profit margin reflects the market power of incumbent firms and the expected profitability of potential new firms. The expected effect of PCM is ambiguous, because if the incumbents earn supernormal profits in the long run, they can create technical or strategic barriers to entry, while a high PCM encourages potential producers to enter. When a new firm overcomes the barriers to entry we expect a positive effect, especially if these firms are large (Arauzo-Carod and Segarra-Blasco, 2005). While Duetsch (1975) points out to the role of price cost margin as a barrier to entry in which impede the new firms to enter the market, Acs and Audretsch (1989) and Dunne and Roberts (1991) concluded that higher margins industries experience higher entry. But commonly it is assumed that industries with more profit attract more entrants. Following the recommendation of Fotopoulos and Spence (1999) it is formulated as value added minus payroll over total sales. Due to data limitation, total output is used as proxy for sales. Since, an entrant looks at the previous profitability of the industry and then decides to enter or not, this variable is entered in estimation with one lag.

Industry growth: Productivity growth creates new demand for the development and manufacture of new products, which means that there will be more newly established companies if productivity growth rises (Nivin, 1998). Many studies suggest that growth rate is undoubtedly an attraction to potential entrants; see, for example, Highfield and Smiley (1987), Khemani and Shapiro (1988) and Ilmakunnas and Topi (1999). It is defined as annual growth rate of each industry's output.

Business risk: Entry can be viewed as an investment decision. With various investment options available to an investor, analyzing the opportunity costs has high importance. So, this idea requires the analysis of risks which is used to capture the opportunity costs of entry. It is sometimes suggested that businessmen avert risk. What is implied is that they have a relatively high disutility for losses and a diminishing marginal utility of profit (Orr, 1974). It is assumed that for any profit rate, as the standard deviation increases, the incentive to enter decreases. For calculating risk this paper interests to use the method supplied by Louri and Anagnostaki (1995). It is measured by the standard deviation

of profitability in the last 4 years, divided by the average profitability in the same period.

Labor productivity: The level of labor productivity is relatively high in industries where investment requirements are indivisible and massive. This discourages potential firms from entering. Moreover, the level of productivity may reflect the performance of existing firms. Potential firms avoid entering into those sectors in which existing firms are very productive because of the risks of severe post-entry competition (Kaya and Ucdogruk, 2002). It is calculated as the logarithm of the ratio of value added to the average number of employees.

Table (1) summarizes the variables description, discussion of theoretical arguments and the previous empirical evidence that has been discussed in this section.

Table 1: Overview of the description, theoretical expectations and previous empirical findings on the determinates of entry

Variables	Description	Theoretical expectation	Empirical findings
CON	Herfindahl-Hirschman index regarding to output	-	-
CAP	Capital output ratio	-	-
MES	Comanor approach	-	+/-
ISIZ	Logarithm of employees	+	+
SFP	Industry output accounted for by firms with fewer than 50 employees	-	-
SI	Number of skilled workers to total employees	+	+
AWR	Sum of total payment to average number of employees	-	+/-[*]
AD	Expenditure on advertising to total output	-	-
RD	Expenditure on research and development to total output	+/-	+/-
PCM	Value added minus payroll over output	+/-	+/-
IGRO	Annual growth rate of output	+	+
BR	Coefficient of variation of profitability	-	-[*]
LP	Logarithm of the ratio of value added to the average number of employees	-	-[*]

*Means that a small majority of the studies tends to find this result

5. Model estimation and results

Since the data that is used in the empirical analysis have the nature of panel data, i.e. combining cross-section and time series, econometric techniques suitable for such datasets have to be used. One of the advantages of using panel data methods is that they allow the researcher to control for individual heterogeneity. In this case, we assume that each individual industry has specific characteristics that we are unable to measure with the set of variables included in our empirical model. These characteristics are denoted unobservable industry-specific effects. These industry specific effects may be assumed either random or fixed. If the individual specific effects are assumed random, this implies that they are uncorrelated with the other explanatory variables. In the fixed effects model, on the other hand, the industry specific effects are assumed to be correlated with the explanatory variables (Greene, 2003). According to Baltagi (2001), the choice between a random and a fixed effects model should be solely based on theoretical consideration. The decision to choose the fixed effects model or random effects can be done by performing the Hausman specification test which has an asymptotic chi-square distribution. Since the value calculated according to the Hausman test statistics is lower than the critical value the Hausman specification test suggest that we should choose the random effect model instead of the fixed effect model[5].

Another important test in this perspective is the panel unit root test which leads results in efficient testing power as ignoring this test will lead to a spurious regression. In this test, the null is based on the existence of unit root in series. Based on Levin, Lin and Chu (2002) and Im, Pesaran and Shin (2003) tests, the results provide evidence on the rejection of null hypothesis at 5 percent significant level. Since, all variables follow an I(0) process which confirm the stationary of variables, the necessity of using cointegration test is denied. Based on the Likelihood ratio test the model has heteroscedasticity. In this case, the best way to estimate the model is the method of Generalized Least Square (GLS). By doing this, the autocorrelation in error terms will also be removed. Table (2) demonstrates the results of GLS estimation for each group of variables.

---

[5] The Hausman test and issues associated with panel data are thoroughly described in Baltagi (2001) and Greene (2003)

Table 2: Results for GLS method

Variables	Coefficient	t-statistics	Prob.
CON	-16.470	-15.266	0.0000
CAP	-0.0036	-3.6328	0.0005
MES	-0.0045	-3.6418	0.0005
ISIZ	0.0286	4.2331	0.0001
SFP	-17.100	-11.438	0.0000
SI	0.028	2.8145	0.0064
AWR	0.0000	2.6130	0.0111
AD	-25.356	-2.4720	0.0160
RD	42.81	1.1631	0.2489
PCM	7.9302	5.2704	0.0000
IGRO	1.6992	3.7592	0.0004
BR	-4.2854	-5.4997	0.0000
LP	0.0004	0.3612	0.7191
F-statistic of model 1= 20.53	Prob= 0.0000	R-squared= 0.80	
F-statistic of model 2= 25.32	Prob= 0.0000	R-squared= 0.69	
F-statistic of model 3= 17.49	Prob= 0.0014	R-squared= 0.75	

Source: own calculation

As can be seen, the probabilities of F statistics are significant which indicate the models estimation are well organized. Furthermore, the sign of ten out of thirteen variables on entry rate is as expected. Our estimation result for concentration goes in line with our expectation. The coefficient of concentration is negative and significant. It is easier to enter perfectly competitive industries in which many firms produce standard products and provide business opportunity that makes entry easy for entrants. Also, performing in industries with large number of firms with small market shares compared with industries with small number of firms with large market shares is more ideal because possibilities of concerted action post entry tend to increase. Capital requirement is statistically significant in lowering gross entry rates because if entry requires high start-up costs, this makes it more difficult to enter a specific industry. In Iran capital intensity acts as a barrier to entry because financing for starting a new business is mainly done from banking system. Due to high interest rate in these systems, entrants face the problem of providing funds. Another common barrier to entry in manufacturing industries is minimum efficient scale. MES refers to build a plant at a particular size to produce goods at a reasonable cost. The results show that industries characterized by plant scale economies have significant barriers to entry because entrants are forced to make

significant investments to enter these industries. Also, new entrants face strong competitive reaction from existing incumbents who benefit from cost advantage of operating in minimum efficient scale. As expected, industry size influences entry in positive and significant way. Larger industries are more attractive for entrants because they can produce more and normally the size of an industry may have direct relation with profitability. The negative and significant coefficient of small firm presence suggests that, in fact, firms do not tend to enter those industries in which there is already a considerable presence of small firms. Based on results, industries with skilled labor have positive and significant effect on the founding of establishments. Average wage rate is significant but the sign is opposite of what was expected. The reason may be that in these industries due to high profitability entrants are not sensitive to wage rate. The advertising intensity is another source of entry barriers, because new firms need to match the advertisements level of the incumbent firms to be known and tested by consumers. Therefore the cost of entry is increased by the advertisement intensity of existing firms. Also, advertising involves costs which are sunk and for a firm that plans to start a business it is hard to overcome these expenditure and therefore it discourages them. New firms are motivated to enter to that industries where profit margin is high and cause excess profits. The growth rate of industry profitability reveals its attractiveness for potential firms because potential entrants are profit seekers. Based on theoretical hypothesis, more profitable industries persuade new entrepreneurs. Highly growing industries absorb more entrants, as it is obvious from results. Firms enter more frequently to rapidly growing industries because these industries create new demand and induce existing firms to diversify their production. Also, industries with higher growth provide more scope for new players to supply their production. In addition, in growing industries, incumbents are less likely to get involved in price war or react adversely against new foreign entrants, as all firms would have the opportunity to grow. In this case, foreign entrants may not have to fight to gain market share and it makes entrants more enthusiastic for entering. Negative and significant effect of risk is not unusual and shows that there are fewer candidates available for entering industries where risk is high. Since, risk shows variability of industry performance over time, higher risk is likely to reduce the likelihood of entry taking place. Labor productivity as well as research and development failed to emerge a significant signs.

6. Conclusion, Policy recommendation and suggestion for future studies

Despite several previous research on new firm formation and industrial factors in developed countries, this phenomenon has got less attention in developing countries such as Iran. In this paper we focus on entry determinants in Iranian manufacturing industries during 2002-2006. To analyze the effect of industry characteristics on entry mode choice we applied structure-conduct-performance paradigm. All in all, results are generally coincidence with expectations, as capital intensity, MES and concentration form significant entry barriers. Among incentives, industry size, price-cost margin and industry growth turn out to induce entry. The results also point out to the fact that, entrepreneurs prefer to enter in industries where advertising expenditure, business risk and small firm presence is low and skilled labor is high. So, the results of this paper can be served as appropriate starting points for a policy that aims to promote industries which are not of interest for potential entrants and government create rooms for entrepreneurs to encourage them for entering in these industries.

The results of this paper show the role of barriers and incentives to entry in Iranian manufacturing industries. For entrepreneurs considering whether to enter a specific industry these findings give some hints as guidance to choose. Capital requirement and minimum efficient scale as barriers that force entrants to assemble funds and discourage them from entering should get more attention. Government could arrange adequate program for financing new entrants. This is possible by improving capital market and enhances competition in banking system. Also, industries with low profitability and growth should be explored and the reasons of this trouble should place in the first stage of policy makers program. As it was shown, majority of entrants prefer to concentrate in the 16 before mentioned industries. Hence, government should support other industries and help them to make attraction for entrants by tax-exemption for example.

Consistent with previous empirical research, the findings of this study shows that the entry rates vary substantially across industries. We make an effort to give a detailed picture of those characteristics of the industries that are able to explain these differences in entry. But the hardiness of capturing data in each industry unfortunately did not let us

to attain all the influential variables, such as export and import orientation. In the future, it would therefore be interesting to perform some more studies that the determinants of entry in each individual industry will estimated separately. Hence, the theoretical models that try to explain the processes of entry need to be further developed to better incorporate industrial characteristics.

Reference

Acs, Z.J. and Audretsch, D.B. (1989), "Small-Firm Entry in US Manufacturing," *Economica*, 56(222), 255-265.

Akram, T. (2002), "Net Entry and Exit Patterns of Bangladesh Manufacturing Industries," *Applied Economics Letters,* 9(1), 25-31.

Arauzo-Carod, J.M. and Segarra-Blasco, A.B. (2005), "The Determinants of Entry are Not Independent of Start-Up Size: Some Evidence from Spanish Manufacturing," *Review of Industrial Organization*, 27(2), 147-165.

Armington, C. and Acs, Z.J. (2002), "The Determinants of Regional Variation in New Firm Variation," *Regional Studies*, 36(1), 33-45.
Bain, J.S. (1949), "A Note on Pricing in Monopoly and Oligopoly," *American Economic Review*, 39(2), 448-464.

Baldwin, J.R. and Gorecki, P.K. (1991), "Firm Entry and Exit in the Canadian Manufacturing Sector, 1970-1982," *Canadian Journal of Economics*, 24(2), 300–323.

Baldwin, J.R. (1995), The Dynamics of Industrial Competition, Cambridge University Press.

Baltagi, B.H. (2001), Econometric Analysis of Panel Data, Wiley, Chichester.

Basant, R. and Nath Saha, S. (2005), Determinants of Entry in the Indian Manufacturing Sector, Modified version of a chapter in a forthcoming book entitled, Competition Policy in India: Issues for a Globalizing Economy by Rakesh Basant and Sebastian Morris.

Basant, R. (2000), "Corporate Response to Economic Reforms," *Economic and Political Weekly,* 35(10), 813-822.

Beheshti, M.B., Senoubar, N., and Farzaneh Kojabad, H., (2009), "Determinants of Net Entry and Exit in Iran's Manufacturing Industries," *Iranian Journal of Economic Research*, 13(38), 157-179.

Brannas, K. and Berglund, E. (2001), "Plants' Entry and Exit in Swedish Municipalities," *Annals of Regional Science*, 35(3), 431-448.

Callejon, M. and Segarra, A. (1999), "Business Dynamics and Efficiency in Industries and Regions: The Case of Spain," *Small Business Economics,* 13(4), 253–271.

Carree, M.A. and Thurik, R. (1994), "The Dynamics of Entry, Exit and Profitability: An Error Correction Approach for the Retail Industry," *Small business economics,* 6(2), 107-116.

Carree, M.A. and Thurik, R. (1996), "Entry and Exit in Retailing: Incentives, Barriers, Displacement and Replacement," *Review of Industrial Organization,* 11(2), 155-172.

Carree, M.A. and Thurik, R. (1999), "The Carrying Capacity and Entry and Exit Flows in Retailing," *International Journal of Industrial Organization*, 17(7), 985-1007.

Chappell, W.F., Kimenyi, M.S., and Mayer, W.J. (1992), "The Impact of Unionization on the Entry of Firms: Evidence From U.S Industries," *Journal of Labor Research*, 13(3), 273-283.

Comanor, W.S. (1967), "Market Structure, Product Differentiation and Industrial Research," *Quarterly Journal of Economics,* 81(4), 639-657.

Davidsson, P., Lindmark. L., and Olofsson, C. (1994), "New Firm Formation and Regional Development in Sweden," *Regional Studies,* 28(4), 395-410.

Duetsch, L.L. (1975), "Structure, Performance, and the Net Rate of Entry into Manufacturing Industries," *Southern Economic Journal,* 41(3), 450-456.

Duetsch, L.L. (1984), "Entry and the Extent of Multiplant Operations," *Journal of Industrial Economics*, 32(4), 477-87.

Dunne, T. and Roberts, M. (1991), "Variation in Producer Turnover across US Manufacturing Industries," In: Geroski, P.A., Schwalbach, J. (Eds.), Entry and Market Contestability. Blackwell, Oxford, 187–203.

Dunne, T., Roberts, M.J., and Samuelson, L. (1988), "Patterns of Firm Entry and Exit in U.S. Manufacturing Industries," *RAND Journal of Economics,* 19(4), 495-515.

Elango, B. and Sambharya, R.B. (2004), "The Influence of Industry Structure on the Entry Mode Choice of Overseas Entrants in Manufacturing Industries," *Journal of International Management,* 10(1), 107-124.

Fotopoulos, G. and Spence, N. (1999), "Net Entry Behavior in Greek Manufacturing: Consumer, Intermediate and Capital Goods Industries," *International Journal of Industrial Organization,* 17(8), 1219-1230.

Fritsch, M. and Falck, O. (2007), "New Business Formation by Industry Over Space and Time: A Multidimensional Analysis," *Regional Studies*, 41(2), 157-172.

Garofoli, G. (1994), "New Firm Formation and Regional Development: The Italian Case," *Regional Studies,* 28(4), 381–393.

Gaygisiz, E. and Koksal, M.Y. (2003), "Regional Variation in New Firm Formation in Turkey: Cross-Section and Panel Data Evidence," *ERC Working Paper,* 03/08.

Geroski, P.A. (1995), "What Do We Know About Entry?" *International Journal of Industrial Organization*, 13(4), 421-440.

Gorecki, P.K. (1975), "The Determinants of Entry by New and Diversifying Enterprises in the UK Manufacturing Sector 1958-1963: Some Tentative Results," *Applied Economics,* 7(2), 139-147.

Greene, W.H. (2003), Econometric analysis, Prentice Hall, New Jersey. Herck, G.V. (1984), "Entry, Exit and Profitability," *Managerial and Decision Economics*, 5(1), 25-31.

Highfield, R. and Smiley, R. (1987), "New Business Starts and Economic Activity: An Empirical Investigation," *International Journal of Industrial Organization,* 5(1), 51-66.

Ilmakunnas, P. and Topi, J. (1999), "Microeconomic and Macroeconomic Influences on Entry and Exit of Firms," *Review of Industrial Organization*, 15(3), 283-301.

Im, K.S., Pesaran, H.M., and Shin, Y. (2003), "Testing for Unit Roots in Heterogeneous Panels," *Journal of Econometrics*, 115(1), 53-74.

Jose, M. and Machado, J.A.F. (1996), "Firm Start-Up Size: A Conditional Quantile Approach," *European Economic Review,* 40(6), 1305-1323.

Karlsson, C. and Nystrom, K. (2003), "Exit and Entry Over Product Life Cycle: Evidence From The Swedish Manufacturing Industry," *Small Business Economics*, 21(2), 135-144.

Kaya, S. and Ucdogruk, Y. (2002), "The Dynamics of Entry and Exit in Turkish Manufacturing Industry," *ERC Working Paper*, 02/02.

Khemani, R.S. and Shapiro, D.M. (1986), "The Determinants of New Plant Entry in Canada," *Applied Economics*, 18(11), 1243-1257.

Khemani, R.S. and Shapiro, D.M. (1988), "On Entry and Mobility Barriers," *The Antitrust Bulletin,* 33, 115-134.

Kleijweg, A.J.M. and Lever, M.H.C. (1996), "Entry and Exit in Dutch Manufacturing Industries," *Review of Industrial Organization*, 11(3), 375-382.

Lay, T.J. (2003), "The Determinants of and Interaction between Entry and Exit in Taiwan's Manufacturing," *Small Business Economics*, 20(4), 319-334.

Levin, A., Lin, C.F., and Chu, C.J. (2002), "Unit Root Tests in Panel Data: Asymptotic and Finite-Sample Properties," *Journal of Econometrics*, 108(1), 1-24.

Louri, H. and Anagnostaki, V. (1995), "Entry in Greek Manufacturing Industry: Athens Vs The Rest Of Greece," *Urban Studies*, 32(7), 1127-1133.

Mansfield, E. (1962), "Entry, Gibrat's Law, Innovation, and the Growth of Firms," *American Economic Review*, 52(5), 1023-1051.

Mata, J. and Portugal, P. (1994), "Life Duration of New Firms," *Journal of Industrial Economics*, 42(3), 227–245.

Mata, J. (1994), "Firm Growth during Infancy," *Small Business Economics*, 6(1), 27–39.

Mayer, W.J. and Chappell, W.F. (1992), "Determinants of Entry and Exit: An Application of the Compounded Bivariate Poisson Distribution To U.S. Industries, 1972-1977," *Southern Economic Journal*, 58(3), 770-778.

Mueller, D.C. and Tilton, J.E. (1969), "Research and Development Costs as a Barrier to Entry," *Canadian Journal of Economics*, 2(4), 570-579.

Nivin, S.R. (1998), "Regional Innovation Potential: The Case of the U.S. Machine Tool Industry," Ph.D. Dissertation, University of Texas at Dallas.

Orr, D. (1974), "The Determinants of Entry: A Study of the Canadian Manufacturing Industries," *The Review of Economics and Statistics*, 56(1), 58-66.

Pe'er, A. and Vertinsky, I. (2008), "Firm Exits As a Determinant of New Entry: Is There Evidence of Local Creative Destruction?" *Journal of Business Venturing,* 23(3), 280-306.

Reynolds, P., Storey, D.J., and Westhead, P., (1994), "Cross-National Comparisons of the Variation in New Firm Formation Rates: An Editorial Overview," *Regional studies*, 28(4), 343-456.

Roberts, B. and Thompson, S. (2003), "Entry and Exit in a Transition Economy: The Case of Poland," *Review of Industrial Organization*, 22(3), 225-243.

Schumpeter, J. (1934), The Theory of Economic Development: An Equity into Profits, Capital, Credit, Interest and The Business Cycle, Harvard University Press: Cambridge, MA (first edition in German: 1912).

Scott Morton, F.M. (2000), "Barriers to Entry, Brand Advertising, and Generic Entry in the US Pharmaceutical Industry," *International Journal of Industrial Organization*, 18(7), 1085-1104.

Shapiro, D.M. (1983), Entry, Exit, and the Theory of the Multinational Corporation, in Charles P. Kindleberger and David B. Audretsch (eds.), *The Multinational Corporation in the 1980s*, Cambridge, Mass, MIT Press.

Siegfried, J.J. and Evans, L.B. (1994), "Empirical Studies of Entry and Exit: A Survey of the Evidence," *Review of Industrial Organization*, 9(2), 121-155.

Sleuwaegen, L. and Dehandschutter, W.V. (1991), Entry and Exit in Belgian Manufacturing, in P. A .Geroski and J. Schwalbach (eds.), Entry and Market Contestability: An International Comparison, Basil Blackwell, Oxford.

Sutaria, V. and Hicks, D.A. (2004), "New Firm Formation: Dynamics and Determinants," *Annals Regional Science*, 38(2), 241–262.
Taymaz, E. (1997), "Small and Medium-Sized Industry in Turkey," SIS, Ankara.

Vivarelli, M. (1991), "The Birth of New Enterprises," *Small Business Economics*, 3(3), 215–223.

Wagner, J. (1994), "Small Firm Entry in Manufacturing Industries: Lower Saxony, 1979-1989," *Small Business Economics*, 6(3), 211-223.

White, L. (1982), "The Determinants of the Relative Importance of Small Business," *Review of Economics and Statistics,* 64(1), 42-49.