

# Investigating the Impact of Market Power on Foreign Direct Investment Absorption in Concentrated and Unconcentrated Industries in Iran

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## Abstract

The central purpose of this thesis is investigating the relationship between market structure and absorption of foreign direct investment in Iran manufacturing industries. Four firm concentration ratio and Herfindal-Hirschman index are used to measure market power. Analysis of these indexes determines the concentrated and monopoly in the market and also provides a good background for understanding the relationship between market structure with FDI. In other words, this research seeks to answer that the 10 industries in ISIC based on two-digit code in Iran industries during 1996 to 2008 have what market structure (concentrated or unconcentrated) and what effect it has on absorption of FDI. Using regression analysis and panel data model, estimation results of model showed that there is a negative relationship between concentrated market structure with absorption of FDI. In Iran industries there is a positive relationship between export and economic scales with FDI.

**Keywords:** Foreign Direct Investment, Market Power, Market Structure.

## 1. Introduction

Theoretically, capital accumulation is one of the fundamental prerequisites for economic growth process that can be financed by domestic (savings) and overseas funds. Overseas funding is not only the supplement to domestic saving and fills the saving-investment gap, but also it is a solution to deal with the foreign exchange gap. In developing countries, foreign funds, includes mutual aid from developed countries, financial flows originating from multiple sources such as the World Bank and regional banks, indirect investment (FPI) and foreign direct investment (FDI). Regardless of the outcome of the first two which contributed to the debt crisis and the debt-service problems and Most often carried by government and governmental institutions such as the IMF and the World Bank, two recent cases are taken place by private sector and multinational companies (MNCs) and they are referred to as private capital flows (Barclay 2000 & Thirlwall 1999-2000 & Chan 1995). Foreign portfolio investment which is opposed to foreign direct investment, includes investments by foreign individual and legal entities to purchase securities of companies and financial institutions and during this process, no one can have control over their money in the host country. Absolute returns, high liquidity and being short term investment are particular attractions of foreign indirect investment for investors. The experience of countries in Southeast Asia and South America suggests that the volatility of foreign indirect investment in terms of external financing could not be considered as a support for the host country. In fact among financing options, countries are obliged to assign less weight to this type of investment. In contrast, it seems that foreign direct investment entering the developing country during 1980-2000 has become almost 30 times and from \$ 8263 million has reached to \$ 240167 million, compared with the entire international financial flows emanating from non-private institutions in this period which has only 2-fold increase, this issue requires a more thought (UNCTAD 2001). In the course of economic development of countries, industrial development is fundamentally important. Issues such as economic interdependence and balance of payments deficits are found mainly in this section. In connection with the development of mentioned sector, one of the main issues is to attract foreign investment in the industrial sector. Because Investors are looking for more market share in developing countries they are seeking suitable and lucrative opportunities to transfer their capital to foreign markets. One of the structural factors related to the market is the market power. This means that investors based on their self-assessment, invest in another country with the aim of gaining more market share and higher profit margin in a particular industry. In this research, we try to answer to this question "whether concentrated structure in industry has impact on FDI inflow?" To explore this question in this research, using data on FDI entry from Iran's Foreign Investment and International Aid Organization and data on Herfindal-Hirschman index and four firm concentration ratios retrieved from the study "Evaluation of nonparametric concentration on Iran's industries. Khdadadkashi & Shahikitash, 2010" we investigate and assess industries on this Issue. Herfindal-Hirschman index indicates the amount of industry's market share and four firm concentration ratio reflects the contribution of the industry's four top firm in the market. Then we turn to examine monopolistic structure and concentration in industries. The basic calculations

are done using Excel software. To test the hypothesis, the research model uses panel data regression analysis as well as diagnostic tests of model and effect. Rest of the paper is organized as follows: Section two deals with foreign direct investment. The third section is devoted to literature review. In the next sections, we analyze the data and model results and finally conclusions are presented.

## 2. Foreign Direct Investment in Iran's Industry

Foreign direct investment in Iran's economy plays a leading role in the transmission of technology and modern management. Iran having the relative advantage of the abundant investment opportunities in various economic and industrial sectors including favorable climate, strategic location and easy access to regional markets, Also, with oil, gas resources, mining, and agricultural industries..., can grow well in attracting foreign investment in various industries (Saremi, 2003). According to UNCTAD statistics for the year 2010, volume of foreign investment in Iran's industrial sector reached to the total amount of \$ 1,030,320,190 and in this year first, second and third ranked in attracting FDI are respectively the tobacco industry, manufacturing basic metals, food and beverage industry. In 2009 the amount of foreign capital entering the industry, was total amount of \$ 705,396,360 and in this year first place belongs to the chemical, petroleum, rubber and plastic industry which is roughly 93/74% of total FDI in the industrial sector accounted for this industry. Second place belongs to food and beverage industry and tobacco with share of 64/13% and third place belongs to the Manufacture of basic metals industry with 3% of total FDI. Minimum volume of investments owned by pharmaceutical industry, recycling industry, non-metallic minerals except petroleum and coal products and transportation equipment and automotive industry. The following table shows each industry's share of the total FDI in 2008.

Table1: Industry's share of total FDI in 2008

ISIC code	industry	FDI
15	Food and Beverage	% 22
16	Tobacco products-cigarettes	% 3
17	Textile and leather	% 0.38
21	Paper production ,publishing, printing and printed media	% 5.47
24	chemical, petroleum, rubber and plastic industry	% 29
26	Non-metallic mineral products	% 0.05
27	Manufacture of basic metals	% 38
28	Fabricated metal products, machinery and equipment	% 1.44
32	Production of communication devices and appliances	% 0.11
34	Production of motor vehicles and trailers and other transportation equipment	% 0.19

## 3. Literature Review

A review of previous studies indicates that the effect of industry concentration on FDI entry into the host country is a controversial subject. The results of some studies indicate that there is a negative correlation between the concentration of industry and FDI attraction (Forte&Sarmiento2012, Zhuang&Zuo 2009, Frage 2007, Francois&Wooton 2007,Luo& Tan 1997, Lundin&Sjöholm2007,Sjöholm 1997,Chari &Nandini2006) Whileotherstudiessuggesta positive associationbetween thesetwo variables (Hao&Lahiri 2009, Campa&Donnenfeld 1998).Also, some researchers have concluded that there are both positive and negative relationship between the degree of market power with FDI attraction (Barrios&Gorg2005).

Due to the lack of consensus regarding the effect of market power on FDI attraction and lack of similar studies in Iran, we decided to investigate the effect of market power unconcentrated and unconcentrated industries to attract FDI in Iran's industrial sectors. We are trying to obtain empirical evidence on this issue using FDI inflow data based on two digit ISIC code during1996-2008 and four-firm concentration and Herfindahl indices during this period as well as panel data estimates.

Table 2: summary of literature review

Researcher,( year of publication )	country	Variables	methodology	results
Forte and Sarmiento (2012)	Portugal	Market concentration, FDI, economiesof scale, capital, advertising, R & D, market size and growth	Panel data estimates in the manufacturing sector during 2006-2009	FDI has a significant negative impact on industry concentration.

Barrios&Gorg (2005)	Ireland	FDI,number of firms, industry growth rate, competitiveness	Semi-parametric regression techniques on firm-level panel data for the manufacturing sector	At the beginning competitive effect of FDI may prevent domestic firms from entering the market, but the effect is gradually losing market conditions that led to the creation of a positive effect of FDI on industry in host country.
Hao&Lahiri (2009)	U.S.	FDI, industry size, exports, industry Efficiency	Partial equilibrium models	International companies invest in a concentrated market structure which is less active and less competitive. It preferable to invest in a country that doesn't participate in global markets and has small industry.
Kadochnikov&Drapkin (2008)	Russia	Market Structure, FDI, backlinks	Cases of imperfect competition in local companies merged with the parent company	Competitive market can't guarantee a positive impact on FDI absorption.
Zhuang&Zuo (2009)	U.S. & China	Market structure, intellectual property rights (IPR), technology, FDI, monopoly power		Monopolistic market will reduce the amount of FDI and technology is transferred through channel of FDI to the host country.
Frage (2007)	U.S.	FDI, exports, Competition	Empirical estimates based on gravity model years 1997-2002 for industries	In Competitive industries, FDI and exports are complementary and in industries which the competition is low, they are alternatives.
Campa&Doernenfeld (1998)	U.S.	Market Structure, FDI, exports, tariffs	Conceptual model and test a sample of manufacturing industries	FDI in industries with high concentration is higher. High tariffs reduce foreign direct investment and increase imports.
Luo& Tan (1997)	China	Market Structure, FDI, exports, sales, profitability, growth rate, size of the industry	The combination of the general linear model (GLM) and multi variate regression (MANOVA) industry between 1988-1991	Monopolistic power in market is negatively related to attracting FDI.
Lundin&Sjoholm (2007)	China	FDI, competitive ness, R&D	panel data econometric models industry-level 1998-2004	FDI increases competition, but there is no strong evidence indicating that competition affects investments in research and development.
Maioli&Ferra (2005)	U.K. & Respective countries	FDI, international trade, competition, industry concentration, margin profits	Econometric models, panel data analysis firm-level 1991-2001	FDI in host country's greenfield, has negative effect on the profitability of industrial sites because new manufacturing capacity added to the host country, which increases the competitiveness of local shops and reduce their profit margins.
Sjoholm (1997)	Indonesia	Technology, FDI, Profitability	Indonesia's industrial sector panel data 1991-1980	There are overflow of FDI in highly competitive industries. Also, the technology gap between foreign and domestic firms is larger, the spillovers are higher.
Pant&Mondal (2010)	India	Market power, FDI, natural monopolies	Panel data relating to industry-level 1990-1988	Firms with a high concentration in industry prevent the entry of FDI. But when foreign investors enter the industry,

		es, labor, market share, profitability		active firms are experiencing a sharp decline in market share and profits.
Yin (1999)	China	Pricing, profitability, FDI, tax incentives, market structure, technology	Evaluation of tax incentives to attract foreign funds	If a host country provides more tax relief for foreign companies, it resulted in reducing the overall output and price index increases. More foreign firms will enter the industry while the domestic companies will be forced out of the industry. Thus, depending on the market structure and degree of industry concentration, the host country must have different preferential tax treatment for foreign investors.
Francois & Wooton (2007)	Austria	Competition, market power, international trade, FDI	combination of linear and nonlinear modeling for industry	links between competitiveness and foreign trade resulted in liberalization of services trade in cross-country. this freedom would extended to industry and trade of goods and lead to increased FDI which in turn causes an increase in capital of the service sector related to manufacturing in the host country.
Haller (2005)	Italy	FDI, competition	Modeling the impact of different ways of market entry of multinational companies to host countries	FDI will increase competition in the market if it does not face with anti-competitive behavior by domestic firms.

#### 4. Variables and model

In this research, the dependent variable is net foreign direct investment to the Iran's industrial sector. Independent variables mentioned in the literature include:

Herfindahl index: an indication of the industry's share of the market which considers share of total square size of firms as share of each firm.

$$HHI = \sum_{i=1}^n S_i^2$$

Profit margin: refers to company's profit with regard to cost of sales or cost of goods sold. In other words, it refers to the level of management efficiency in the utilization of labor resources.

$$pcmg = \frac{price - marginal\ cost}{price}$$

Economies of scale: One of the criteria for assessing the degree of competitive or monopolistic markets. they are one of the basic barriers to entry to a market. Thus the Economies of scale larger in a market, the entry of new firms into the market more difficult (Modigliani 1958).

Government share: represents the government's share in economic activities in Iran.

Export: sending goods outside of the geographic boundaries so as for sales and international trade.

The main hypothesis of this research is: "Does market power have an effect on the entry of FDI in industrial sector of Iran?" To test the hypothesis, we use data of FDI inflow from the organization of Foreign Investment and International Aid in Iran and the Herfindahl index and four firm concentration ratio. Herfindal-Hirschman index indicates the amount of industry's market share and four firm concentration ratio reflects the contribution of the industry's four top firm in the market. Then we turn to examine monopolistic structure and concentration in industries. The basic calculation is done using Excel software. To test the hypothesis, the research model uses panel data regression analysis as well as diagnostic tests of model and effect. Tests and model estimating are done using econometric EViews 7 software. The research model is presented in Equation 1. to identify the type of model, Lymer-F and the fixed effects model or random effects, Hausman test were used.

$$FDI_{it} = \alpha + \beta_1 HHI_{it} + \beta_2 PCMG_{it} + \beta_3 MES_1 + Sngov_{it} + EX_{it} + \varepsilon_{it}$$

In which: FDI: Net foreign direct investment, HHI: Herfindahl-Hirschman index, PCMG: Profit margin, MES: Economies of scale, Sngov: share of Iran government in economic activities, EX: Exports.

#### 5. Data Analysis

To test the hypothesis, the research model uses panel data regression analysis and also diagnostic tests of model and effect. Tests and model estimating are done using econometric EViews7 software to identify the type of model, Lymer-F and the fixed effects model or random effects, Hausman test were used.

Model estimating requires the use of panel data techniques that combine time series data and cross-sectional data which have several benefits including increased number of observations, increasing the degrees of freedom, reduction in the variance anisotropy and reduction in multi-collinearity among the variables. We estimate the model using panel data for 10 industrial sectors in the ISIC two-digit code in Iran during 1996-2008.

At first, we should answer to this question that "Is there any evidence proving that it is possible to merge data? Or the model has different cross-sectional units?" It should be investigated whether heterogeneity between sections or individual differences exist or not? If there is heterogeneity we use panel data approach to estimate, otherwise, the data fusion approach with ordinary least squares (OLS) model is used to estimate. Lymer-F test is performed for this purpose. In this test the zero hypothesis  $H_0$  is equality of intercept (data fusion) and in contrast, the opposite hypothesis  $H_1$  is different Intercept (using panel data). Results of Lymer-F test for identifying model are shown in Table 3.

Table 3: Results of model identification

	Statistic	d.f.	Prob.
<b>F</b>	8.751908	(9,90)	0.0000
<b>Chi-square</b>	65.385881	9	0.0000

Result of Lymer-F test is approximately 8.751908. Since the calculated F value is greater than the F table so  $H_0$  is rejected. There are heterogeneity and individual differences in sections, as a result, panel data techniques are appropriate. After selection of panel data approach by Lymer-F test, in order to choose between fixed and random effects Hausman test has been used. The Hausman test statistic is calculated for determining fixed or random differences in cross-sectional units and it has Distribution of chi-square and degree of freedom is the number of independent variables.

Table 4: Hausman test summary

	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
<b>cross-section random</b>	5.566786	4	0.2339

According to the result of Hausman test and calculated probability given in table 4,  $H_0$  is rejected and  $H_1$  is accepted in 95% confidence level, which implies the use of fixed effects method. In following table according to the model presented, examination of effects of independent variables on FDI inflow in the industry is presented.

Table 5: Impact of market structure on FDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
<b>C</b>	-2.726738	4.017905	-0.678647	0.4991
<b>SNGOV?</b>	-2.235520	2.350478	-0.951092	0.3441
<b>LEX?</b>	0.366734	0.186143	1.970178	0.0519
<b>HHI?</b>	-0.984236	2.624693	-0.374991	0.7085
<b>LOG(K?)</b>	0.083480	0.140410	0.594547	0.5536

In this research the Herfindahl-Herishmn index (HHI) is considered as a proxy for the market structure. Results show there is a negative relationship between market structure and FDI attraction in studied industries. It means higher monopolistic industries have not been successful in attracting FDI, and more competitive industries have been more successful in attracting FDI. Based on results of the regression model is expected that increasing one degree in competition of industrial markets, there would be 92/0 per cent increase in FDI attraction (By contrast, increasing the degree of monopoly decreases 92/0 per cent of FDI). Results also show a negative relationship between ownership structure (public or private) and attracting FDI. Furthermore, the results suggest a positive relationship between exports (Participation of enterprises in world markets) and FDI.

## 6. Conclusions

In this research, results of the econometric models show that if the market structure is concentrated in an industry and competitive conditions are not dominant, the industry will not be successful in attracting FDI and there is a negative relationship between FDI with concentrated market structure. There's also a negative relationship in industries that government ownership is dominated and government owns most of the market and plays a major role in industry. Based on results of this research, industries that have more capital, and have active participation in world markets by their exports, have been successful in attracting foreign direct investment so they have imported greater FDI flows to the industry. Thus, the export and capital have a positive relationship with FDI absorption and also MNCs tend to invest in such industries. Other factor related to the characteristics of

industries that have had an effect on attracting FDI is economies of scale (the optimal level of production) that in this research the relationship between economies of scale with foreign direct investment is evaluated positive.