MODELLING THE INTRA-METROPOLITAN LOCATION OF FOREIGN INVESTMENT FIRMS IN ISTANBUL

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In the context of economic globalization, there has been considerable academic interest on the understanding of location behavior of FDI firms. Generally while studies on FDI firm location focus mainly at the national and regional levels, those of the intra-urban level are limited, especially for developing countries. This article investigates how FDI firms are distributed at the intra-urban level and how intra-urban FDI firms location can explain using Istanbul as a case study. The study is based on a sample of 100 companies that were surveyed in in Istanbul at the end of 2002. Locational determinants of foreign investment firms in Istanbul have been analyzed by using factor analyzing and logit regression model.

Keywords: Foreign direct investment, Istanbul, determinants, zones

1- Introduction

Turkey with policies implemented since the early 1980s, have aimed at developing a free market economy, and have replaced the country's traditional inward-oriented import-subsition policies with an export-oriented development strategy. (Tatoglu and Glaister, 1998). As a result of these policies which were made in order to increase the FDI inflows the number of FDI firms increased 29 times (Berköz 2001). Although the increase in FDI inflows in Turkey, the share of Turkey in global FDI has been less than expected compared to other developing countries. With a total share of 807 billion USD of foreign investment it reached until 1998, Turkey has obtained of 0.15% of the total sum. This share is 27.4% for China, 17.3% for Brazil, 6.2 % for Mexico, 4.2% for Thailand, and 3.4% for Argentina (UNCTAD, 1999, p.477). According to the findings of 2003, with 0.10%, Turkey has a share of 575 million Dollars of the total foreign investment of 560 billion Dollars in the world. Until 1980 in Turkey, 87 % FDI had invested to industy sector. Today, the percentage decreases to 45.45%. Oppositely, while the share of service sector was 13% in 1980, today this share increases to 52.52% (Berköz, Eyüpoğlu 2005).

In the general perspective of Turkey related to FDI, Istanbul has an importance. Because Istanbul attracts the highest level of foreign investment in Turkey. 75.39% of Turkey's total capital investment, and 63.29% of the total number of firms in Turkey are in Istanbul. Istanbul has attracted 59.63% of the firms which have made investment in industry in Turkey with 55.22% of this capital, and 66.35% of the firms making investment in the service sector with 92.33% of the capital (Berkoz and Eyuboglu,2005) According to the report of YASED, Istanbul held 6174 foreign capital investment in 2003 (Table1). 2.53% of these foreign invetments were in agriculture, 25.79% in industry, and 71.69% in the service sector. Looking at the years of establishment of foreign capital investment companies, it is observed that 1.25% the companies were established during the period of 1961-1980, 24.13 % during the period of 1981-1990, and 74.62 % started their operations after 1991(Berköz, Eyüpoğlu 2005).

FDI becomes a leading force in the formation of metropolitan structure especially after 1990 in Istanbul (Erkip, 2000). However, there is a lack of empirical studies on intrametropolitan FDI location. It is still not clear how FDI firms are distributed in Istanbul metropolitan area and what location spesific factors or attributes are most important for foreign investor on their

intrametropolitan FDI location. Previous studies related to FDI location in Turkey have usually been made at national or regional levels. Erdilek (1982) analyzed the micro economic cause and effect relationship of FDI in Turkish manufacturing sector in the early 1980s. Demirbağ (1995) specified certain factors which influence the location choice of MNCs in Turkey. The findings of Erden's study (1996) indicate that Turkey is an appealing country for multinational firms because of its market potential, geographic proximity, and low labour costs. Tatoglu and Glaister determined the characteristics of spatial choice of multinational enterprises in Turkey, using factor analysis (1998a) and binominal logit regression models (1998b). Tokatlı and Erkip (1998) discussed about the increasing involvement of foreign capital producer service firms in Turkish economy. Deichmann, Karidis and Sayek (2003) studied the factors determining the spatial decisions of MNFs in Turkey with specific reference to policy implications. Despite some studies related to FDI firms in Istanbul, it is clear that there is a lack of empirical studies on intrametropolitan FDI location. Özdemir (2002) analyzed the distribution of FDI in the service sector in Istanbul. Berkoz and Eyüboglu (2005) examined spatial preferences of FDI firms in Istanbul. Berkoz (2005) examined criteria to which the foreign- owned investments in the industrial and service sector attach significance in location are set for each sector in Istanbul.

The aim of the paper is to investigate what location specific factors or attributes are most important for foreign investor in industrial and service sector on their FDI location within Istanbul Metropolitan Area. By focusing on the geographic distribution of FDI activities at the intrametropolitan level in a developing country, this study can be contribute in the understanding of spatial effects of FDI at the metropolitan level.

2. Theoretical background: The nature of FDI firm location

In literature, studies on FDI firm location focus mainly on national and regional levels. The studies of national levels emphasize the effective role of economic growth rates, labor costs, availability of qualified labor, technology, governmental arrangements, tax amenities, the country's physical structure, etc. used by countries in successfully attracting FDI investments, due to diverse physical, economic and political characteristics (Lipsey, 1999). These characteristics may influence multi-national companies to identify which countries to direct their investments towards.

The regional determinants play an effective role in an investor's decision-making process for FDI firm location. Firm-specific agglomeration effects (Guimares et al., 2000; Head and Ries, 1996), local market measures (Hayter, 1997), infrastructure (Couglin et al., 1988; Glickman and Woodward, 1988), market size (Chakrabarti, 2003), the effect of specific market and regional growth characteristics (Bagchi-sen Wheeler, 1989), information cost (He,2002; Chien- Hsun, 1996) all influence the decisions of FDI firm location at the regional level. The state may influence the decisions of of FDI firm selection at the national and regional level by enforcing various instruments of interference, Regional-scale interference especially has impacts on economies. Besides the national and regional levels, the rules of market economy also have a considerable effect on the decisions of an urban FDI firm location (Wu, 2000, p. 2446). In this respect, the determinants of national and regional levels and those of the intra-urban level may vary. According to Wu's study (2000), in the Guangzou metropolitan area, traditional factors such as highway accessibility, access to major high-ranking hotels and the status of the Economic and Technological Development Zone, access to railway terminals, agglomeration economies and labor markets may effect the selection of FDI firm location. Another study (Wu and Radbone, 2005) shows that intra-urban determinants of FDI in the city of Shanghai are political investments (especially the zones established for attracting FDI), the density of economic output and the availability of an airport.

Another viewpoint has been introduced by Dunning for studies of FDI firm location. Dunning's eclectic paradigm, which as its name suggests, sets out a holistic approach to explain the level of pattern of international production (Dunning, 1988a, 1988b). Dunning simply combines several factors that offer a greater explanation of MNE or FDI activity in open markets than any single approach does. Dunning's approach consists of an attempt to analyze the who, where and why of FDI activity in terms of ownership, location and internalization advantages. Ownership advantages are those that are specific to a particular firm and that enable it to take advantage of investment opportunities abroad. Locational advantages are those advantages specific to a country which dictate the choice of a production site. Internalization advantages determining foreign production will be organized through markets or hierarchies.

3. The growth of FDI in Turkey and the role of Istanbul

In 1954 the government passed the "Foreign Capital Investment Law", a law giving foreign investors the same rights as those held by Turkish investors. Economic instability during that

period, however, acted as a barrier to investments (Sönmez, 1996). By the end of the 1960s foreign investments were centered within the Marmara region and especially in Istanbul, and these included investments in manufacturing sectors, energy, transportation and communications. In 1972, 75% of the 110 foreign investment companies operating in Turkey within the guidelines of the Foreign Capital Investment Incentives Law were operating in the Marmara region. This region accounted for 85.7% of their investments, and 58% of total foreign firms had invested at least 50% of their capital investments into Istanbul (Berköz, 2001, p. 981). By 1978, the entrance of foreign capital into Turkey to make investments with the permission of Law 6224 was a low level, namely US$ 228 million. During the following decade the aforesaid amount increased to US$ 7 billion due to the following reasons: on the one hand, chances to provide international loans with the country increased, on the other hand, structural adjustment policies emphasizing the role of foreign capital in terms of export were implemented. With the aid of structural adjustment policies, the economy with its developing foreign commerce sector, became more unified with international markets. The 1980 Stabilization and Adjustment program was set with the purpose of freeing commerce, thus integrating the economy of the country with that of the world. Following 1980, the program of commerce and direct foreign investment policies was set with the purpose of sustaining the entire country's economic development by means of policy. Such policy would be aimed at achieving increased exports. Moreover, the main policy means of that new economic model were the development of exports and the liberation of imports. The direct entrance of investment into the country was also promoted in order to increase competition. The program was designed to create more radical changes within the economic structure by applying a more liberal and foreign capital-oriented policy. The objective was to make international price mechanisms and international capital flows create significant effects on economic restructuring (Balkır,1996).

During the 1980-1990 period of these implementations, the number of foreign companies active in Turkey increased from 78 to 1856. Changes took place in the sectoral distribution of foreign capital in this period. While the industrial sector had a 92% share and the services sector an 8% share in 1980, the share of the industrial sector dropped to 65%, and that of the services sector rose to 29% in 1990.

During the 1990-2000 period, despite an increase in the number of FDI firms, this increase was relatively below expectations. The number of foreign capital companies increased from

1856 in 1990 to 5328 in 2000. An overview of the sectoral distribution of foreign capital in this period shows that the share of the services sector increased, whereas that of the industrial sector decreased. In 1990, while the industrial sector had a share of 65%, the services sector had a share of 29%. In 2001, the share of the industrial sector dropped to 46%, and that of the services sector increased to 48% (Treasury Undersecretary, 2005). As at the end of 2003, the number of foreign capital companies increased to 9749.

Istanbul has always played a critical role as it attracts a substantial part of the foreign capital in Turkey. Between 1980 and 1990, the number of foreign investment companies in Istanbul increased from 46 to 873. In this period, the sectoral distribution of foreign capital in Istanbul, is parallel to the overall profile in Turkey. While the share of the industrial sector was 76% and the share of services was 20% in 1980, the share of the industrial sector dropped to 26.7% and the share of the services sector increased to 71.6% in 1990.

Between 1990 and 2000, there was a considerable increase in the number of FDI firms in Istanbul. It increased from 873 in 1990 to 3010 in 2000. An overview of the sectoral distribution of the foreign capital shows an increase in the share of the services sector and a decrease in the share of industrial sector. In 1990, while the industrial sector had a share of 26.7%, the services sector had a share of 71.6%. In 2000, the share of the industrial sector increased to 25.8%, and that of the services sector to 73%. As of the end of 2003, the number of foreign capital companies increased to 6174. An evaluation of inter-periodical trends displays considerable changes in foreign capital distribution after 1990 and an increase in the share of services sector in sectoral distribution. This trend is still ongoing. Table 2 indicates the change in the sectoral distribution of foreign capital in Istanbul over the course of time.

4-The spatial structure of Istanbul

Istanbul had its monocentric structure that is from 19th century to the end of the 1970s. After 1975 the CBD functions began to spread from the vast part of Eminönü and small part of Fatih district in the historical peninsula, and Beyoğlu district to Şişli, Zincirlikuyu and Barboros Boulevard. With the highways and the opening of Boshporus Bridge in 1973, accessibility between the European and the Asian sides of city was facilitated, allowing Kadıköy to develop into a central zone (Berköz, 1994). As a result of the new highways along the metropolitan area, the settlement area has also enlarged, and the process of

decentralization has begun. The increase in owning private cars and the low prices of land in the peripheral zones have accelerated this tendency. In the 1990's the opening of Fatih Sultan Mehmet Bridge and new highways caused a northward growth in Istanbul. Maslak area in the northern part of Istanbul started to become congested with high-rise office buildings and plazas (Cengiz,1995). The firms located on Maslak axles were mainly national and multinational companies, specializing in banking and financial services, producer and other services, as well as construction firms (Özdemir, 2002). As a result of all shifts, the city was transformed from a monocentric structure into a polycentric one. In the polycentric structure districts can be thought as central districts and peripheral districts. While central districts includes old CBD, new CBD and second order commerce centers, Peripheral districts include new developing districts.

Over the years while the population has rised in peripheral districts and new CBD in central distircts, the old CBD's population (historical peninsula and Beyoğlu district) has decreased due to the changing urban structure. With their modern office buildings and residential settlements, the peripheral districts and new CBD demonstrated an increase in population and employment rates.

The Old CBD has the conservational restrictions due to being historical area. Within the scope of these restrictions, it is legally prohibited to build new office buildings or to replace the old ones in these areas, which is highly preferred by many multi national companies. Moreover, the small parcels of land and narrow streets of the historical urban structure have also failed to adjust to the needs of a modern CBD that requires large floor areas, and sufficient space for mechanical infrastructure of telecommunication system. Oppositely, the second zone has important advantages like better environmental amenities and accessibility to national highways system and the airport. These advantages in second zone led to become highly preferred locations for new firms that can not find space in the old CBD. Today, various multi national companies are located in this zone (Dökmeci and Berköz, 1994).

5. Modeling the intra-metropolitan location of FDI firms

5.1. Data

The data in this study have been acquired through questionnaires filled out during personal interviews in 100 leading foreign investment firms in Istanbul. While half of these

questionnaires was made with foreign investment firms where was active in service sector, the other half was made with foreign investment firms where was active in industry sector. The firms are marked by their high ranks in the capital amount they possess. The questionnaire survey was carried out between November and December 2002. The questions on the form are inclusive of closed-end ones and questions on a four point scale (varying between 1,2,3,4 values). The meaning of this score has been taken the following procedure: 4=decisive, 3=of major importance; 2=of some importance; and 1= unimportant.

5.3. Methodology and Model Specification

After the completion of survey, the data obtained from these questionnaires was transferred into the SPSS 10.5 program. Descriptive analysis, factor analysis have been used in the analysis of the obtained data from questionnaires of foreign investment firms where was active in both service and industry sectors. In this study, factor analysis was used for summarizing many variables by a few factors. Each of factors acquired from these analyses presents location specific factors and then these factors were used input variables for logistic regression. The same procedure was applied to two groups (service sector and industry sector) (Table 4 and Table 5) .

According to Dunning (1993), MNFs are motivated by net worth maximization. The firm maximizes its net worth by maximizing the current discounted value of profits. Therefore the choice between two location sites is driven by the relative present value of discounted profits the firm expects from investing in two sites.

The *i*th firm derives profits after investing in the jth district according to the following function (Deichmann, Karidis and Sayek, 2003, pp.1770):

$$\Pi_{ij} = \beta z_j + \varepsilon_j \qquad (1)$$

If it decided to invest in the kth district, its profit function becomes:

$$\Pi_{ik} = \beta z_j + \varepsilon_k \qquad (2)$$

Where z is a vector of characteristics for particular district defined in below. If the the firm's choice to invest in district j instead of district k is denoted by=1 then:

$$\text{Prob } [Y= 1|z] = \text{Prob } [\pi_{ij} > \pi_{ik}| z] \quad (3)$$

The logistic estimate provides information on which of characteristics included in vector z plays an important role on the firm's location choice. According to the model, the dependent variable takes the value of "1" for district where company chooses to invest and the value of "0" for the rest of zones. The logistic model is very widely used in economics and market research. If is is assumed that Y_i is a random variable that indicates the choice made, then McFadden (1974) has proven that under certain assumptions:

$$\text{Prob } (Yi=j)= \frac{e^{\beta zij}}{\sum_{j=1}^{i} e^{\beta zij}} \quad (4)$$

Profitability will depend on a set of variables that includes characteristics specific to the firm as well as to the potential locations. For example, if a specific firm decided to invest in a zone in Istanbul, the dependent variable Y takes the value of "1" for a zone in Istanbul, and the value of "0" for the other regions in Istanbul. This decision of the firm to invest in one specific zone instead of another depends on the aspects of the firm and the particular zone. The conditional logit model perform a maximum likelihood estimation of models with dependent variables coded as 0/1.

6. Characteristics of Sample

More than half the industrial firms within the scope of the study (36%) preferred central districts. The data on the number of employees indicate that 46% of the firms have less than 250, whereas 36% of them have more than 500 employees. 46% of firms were established after 1980, and it is certain that this is due to the economic, legal, and organizational arrangements made in Turkey. The data about the intensity of export facilities show that 46% of the firms export 1-25% where as 34% of them export 26-50% of the products they produce.

It has been found that 76% of the service sector firms within the scope of the study operate in the inner zone of Istanbul. It is seen that 40% of the firms have focused on subsectors including finance, insurance, and real estate. These findings show that the service sector firms

within the scope of this study are relatively new firms, 82% of which established after 1980 and 58% of which established after 1990. 32% of the firms have less than 50 employees, whereas 20% of them are firms with more than 500 employees (Table2, Table, 3).

7. Empirical Results

The results of the model are shown in Tables 6 and 7. According the result of table 6, service sector FDI firms prefer to peripheral districts instead of central districts on the quality of communication infrastructure and quality of public service. Labour with required skill and employment agencies are important factors for location choice of service sector FDI firms. Service sector FDI firms prefer to central districts for labour with required skill and employment agencies. Buildings are also the other important factor in location choice for service sector FDI firms. On the other words, an increase in quality of buildings in central districts will increase the probability of service sector FDI firms in these districts. In preferences of location for service sector FDI firms in peripheral districts, agglomeration is important factor. However, this is not proven in the model. Because this factor is not statistically significant in the model.

According the result of table 7, industry sector FDI firms prefer to peripheral districts instead of central districts for plentiful and cheap labour, labour with required skills and employment agencies. Accessibility is important factor for location choice of industry sector FDI firms. Industry sector FDI firms prefer to central districts on easiness in public transportation and access to airport. However, on access to international maritime port, access to developed highway network and access to developed rail network they prefer to peripheral districts instead of central districts. Information cost and infrastructure is not important factor in location choice of peripheral districts versus central districts. In preference of location for industry sector FDI firms in central districts, agglomeration is important factor. However, this is not proven in the model. Because this factor is not statistically significant in the model.

8. Conclusion

This article has presented what location specific factors or attributes are most important for foreign investors for their intra-urban FDI location, using Istanbul as a case study. It was found in previous studies (Wu, 2000; Wu and Radbone, 2005) that FDI location follows a certain rationality at the intra-urban level. This finding is valid for the Istanbul case. However, there are differences between the effects of some common variables which had been used in previous studies and this study.

Some interesting findings have been further produced. There is diversity in location choices of service and industry FDI firms in Istanbul. The distribution of FDI firms does not present an arbitrary structure, but a logical structure. The logical structure can be explain with location specific factors depending on investor's sector. In addition, this distribution also supports the poly-centric structure of Istanbul.

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Table 1. Distibution of FDI firms in Turkey and Istanbul by the end of 2003

Sectors	**TURKEY**		**ISTANBUL**	
	number of firms	%	number of firms	%
Agriculture and Mining	414	4.25	156	2.53
Industry	2670	27.39	1592	25.80
Service	6665	68.37	4422	71.67
TOTAL	**9749**	**100**	**6174**	**100**

Source: Berköz,L.; Eyuboglu,E. (2005)

Table 2. Characteristics of Industrial Sector Firms

	Frequency	Percent
Distribution of Industrial Firms		
Central Districts	18	36
Peripheral Districts	32	64
Distribution of Industrial Firms by sub-sectors		
Food manufacturing	8	16
Ready made garments	4	8
Medicine	4	8
Chemical industry	3	6
Paper	3	6
Transport equipment	11	22
Other	17	34
Export Intencity		
1-25%	23	46
26-50%	17	34
51-75%	8	16
76-100%	2	4
Date of Estblishment		
Before 1980	27	54
1980-1989	11	22
1990-1999	12	24
2000+	-	-
Employment Range		
1-50	8	16
51-100	6	12
101-250	9	18
251-500	9	18
501+	18	36

Table 3. Characteristics of Service Sector Firms

	Frequency	Percent
Distribution of Service Sector Firms		
Central districts	38	76
Peripheral districts	12	24
Distribution of service sector firms by sub-sectors		
FİRE (finance, insurance, real estate)	20	40
Administrative	3	6
Telecommunication/Communication	5	10
Transportation	1	2
Real Trade	5	10
Export-import	10	20
Tourism	6	12
Date of Establishment		
Before 1980	9	18
1981-1990	12	24
1991-2000	26	52
2001+	3	6
Employment Range		
1-50	16	32
51-100	9	18
101-250	10	20
251-500	5	10
501+	10	20

Table 4. Factors for choice of Location by service sector firms

Factors	Factor loading	Eigen-values	Percentage of variance	KMO	Barlett Test
Market Potential		**1.610**	**53.669**	**0.583**	**13.560*** **
Customer potential	0.753				
Proximity of business center	0.812				
Suitability of type of operations to setting	0.620				
Information Cost		**1.649**	**82.456**	**0.500**	**25.980*** **
Quality of communications infrastructure	0.847				
Quality of public services	0.847				
Labour		**1.206**	**60.276**	**0.580**	**10.050*** **
Labour with required skill	0.776				
Employment agencies	0.777				
Building		**2.077**	**69.238**	**0.569**	**50.286*** **
Quality of building	0.822				
Physical condition of office	0.923				
Availibility of parking space	0.741				
Agglomeration		**1.80**	**60.047**	**0.659**	**20.699*** **
Proximity to firms in same sector	0.794				
Proximity of complementary sector	0.776				
Suitability of type of operations to setting	0.754				
Accessibility		**1.407**	**46.895**	**0.589**	**5.409**
Public transportation to firm site	0.701				
Access to international airport	0.652				
Access to developed road network	0.700				

Notes: *** Significant at the 0.1 level, ** Significant at the 0.5 level, * Significant at the 0.10 level.

Table 5. Factors for choice of Location by industry sector firms

Factors	Factor loading	Eigen-values	Percentage of variance	KMO	Barlett Test
Labour		**1.512**	**50.385**	**0.571**	**9.673****
Plentiful and cheap labour	0.773				
Labor with require skills	0.559				
Employment acencies	0.775				
Accessibility 1		**1.880**	**37.606**	**0.561**	**26.342*****
Public transportation to plant site	0.862				
Access to airport	0.748				
Accessibility 2		**1.130**	**22.594**		
Access to international maritime port	0.607				
Access to developed highway network	0.638				
Access to developed rail network	0.795				
İnformation cost and infrastructure		**2.464**	**61.524**	**0.753**	**57.590*****
Quality of communication infrastructure	0.710				
Reliable electric power	0.746				
Public water supply and infrastructure	0.868				
Disposal of waste	0.804				
Agglomeration		**1.465**	**73.230**	**0.540**	**11.550**
Proximity of complementary sector	0.856				
Presence of sector subsidiary firms	0.856				

Notes: *** Significant at the 0.1 level, ** Significant at the 0.5 level, * Significant at the 0.10 level.

Table 6. Central districts versus peripheral districts for service sector FDI firms

Dependent Variable is Choice Central districts :1 Peripheral districts:0 LR= 41,505	
Variable	**Coefficient (Wald stat)**
Desired for centralized location	0.1019 (0.0527)
Information cost	-1.4457 (3.5562)*
Labour	1.1759(4.5191)**
Buildings	0.9714 (5.1002) **
Agglomeration	-0.4899 (1.1294)

Notes: *** Significant at the 0.1 level, ** Significant at the 0.5 level, * Significant at the 0.10 level

Table 7. Peripheral districts versus Central districts for industry sector FDI firms

Dependent Variable is Choice Central districts :0 Peripheral districts:1 LR= 45,182	
Variable	**Coefficient (Wald stat)**
Labour	0.7723 (3.5556)*
Accessibility 1	-1.1295(5.3209)**
Accessibility 2	1.5529 (7.3092) ***
Information cost and Infra	0.2351 (0.2898)
Agglomeration	-0.3591 (0.5815)

Notes: *** Significant at the 0.1 level, ** Significant at the 0.5 level, * Significant at the 0.10 level