EMPLOYMENT EFFECTS OF FOREIGN DIRECT INVESTMENT IN THE TURKISH MANUFACTURING INDUSTRY

A Master's Thesis

by
MERVE YİĞİT

Department of
Economics
Bilkent University
Ankara
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To My Family

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The Institute of Economics and Social Sciences
of
Bilkent University

by

MERVE YİĞİT

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I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Economics.

Assist. Prof. Dr. Selin Sayek Böke

Supervisor

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Economics.

Assoc. Prof. Dr. Fatma Taşkın

Examining Committee Member

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Economics.

Dr. Bahar Bayraktar Sağlam

Examining Committee Member

Approval of the Institute of Economics and Social Sciences

Prof. Dr. Erdal Erel

Director

ABSTRACT

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YİĞİT, Merve

M.A., Department of Economics

Supervisor: Asst. Prof. Dr. Selin Sayek Böke

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This thesis studies the causal effects of foreign ownership on plant employment of varying degrees of FDI. I not only examine the employment effects of FDI inflows by using standard definition of FDI as is standard in the literature, but I also look into the possible differentiale effects of different levels of FDI and identify these effects at the 10, 25, 50, 75 and 100 percent foreign ownership in plants, respectively. These effects are tested using plant-level data from Annual Manufacturing Industry Statistics on the Turkish Manufacturing industry. To control for the possible selection-bias, a difference-in-differences approach is combined with propensity score matching. The advantage of this method is that it allows observing the divergence in the paths of employment between the treated plants and the matched control plants. It is shown that foreign acquisition in Turkish manufacturing industry leads to a significant increase in employment in the acquired plants when the standard definition of FDI is used. The positive and statistically significant effects become visible in the acquisition year and continue in the subsequent periods. I find that after three

years, the acquired plants outperform the control group in terms of employment by 21 percentage points. The significant positive employment effects are also observed when I only focus on the private establishments, excluding public establishments from the sample. The analysis also suggests that the positive employment effects occur together with increases in output and productivity. However, it is observed that as the dominance of foreign partners increases in foreign ownership percentages the employment effects of FDI inflows begin to decrease.

Keywords: Turkey, Foreign Direct Investment, Employment, Manufacturing Sector, Panel Data

ÖZET

DOĞRUDAN YABANCI YATIRIMLARIN TÜRKİYE İMALAT SANAYİSİNDEKİ İSTİHDAMA ETKİLERİ

YİĞİT, Merve

Yüksek Lisans, Ekonomi Bölümü

Tez Yöneticisi: Yrd. Doç. Dr. Selin Sayek Böke

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Bu tez çalışması, muhtelif seviyelerdeki doğrudan yabancı yatırımlarda (DYY) yabancı mülkiyetin firma istihdamı üzerindeki nedensel etkilerini incelemektedir. DYY'lerin istihdama olan etkileri sadece literatürde standart olan standart DYY tanımını kullanarak araştırılmış değil, ama aynı zamanda farklı düzeylerdeki DYY'lerin olası fark gösteren etkilerine bakılmış ve bu etkiler sırasıyla yüzde 10, 25, 50, 75 ve 100 yabancı mülkiyet seviyelerinde belirlenmiştir. Bu etkiler Türkiye imalat sanayisi üzerine olan firma düzeyindeki Yıllık İmalat Sanayi Anketi verisi kullanılarak test edilmiştir. Olası seçim yanlılığını kontrol etmek için farkların farkı yöntemi eğilim puanı eşlemesi ile birleştirilmiştir. Bu yöntemin avantajı tedavi gören işletme ile uyumlu kontrol işletme arasındaki istihdam yollarındaki sapmanın gözlemlenmesine izin vermesidir. Standart DYY tanımı kullanıldığında, Türkiye imalat sanayisinde yabancı tarafından satın alma satın alınan firmada istatiksel olarak anlamlı bir istihdam artışı ile sonuçlanmaktadır. Pozitif ve istatiksel olarak anlamlı etkiler edinme yılı görünür hale gelmekte ve daha sonraki dönemlerde devam etmektedir. Üç sene sonra, edinilen firmalar kontrol firmalarına 21 puanlık istihdam açısından üstün gelmektedir. Kamu kuruluşları hariç olmak üzere,

istatiksel olarak anlamlı ve pozitif etkiler aynı zamanda sadece özel kuruluşlar üzerine odaklanıldığında da gözlemlenmiştir. Analiz aynı zamanda göstermektedir ki pozitif istihdam etkileri çıktı ve verimlilik artışları ile birlikte gerçekleşmiştir. Ancak, yabancı ortakların yabancı mülkiyet yüzdelerindeki hakimiyeti arttıkça DYY akışlarının istihdama olan etkilerinin azalmaya başladığı gözlemlenmiştir.

Anahtar Kelimeler: Türkiye, Doğrudan Yabancı Yatırımlar, İstihdam, İmalat Sektörü, Panel Veri

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CHAPTER 1

INTRODUCTION

Since the mid-1980s Foreign Direct Investment (FDI) started to play a significant role where both developed and developing countries have started to attracted significant amount of FDIs. Since it is believed that FDI can be the channel to increase productivity and economic growth in the host economy, in many countries policies have been adopted to attract more FDI inflows. Meanwhile FDI is also seen as an important channel to create jobs in host economies.

There exists a vast empirical literature on the effects of FDI. While the majority of these previous studies focus on economic growth, wage differentials, technology spillover and foreign trade effects; relatively few studies look into the relationship between employment and FDI inflows.

Both academics and policy-makers suggest that increasing globalization, both in the from of FDI and international trade, has a dramatic effect on labor demand in the world. In the literature studies commonly focus on the knowledge spillovers from FDI and point out that the host country will benefit from additional employment only if the advanced technology of MNCs is transferred effectively to domestically owned companies. If this is not the case, and if foreign firms are likely to employ labour from existing domestic firms and expatriates then FDI will have a marginal effect on employment in host economies (Driffield and Taylor, 2000). Even without looking the knowledge spillovers effects, the direct positive employment effects of FDI inflows are observed in this thesis.

This thesis investigates the causal link between foreign ownership and plant em-

ployment. While there are few studies that have examined the causal relationship between FDI inflows and employment, the question has not been explored by using the methodology of difference-in-differences combined with propensity score matching except in Arnold and Javorcik (2005). Furthermore, not only do I examine the employment effects of FDI inflows by using the standard definition of FDI[1] as is standard in the literature, but also I look into the possible differentiale effects of different levels of FDI and identify these effects at the 10, 25, 50, 75 and 100 percent levels, of foreign ownership respectively.

Identifying the causal relation between FDI and employment is not straightforward. If already existing firms that have higher employment are affiliated by foreign investors, then the ownership status becomes endogenous and ordinary least squares estimations produce invalid results. To control for the endogeneity of the FDI decision difference-in-differences is combined with propensity score matching. Difference-in-differences approach allows us to compare the performance of foreign ownership with the performance of otherwise identical "statistical twins"; however, this methodology still suffers from a "selection bias" problem. In order to control for the selection bias difference-in-differences is combined with propensity score matching.

The propensity score matching technique addresses the counterfactual question of what would have happened to those who, in fact, did receive treatment, if they had not received treatment or vice versa.[2] For the counterfactuals we can only create an estimate since they are unobservable and, this technique creates the missing counterfactual of an acquired plant had it remained in domestic hands by pairing up each plant that will receive FDI in the future with a domestic plant that has very similar plant characteristics operating in the same sector and year. The propensity score matching is then combined with difference-in-differences approach. The advan-

[1] In the literature, plants with 10 percent or more foreign ownership are considered as foreign affiliated.

[2] In order to employ the matching procedure, first the probability of receiving FDI is calculated for each firm for each year and sector. Moreover, for the purpose of the study total factor productivity is estimated at the level of 3-digit sectors by using the Levinsohn-Petrin (2003) procedure.

tage of combining propensity score matching approach with difference-in-differences is to observe the divergence in the paths of performance between the treated plants and the matched control plants that had similar characteristics in the pre-acquisition year (Arnold and Javorcik, 2005). The benefits of combining these two approaches is also well accepted by recent studies which argue that the standard matching estimators are unsatisfactory, but in combination with difference-in-differences approach the matching analysis improves "...the quality of non-experimental evaluation results significantly" (Blundell and Costa Dias, 2000, p. 438). Furthermore with the difference-in-differences approach we are also able to eliminate unobserved fixed effect differences in employment between acquired plants and non acquired plants whereas the standard matching estimators fail such an elimination (Smith and Todd, 2005).

The methodology used in this thesis has further advantages. Unlike other approaches such as the Heckman (1979) two-step procedure or GMM, difference-in-differences propensity score matching estimation does not require any restrictions, namely the restrictions are of using a proxy measure or an instrumental variable (Arnold and Javorcik, 2005). The Heckman (1979) two-step procedure requires a proxy measure that affects the probability of receiving FDI but not the subsequent plant performance. Arnold and Javorcik (2005) suggest that finding such variables is almost impossible. Also, unlike the GMM approach we do not have to use lagged values as instruments for the level of the lagged dependent variable and other dependent variable and thereby we do not have to question the appropriateness of lags as instruments. Besides, unlike GMM, this approach is not dependent on the second order correlation in the data. Furthermore, rather than just estimating the average effect of receiving FDI, this methodology allows us to follow the trajectory of FDI recipients (Arnold and Javorcik, 2005).

Despite the relevance of the issue for Turkey, there are relatively very few studies that examine the effects of foreign acquisitions on employment and moreover, these few studies often disagree on the employment effects of FDI inflows.

The plant-level data employed in this paper is from the Annual Manufacturing Industry Statistics on the Turkish Manufacturing industry which has been collected from the Turkish Statistical Institute (TURKSTAT). Although Turkey has experienced low levels of FDI inflows until 2005 compared to world FDI inflows, due to the availability of the data, this study covers the period of 1990-2001.[3] The average FDI inflows to Turkey throughout the period of 1990-1996 was $834 million on average where this number has slightly increased to $900 million in the period 1997-2000 with the introduction of the customs union between EU and Turkey. The average FDI inflows to Turkey has increased sharply after 2001. For the years between 2002-2004 the average FDI inflows was $1.925 billion while it increased to $17.420 billion in the period 2005-2007. However, the low levels of FDI compared to other years do not create any problems for the purpose of our study. First of all, note that, when the sectoral composition of FDI inflows in Turkey are examined, manufacturing is seen to be the top FDI receiving sector with the share of 53% of total FDI inflows during the late 1990s and early 2000s.[4] Second, the extent of the data and the number of plants considered is quite long and large enough to generalize our results with confidence.

The results show that, by using the standard definition of FDI, foreign ownership has a significant positive effect on plant employment and suggest that the acquired firms enjoy an employment advantage over the firms that remained in domestic hands by about 21 percentage in the third year of the ownership. About half of the positive effect is observed during the year foreign acquisition takes place with the rest occurring during the following two years. However, as the dominance of the foreign ownership increases the employment effects of FDI inflows begin to decrease. This situation can be explained by the fact that the increase in foreign managerial control makes the restructuring process more active and there is much awaited employment improvement in the domestic firms, does not take place.

[3] Due to the change in the structure of the database, this study does not cover the period after 2001.

[4] See Figure-5.

To assess the validity of the results, some robustness checks are conducted. First, I show that the positive employment effects persist when I extend the time horizon under consideration to five years of foreign ownership. This robustness check shows that receiving FDI inflows does not only lead to an employment increase in the acquisition year but also in the subsequent periods. Second, to ensure that our results are not driven by the restriction of matching within the same sector and year, I relax the restriction and still observe positive significant employment effects. Finally, I provide evidence indicating that employment improvements take place simultaneously with increases in productivity and output.

This thesis is organized as follows: Chapter 2 reviews the literature, chapter 3 gives details of data and methodology, chapter 4 presents the results and chapter 5 concludes.

CHAPTER 2

LITERATURE REVIEW

Understanding the nature of the relationship between FDI inflows and economic activities has been an issue of concern to both policy-makers and researchers in the recent decades. In the literature macroeconomic effects of FDI inflows on the host and home economies have been widely analyzed. While numerous studies have achieved remarkable progress in explaining the effects on economic growth, wage differentials, technology spillover and foreign trade, there are relatively less studies devoted to the effects on employment.

On top of it, the studies on the employment effects of FDI are unable to form a consensus among themselves. The debates point that those effects can change from one country to another or even can differ from one sector to another. The studies mostly explain this heterogeneity of the response to FDI presence as country-specific features, the form of FDI and sector differences.

The form of FDI inflows in the host country can affect direct employment when FDI inflows are in the mergers and acquisitions.[1] Because mergers and acquisitions can lead job losses in the existing domestic firms, at least initially, because of rationalization of the operations of the enlarged firm. Therefore, in the literature it has been commonly accepted that Greenfield FDI[2] is more likely to create jobs than mergers and acquisitions (McDonald et al., 2003). However it

[1] Mergers and acquisitions are the investment which aims to get the already existing havings of a local company by foreign investors.

[2] Greenfield investment is a form of foreign direct investment, when investors' company builds a new asset in host economy. As well as the buildings, new jobs are also offered in the host country.

should be also noted that the initial effect of mergers and acquisitions can change in the following years due to the realization of brownfield investments.[3] In the long run backward and forward linkages within the domestic economy can provide employment to increase as a result of increase in production capacity of the firms (Aşıcı et al., 2009).

A number of macroeconomic empirical studies on the impact of FDI inflows on employment indicate that FDI plays a significant and positive role on employment. In a recent study by Karlsson et al. (2009), the employment effects of FDI is analyzed by using the Heckman (1979) two step procedure on Chinese manufacturing industry for the periods of 1998-2004. They establish that positive employment effects from FDI inflows are due to high survival rates of foreign-owned firms and firm characteristics, and these positive effects on private-domestic firms are due to spillovers.

Other economies have also been empirically investigated and the positive effects on employment are also found to be evident in the UK and Irish economies. An econometric study conducted by Driffiled (1999) on the UK manufacturing industry for two separate time periods, from 1986 to 1989 and from 1989 to 1992 also provides evidence for positive effects of FDI inflows. Moreover, the studies on the Irish manufacturing industry (Barry and Bradley, 1997; Figini and Görg, 1999) provide evidence indicating that multinational companies have provided about 45% of employment in manufacturing industry over the last two decades. These studies commonly argue that FDI encourages demand for labor but host country will benefit from additional employment only if the advanced technology of MNCs is transferred effectively to domestically owned companies. If this is not the case, and if foreign firms are likely to employ labor from existing domestic firms and expatriates then FDI will have a marginal effect on employment in host economies (Driffield and Taylor, 2000).

[3] Meyer and Estrin (2001) defined brownfield investment as "Brownfield investment is a foreign acquisition undertaken as part of the establishment of a local operation. From the outset, its resources and capabilities are primarily provided by the investor, replacing most resources and capabilities of the acquired firm."

Axarloglou and Pournarakis (2007) examine the effects of FDI inflows on local economies of the US states in manufacturing for the period of 1974-1994 and find that the effects differ among industries. They observe that FDI in industries such as printing&publishing and transport equipment and instruments have positive effects on local employment and wages across several US states whereas FDI in industries such as leather&stone, clay and glass have detrimental effects on local employment and wages.

Aitken and Harrison (1999) and DeMello (1999) find that FDI spillovers are small and the competition effect combined with labor switching from domestic firms to foreign owned firms cause productivity to decrease in the domestic firms thereby in the long run, hamstring the positive employment effects of FDI inflows.

Not only are there relatively few studies that examine the causal effects of foreign ownership on employment, these studies only look at the employment effects of FDI inflows by using the standard definition of FDI. However, I find it important to look at the possible differentiale effects of different levels of foreign control and examine these effects at different extents of foreign ownership.

Despite the possible contribution of FDI to employment in Turkey their relationship has been little explored so far. Furthermore, these few studies often disagree on the employment effects of FDI inflows.

Karagöz (2007) for the period of 1970-2005 and Aktar and Ozturk (2009) for the period of 2001-2007[4] analyze the effects of FDI inflows on employment by using time series analysis and find that the results suggest no causal relationship between Turkey's FDI inflows and employment. Another study by Aşıcı et al. (2009), on the other hand, examines the relationship between employment and FDI at a sectoral level by analyzing 10 sectors and 9 manufacturing sub-sectors for the period of 2000-2007. A negative relation between employment and FDI inflows is observed by using dynamic panel data analysis and applying the GMM approach.

[4]Quarterly data is used (2001:1-2007:4).

There are some shortcomings in these studies, however. For instance, Karagöz (2007) and Aktar and Ozturk (2009) employ aggregated data. As noted before in the literature it is suggested that the effects of FDI can differ among sectors, therefore using aggregated data without considering industries or sectors may lead to different. Secondly, the data used in the analysis of Karagöz (2007) covers a time period hidden by major structural breaks in terms of FDI inflows. As noted before, Turkey has attracted a very low level of FDI until the early 2000s but then inflows have increased enormously after 2001 and reached record levels between 2005 and 2007.

Nevertheless, all these papers on Turkey argue that mergers and acquisitions is the main reason for not observing the positive effects of FDI. Their arguments are based on the findings in the literature that suggests greenfield investments are more likely to create more jobs than mergers and acquisitions.[5] However, Aşıcı et al. (2009) point out that their study has limitations in itself because of their data. Rather than observing the long-term impact they are only able to observe the effects of foreign acquisitions for the acquisition year and the following year, therefore they are not able to examine brownfield investment effects, if any.

As can be seen, one can not reach any unique conclusion on the employment effects of FDI for Turkey. Discrepancies between the results can be attributed to the different time periods and the sectors that are covered by these studies.

Identifying the causality between employment and FDI inflows is not straightforward and the selection bias problem is the leading factor to observe invalid ordinary least squares estimations since plants acquired by foreign investors are unlikely to be a random sample from the population. Karlsson et al. (2009) take into account this problem and correct for the selection bias by using Heckman's two step procedure. Within the studies on Turkey, only Aşıcı et al. (2009) control for the endogeneity of the ownership by using the lagged values of the first differences

[5] Although in Turkey it seems that mergers and acquisitions (M&As) follow greenfield investments as the secondary in the existing firms for the period of 2000 and 2008 (Turkish Treasury, 2008), Yılmaz (2007, 10-12) points out the dominance of M&As and privatization rather than greenfield investments when the average sizes of capital invested are considered.

as instruments, using a system GMM estimator suggested by Arellano and Bond (1991). The difference in methodologies and results indicate that the empirical methodology may strongly affect the conclusions on whether employment effects of FDI are positive, negative or insignificant. The methodology employed in this paper controls for the selection bias problem and does not require any restrictions. Moreover, rather than only observe the average effects of foreign ownership effects we are able to follow the trajectory of FDI recipients. Hence, the methodology of difference-in-differences combined with propensity score matching has several advantages over the other empirical methodologies.

CHAPTER 3

DATA AND METHODOLOGY

3.1 FDI Inflows in Turkey

This section will present worldwide FDI inflow trends and will discuss those inflows in detail for Turkey. With increased globalization, both developed and developing countries have started to attract FDIs into their economies. Since it is believed that FDI can be the channel to increase productivity, economic growth and reduce unemployment in the host economy, several policies have been adopted to attract more FDI inflows. As can be seen in Figure-1, the upward trend of FDI inflows is observed for both developed and developing countries.

The world FDI inflows grew by 23% in 2006 and reached a new record level of $1,833 billion in 2007. With inflows of $1,833 billion, the previous record observed in 2000 was passed by $400 billion. The upward trend in FDI inflows are observed in both developed and developing countries. In developed countries, FDI inflows increased in 2007 by 33% more than in 2006 and reached $1,248 billion. In developing countries FDI inflows reached a new record level of $ 500 billion by 21% increase from 2006 to 2007 (UNCTAD, 2008).

However, as Figure-2 presents, Turkey has attracted only a very low level of FDI compared to many other developing countries until the early 2000s. Turkey had a closed economy based on import substituting industrialization before 1980's with insignificant FDI share, and after 1980 due to an export led growth model, has began to receive FDI inflows. However, compared with world FDI inflows, these

inflows continued to be low until 2005. When one compares the performance of Turkey in attracting FDI with the three most important host countries among the transition economies, namely Czech Republic, Hungary and Poland, it is still not as successful as these three countries. As can be seen in Figure-4, the gap between FDI inflows have persisted throughout the period. Although this gap decreased in 2001 compared to previous years, this can be attributed to the fact that in 2001 the GSM tender led to a sharp increase in the FDI inflows in Turkey.[1]

The numerical values will present a clearer picture for FDI inflows in Turkey. The average annual FDI inflows to Turkey throughout the period of 1990-1996 was $834 million where this number has slightly increased to $900 million in the period 1997-2000 with the customs union between Turkey and the European Union coming into effect. The average FDI inflows to Turkey has increased sharply after 2001. For the years between 2002-2004 the average annual FDI inflows was $1.925 billion while it increased to $17.4 billion in the period 2005-2007.[2] As can be seen in Figure-5, when the sectoral composition of FDI inflows in Turkey are examined, manufacturing is seen to be the top FDI receiving sector with a share of 53% of total FDI inflows during the late 1990s and early 2000s. However this picture has changed after the early 2000s and service related sectors became the top FDI receiving sectors (see Figure-6). Financial services attracted the most service-related FDI in 2007 with $11.4 billion FDI inflows[3], followed by real estate receiving nearly $3 billion ad transport and telecommunications with $1.1 billion (UNCTAD, 2008). By the recent acquisition of Migros by BC Partners (United Kingdom) retailing sector also attracted foreign investors in Turkey. In the primary sector, FDI inflows of $341 million took place in the mining industry in 2007, following the Mining Law of 2004 that eased privatization and foreign ownership (UNCTAD, 2008).

[1] The Telecom Italia which is the foreign partner of the GSM Is-TIM Telekominikasyon Hizmetleti A.S. company, gave credit and counted as inflows to Turkey.

[2] However, due to the availability of the data, this study covers the period until 2001.

[3] Such as the acquisitions of Finansbank, Akbank, Oyakbank, Denizbank FS by National Bank of Greece, Citibank, ING Group, Dexia; respectively.

This study focuses on the plants that are operating in the manufacturing sector. The details about the data-set used in this analysis are given in the next section.

3.2 Data

3.2.1 Data Set Description

The survey data employed in this paper is Annual Manufacturing Industry Statistics on the Turkish Manufacturing industry which has been conducted by Turkish Statistical Institute (TURKSTAT) on annual basis.

Since 1980, Census of Industry and Business Establishments (CIBE) is periodically conducted by TURKSTAT. TURKSTAT conducts CIBE every 10 years for every industry.[4] TURKSTAT collects CIBE form establishments with 1 or more employees and gathers information on addresses and employment of firms. For establishments that have 10 or more employees, information is collected from the chamber of industry annually. In addition, after collecting addresses TURKSTAT conducts Annual Survey of Manufacturing Industries (ASMI) for establishments that have 10 or more employees.

Up to 1983, the data set only covers the establishments with 10 or more employees engaged in the private sector. After then, Manufacturing Industry Surveys began to cover the establishments in the public sector and the establishments with 25 or more employees engaged in the private sector. In this study, only data on establishments with 25 or more employees is used because the necessary variables are not available for the establishments with employees less than 25.[5] Since the information we are interested in is available from 1989 our sample cover the period between 1990 and 2001.

The survey data employed in this analysis allows us to determine the form of

[4] CIBE is conducted only in 1992 throughout the period of this analysis.

[5] The capital stock series is constructed from 1983 in order to avoid the problems that may arise from the initial capital stock calculation. However, for the firms that have 10-24 employees, detailed investment series that are needed to construct capital stock series is only available after 1991. Moreover, for these firms, the fuel consumption is included in material inputs and cannot be extracted. Therefore, these firms are excluded in this analysis.

ownership of the establishments. In particular, we are able to determine whether a firm is state-owned, private and foreign affiliated. Furthermore, along enough time series enables us to observe the changes in the ownership form.

Total number of firms and foreign affiliated firms increased throughout the period. Table-1 presents the total number of firms and foreign firms for each year in the analysis. Although the number of foreign affiliated firms increased by %78 percent from 1992 to 2001, the percentage share of the foreign affiliated firms have only increased from 3.9 percent to 4.9 percent in 2001 (see Table-1).

In our data set, as illustrated in Table-2, foreign affiliated firms have the highest share in the sectors of industrial chemicals (351), other chemicals (352), electrical machinery (383) and transport equipment (384). The sectors with the lowest share of foreign firms are leather products (323) and footwear (324).

In the analysis, in order to increase the reliability of the model, all combinations of sectors, years where no foreign acquisitions or one foreign acquisition occurred are dropped. Hence the sectors beverages (313), leather products (323), footwear (324), wood products (331), furniture (332), ceramics (361), glass (362), nonferrous metal (372) and other manufacturing products (390) are dropped from the analysis.[6,7,8,9]

In the next sections the detailed descriptions of the capital stock and total factor productivity calculations are given in detail. Although we will not be using capital stock and total factor productivity in our primary analysis, in order to calculate the propensity scores we need the information on capital stock and total factor productivity.

[6]For the analysis of 75 percent foreign acquisitions, in addition to the above sectors, the sectors food miscellaneous (312), paper (341), rubber products (355) and fabricated metals (381) are also dropped.

[7]For the analysis of 100 percent foreign acquisitions, in addition to the above sectors, the sectors food miscellaneous (312), textiles (321), paper (341), rubber products (355), plastics (356), non-metal minerals (369), fabricated metals (381), non-electrical machinery (382) and transport equipment (384) are also dropped.

[8]Also, the data have been cleaned for obvious keypunch errors. The outlier values are replaced by adjacent values whenever there is a drop to zero followed by a return to previous year value (e.g. 100,100,0,100), or a mistake in decimal value (4950,5050,49.5,50.5).

[9]The descriptive statistics on number of foreign affiliated firms according to FDI inflow levels are given in Table-3.

3.2.2 Production Function Estimates and Measures of the Capital Stock

The data contains information on variables that are commonly used in estimation of firm level production functions. Specifically, data set contains on information on value of output, number of employees, values of material inputs, electricity, fuels and investment. The capital stock variable has been newly constructed using the perpetual inventory method and the detailed description of capital series construction is provided below. Note that output, material inputs, energy and capital each have their own price deflator and all are measured in 1990 Turkish Liras.

The value of output is calculated by subtracting the value of the beginning of the year stock from the sum of revenues from sales and services, the value of stock final products at the end of the year and the revenues from the contract manufacturing. The output variable is deflated by the relevant three-digit output price deflator.

In the data measures of the labor force are readily available, where total labor is the sum of the number of employees of the firms in a given year. The data allows us to observe the distribution of the labors groups among their skills. Labor force is classified into two groups; production and non-production workers. Production workers are classified as technical personnel, foremen and workers. Moreover, technical personnel is divided into high-level and middle-level technical personnel. The employees that work in non-production are classified as management employees, office employees and other type of employees. Furthermore, information on wages paid to production and non-production workers is available in the data set.

The value of material inputs is calculated by summing up the value of purchases of intermediate inputs (excluding the fuel) and the value of the beginning of the year stock of material inputs and subtracting the value of stock of material inputs at the end of the year from the above summation. The material inputs variable is deflated by the relevant three-digit price deflator.

Energy variable is the sum of the value of electricity used in production and

fuel purchases. Electricity used in production is calculated by summing up the value of electricity produced and the value of electricity purchased and subtracting the value of electricity sold. Both electricity and fuel are deflated by their own relevant price deflator.

Though measures of the total labor force are readily available, measures of capital must be constructed. The data contains information on investment in machinery and equipment, transportation equipment, building and structure, office equipment and finally in computer and programming. From 1983 we have information on all the series except computer and programing where investment series are on computer and programming are available since 1995. The different investment series are deflated by aggregate investment deflator because the disaggregated investment deflator is not available.[10]

In the data we are not able to observe capital stock series explicitly for machinery and equipment, transportation equipment, building and structure, office equipment and computer programming. In order to calculate the capital stock on these series, information on investment is used and capital stock series are found by applying the perpetual inventory method.

Since the data set does not contain information on capital stock in any year initial capital stock series is constructed for each establishment. Initial capital stock series is computed by assuming that the establishments are on their balanced growth path. By doing so, denoting the initial year by "0", a capital growth rate $\dot{K}_{i,t}$ can be constructed for each firm i:

$$\dot{K}_{i,t} = \frac{K_{i,t+1} - K_{i,t}}{K_{i,t}} \tag{3.1}$$

and the initial capital stock is calculated as:

$$K_1 = (1 - \delta)K_0 + I_0 \tag{3.2}$$

[10]The aggregate investment deflator is obtained from Saygılı et al. (2005).

$$\frac{K_1}{K_0} = (1-\delta) + \frac{I_0}{K_0} \tag{3.3}$$

If the balanced growth path is satisfied:

$$\frac{K_1}{K_0} = \frac{Y_1}{Y_0} = 1 + \dot{K}_0 \tag{3.4}$$

Substituting (3.4) into (3.3) gives

$$1 + \dot{K}_0 = (1-\delta) \ + \frac{I_0}{K_0} \tag{3.5}$$

$$\dot{K}_0 \ + \delta \ = \ \frac{I_0}{K_0} \tag{3.6}$$

The initial capital stock can therefore be obtained by solving the following equation since we already have measures of gross investment in each period given by I_0.

$$K_0 \ = \ \frac{I_0}{\dot{K}_0 + \delta} \ , \ \forall \ I_0 \neq 0 \tag{3.7}$$

Having calculated the initial values, any remaining values are calculated by using the standard equation:

$$K_t = (1-\delta)K_{t-1} + I_t \tag{3.8}$$

Applying 5%, 10%, 20% and 30% as the depreciation rates for building and structure, machinery and equipment, transportation equipment, computer and programming, respectively, initial capital stock is calculated.[11]

By structure, the data contains zero investment observations. For the establishments that are reported zero investment for the entry year, it is assumed that they can not be producing without capital. Hence initial capital stock for these firms is calculated where positive investment is reported and this amount is iterated back to the entry year by dividing capital stock $(1-\delta)$ each year.

[11] The depreciation rates are gathered from Yılmaz and Özler (2005).

Total capital stock series of a firm is calculated by summing up the capital stock series on building and structure machinery and equipment, and computer and programming.

Table-4 summarizes the statistics on the Turkish manufacturing industry. Foreign firms are much larger in terms of number of employees when one compares their average employment with domestic firms. In addition, foreign firms have higher production and are more capital intensive when the average output and capital/labor are compared with domestic firms. Finally, the average total factor productivity of foreign firms are higher than the domestic firms. Note that, all of these differences are statistically significant.

Table-5 presents the summary statistics by sector. The sectors with the highest employment and production are industrial chemicals (351), ceramics (361), glass (362), electrical machinery (383) and transport equipment (384). The most capital intensive sectors are beverages (313), textiles (321), industrial chemicals (351), other chemicals (352), ceramics (361), glass (362) and fabricated metals (381). Finally, the sectors with the highest productivity are wearing appeal (322), leather products (323), industrial chemicals (351), fabricated metals (381), and electrical machinery (383).

3.3 Methodology

3.3.1 Methodology for TFP Calculation

In recent years there have been a surge in both theoretical and empirical studies of the total factor productivity (TFP). Typically, it is assumed that output is a function of the inputs the firm employs and its productivity. The measure of TFP is obtained as the residual in this establishment-level productivity studies.

The earlier studies estimated TFP using traditional methods i.e.; by applying Ordinary Least Squares (OLS) to Cobb-Douglas production function. However, using OLS estimation may create some methodological problems. Specifically the production function takes the following Cobb-Douglas form:

$$Y_{it} = A_{it}(K_{it})^{\beta_K}(L_{it})^{\beta_L}(M_{it})^{\beta_M}(E_{it})^{\beta_e} \tag{3.9}$$

Where Y_{it} represents physical output of firm i in period t ; K_{it}, L_{it}, M_{it} and E_{it} are inputs of capital, labor, materials and energy respectively and A_{it} is the Hicksian neutral efficiency level of a firm i in period t.

$Y_{it}, K_{it}, L_{it}, M_{it}$ and E_{it} are all observable to the researcher. Taking natural logs of equation (3.9) results in a linear production function,

$$y_{it} = \beta_0 + \beta_k k_{it} + \beta_l l_{it} + \beta_m m_i + \beta_e e_i + \varepsilon_{it} \tag{3.10}$$

Where small-case letters demote natural logarithms of the variables and A_{it} takes the following form,

$$\ln(A_{it}) = \beta_0 + \varepsilon_{it} \tag{3.11}$$

β_0 denotes the measurement of the mean efficiency level across firms and over-time; and ε_{it} is the time specific and producer specific deviation from that mean. ε_{it} can be decomposed into an observable (observable to the firm but not to the econometrician) and unobservable component (measurement error). Observable

component of ε_{it} can also be named as firm-level productivity.

One of the problems that OLS produces in estimation of the production function is the "endogeneity" problem. OLS requires that the inputs in the production function are exogenous or, in other words, determined independently from the firm's efficiency level. However, as Marschak and Andrews (1944) already noted, a firm's input decision in the production function are not independently chosen, but rather determined by the characteristics of the firm, including its efficiency . If a firm has prior knowledge of its level productivity (observed component of ε_{it}) at the time input decisions are made, endogeneity arises since prior beliefs about productivity will affect input decisions (Olley and Pakes, 1996). If there is a serial correlation in productivity which is embodied in ε_{it} as an observable component, a positive productivity shock will lead to an increase in input variable usage; causing an upward bias in the estimation of input coefficients for labor and materials.

In addition to endogeneity problem, selection bias problem also arises in the estimation of OLS. Traditional method for TFP estimation omit all firm that enter or exit over the sample period by constructing a balanced panel (Olley and Pakes, 1996). However, several theoretical models predict that the growth and exit of firms is motivated to a large extent by productivity differences at the firm level.

Conditional on being in the data set, if productivity level is known by firms prior to their exit, a correlation between ε_{it} and the fixed input capital will exist. This correlation causes that firms with a higher capital supply in this period will be able to withstand lower productivity level without exiting in the next period. The selection bias problem causes a negative correlation between ε_{it} and K_{it}, causing the researcher to underestimate the capital coefficient in a balanced sample.

In response to these methodological problems, several methodologies like fixed effects, instrumental variables and Generalized Method Moments (GMM) have not been successful in reducing these problems for production functions. The underlying reason behind the poorness of these methodologies is their assumption. Hence, a number of semiparametric estimators have been proposed in the litera-

ture. Both Olley and Pakes (1996) and Levinsohn and Petrin (2003) addresses the simultaneity bias problem and developed a semiparametric estimator.

Olley and Pakes (1996) have introduced a consistent semiparametric estimator and were the first to take selection bias explicitly into account. They overcome this problem by using the firm's investment decision to proxy for unobserved productivity shocks. By doing so, eliminate the correlation between variable inputs and productivity shocks. Furthermore, they address the selection bias problem by integrating an exit-entry rule into their model.

While Olley and Pakes (1996) use the investment decision to proxy for unobserved productivity shocks; Levinsohn and Petrin (2003) propose to use intermediate inputs as a proxy. Levinsohn and Petrin suggest that the monotonicity condition of Olley-Pakes that requires investment to strictly increase in productivity can not be satisfied with the data that includes significant number of zero-investment. While the monotonicity condition can not be satisfied with the data including zero-investment reporting, deleting these observations will cause loss in efficiency. Therefore, Levinsohn and Petrin (2003) propose to use intermediate inputs to proxy for unobserved productivity shocks. Since usually positive use of materials and energy are reported in each year, it is possible to keep more observations; which also implies that the monotonicity condition is more likely to hold.

The estimation procedure of Levinsohn and Petrin (2003) is explained in detail below. By disaggregating the error term ϵ_{it} into its observed component, w_{it}, productivity shocks known to the firm and unobservable component, υ_{it}, measurement error, it is possible to rewrite (3.10) as follows:

$$y_{it} = \beta_0 + \beta_k k_{it} + \beta_l l_{it} + \beta_m m_i + \beta_e e_i + w_{it} + \upsilon_{it} \tag{3.12}$$

Using intermediate inputs as a proxy for unobserved productivity implies that

material inputs are expressed as a function of capital and productivity, i.e.:

$$m_{it} = m_t(k_{it}, w_{it}) \tag{3.13}$$

Levinsohn and Petrin assume that the monotonicity condition is satisfied and material inputs are strictly increasing in productivity which allows for the inversion of the above function:

$$w_{it} = w_t(k_{it}, m_{it}) \tag{3.14}$$

The unobservable productivity term is now a function of two known.

In addition to above assumption, Levinsohn and Petrin further assume that productivity shocks follow a first-order Markov process:

$$w_{it+1} = E[w_{it+1} \mid w_{it}] + \xi_{it+1} \tag{3.15}$$

Value added is considered as the dependent variable rather than output. Because when output is used as the dependent variable the LP procedure is not able to identify the coefficients for material inputs, energy, labor and capital because of the lack of variation in data (Arnold, 2005). I face with the same problem for the Turkish manufacturing industry, therefore, value added is used as the dependent variable.

Value added is defined as gross output net of intermediate inputs and computed as the following:

$$v_{it} = y_{it} - \beta_m m_{it} - \beta_e e_{it} \tag{3.16}$$

Substituting (3.16) into the production function (3.12), (3.12) can be written as follows:

$$v_{it} = \beta_0 + \beta_1 l_{it} + \beta_k k_{it} + w_{it} + \upsilon_{it} \tag{3.17}$$

By substituting (3.14) into (3.17) the following equation is obtained:

$$v_{it} = \beta_l l_{it} + \Phi_t(k_{it}, m_{it}) + \upsilon_{it} \tag{3.18}$$

where

$$\Phi_{it}(k_{it}, m_{it}) = \beta_0 + \beta_k k_{it} + w_t\ (k_{it}, m_{it}) \tag{3.19}$$

From estimation of equation (3.18) at the first stage of Levinsohn-Petrin, a consistent estimate of β_l is obtained where (3.18) is estimated by substituting a higher order polynomial in k_{it} and m_{it} for $w_t(k_{it}, m_{it})$. The second stage of LP helps to identify the coefficient β_k.

The coefficient of labor and predicted values of value added are the known variables at this stage. Hence one can write the estimated $\Phi_{it}(k_{it}, m_{it})$ as the following:

$$\Phi_{it} = \hat{v}_{it} - \hat{\beta}_l l_{it} \tag{3.20}$$

From (3.19) it is known that

$$w_{it} = \hat{\Phi}_{it} - \beta_k k_{it} \tag{3.21}$$

In addition to these, the assumption that is made on the productivity shocks enables to predict w_{it}:

$$\hat{w}_{it} = E[\hat{w}_{it} \mid w_{it-1}] = \gamma_0 + \gamma_1 w_{it-1} + \gamma_2 w_{it-1}^2 + \gamma_3 w_{it-1}^3 + \varepsilon_t \tag{3.22}$$

Hence, LP write the sample residual of the production function as:

$$w_{it} + \xi_{it} = v_{it} - \hat{\beta}_l l_{it} - \beta_k k_{it} - E[\hat{w}_{it} \mid w_{it-1}] \tag{3.23}$$

Then, the coefficient of capital that gives a solution to the minimization of (3.22) gives the consistent estimate of capital, β_k.

Due to the data in hand, Levinsohn and Petrin estimation methodology is used in this analysis.[12] As mentioned before, Turkish manufacturing industry data contains a large number of zero observations in investment. I could have used Olley

[12] Carried out using the Stata 10 levpet command.

and Pakes, however, this would lead to delete zero investment observations for to satisfy monotonicity assumption. Although the monotonicity condition would be met by doing so, it would cause loss in efficiency of the estimators. Levinsohn-Petrin is also applied to sectors individually rather than applying it on the whole manufacturing industry.

Table-6 and Table-7 presents the estimation results of the TFP and the production function by using OLS and Levinsohn and Petrin, respectively. As expected, the coefficient on capital is moved in the upward direction by Levinsohn and Petrin procedure when compared to OLS estimation of the production function. This gives a signal that the correction is working properly.

3.3.2 Methodology for Difference-in-Differences combined with Propensity Score Matching

Following Arnold and Javorcik (2005), the first step of our empirical strategy, namely difference-in-differences approach allows us to compare the performance of foreign acquisition with the performance of otherwise identical "statistical twins". Due to its nature, the disadvantage of this approach is that it reduces the number of plants considered. The quality of the estimations therefore depends much on the data availability. Since we have a data set with a large enough sample size, our results do not suffer from this problem.

Employing difference-in-differences approach allows us to observe the (cumulative) changes in performance of ownerships; however, this methodology still suffers from non-random sample selection that leads to a problem of selection bias. To address this problem propensity score matching technique is combined with difference-in-differences approach. "The matching procedure controls for the selection bias by restricting the comparison to differences within carefully selected pair of plants." (Arnold and Javorcik, 2005). By this method, an acquired plant and domestic plant is matched where these 2 firms have similar plant characteristics in the pre-acquisition year.

If foreign investors are more willing to invest in high productive plants and more technology incentive industries then an endogeneity problem arises in the regressions and the employment difference between foreign and domestic firms would be difficult to interpret since the usual least squares estimations produce invalid results. This is why propensity score matching is used to identify the causal effects of foreign ownership. The causal effect of foreign acquisition on employment defined as[13]:

$$E(Emp_1 - Emp_0 \mid_{FDI=1}) = E(Emp_1 \mid_{FDI=1}) - E(Emp_0 \mid_{FDI=1}) \tag{3.24}$$

where $FDI \in (0, 1)$ is an indicator of whether plant is acquired by a foreign ownership, Emp_1 is the employment level of the plant following acquisition and Emp_0 denotes the employment level of the plant it had not been treated.

This equation gives the difference between the employment paths of plants that changed ownership (first term) and the analagous outcome of the same plants had they not been acquired by foreign investors (second outcome). However, in the data we are not able to observe the second term, namely the unobserved counterfactual. The matching procedure addresses the counterfactual question of what would have happened to those who did receive treatment if they had not received treatment. This technique creates the missing counterfactual of an acquired plant had it remained in domestic hands by pairing up each plant that will receive FDI in the future with a domestic plant that has very similar plant characteristics operating in the same sector and year. The underlying assumption for the validity of the matching procedure is that conditional on observable plant characteristics that are relevant for the acquisition decision, the acquired plants (treated plants) and domestic plants (non-treated plants) would have similar employment under

[13]To make a clear distinction between correlation and causality, our analysis focuses on the plants that change from domestic to foreign ownership.

the same conditions:

$$E(Emp_1 - Emp_0 \mid {}_{FDI=1}) = \tag{3.25}$$
$$(E(Emp_1 \mid {}_{FDI=1}) - E(Emp_0 \mid_{FDI=0})) - (E(Emp_0 \mid_{FDI=1}) - E(Emp_0 \mid_{FDI=0}))$$

The second term in the equation is the selection bias which is assumed to be zero conditional on a vector of observable plant characteristics. It is the difference between the outcome of plants that did receive treatment, under the hypothetical circumstances that they had not been acquired, and the plants remaining in domestic hands. If the second term is zero, then the equation gives us the causal effect that we want to see. In other words, the employment difference is a consistent estimate of the causal effect under the matching assumption. Therefore, if the matching process is successful a causal interpretation to the average employment difference between treated and control plants is possible (Arnold and Javorcik, 2005).

3.3.2.1 Propensity Score Matching Propensity Score Matching is proposed by Rosenbaum and Rubin (1983) in a seminal work as a method to eliminate the bias in the estimation of treatment effects with observational data sets. In the assessment of the causal effect it is impossible to observe individual treatment effects since the outcomes for untreated observations when it is under treatment and for treated when it is not under treatment are not known.

The application of the propensity score matching involves estimating the propensity scores as the first step. Rosenbaum and Rubin (1983) defined the propensity score as the conditional probability of receiving a treatment given pre-treatment characteristics:

$$p(X) \equiv \Pr(D = 1 \mid X) = E(D \mid X) \tag{3.24}$$

where $D = (0, 1)$ is the indicator of exposure to treatment and X is the multidimensional vector of pre-treatment characteristics.

Given a population of units denoted by i, if one knows the propensity score $p(X_i)$ then one can estimate the Average Treatment Effect on the Treated (ATT) as follows:

$$\begin{aligned} \tau &= E\{Y_{1i} - Y_{0i} \mid D_i = 1\} \\ &= E\{E\left(Y_{1i} - Y_{0i} \mid D_i = 1\right), p(X_i)\}\} \\ &= E\{E\{Y_{1i} \mid D_i = 1, p(X_i)\} - E\{Y_{0i} \mid D_i = 0, p(X_i)\} \mid D_i = 1\} \end{aligned} \tag{3.25}$$

where the outer expectation is over distribution of $(p(X_i) \mid D_i = 1)$ and Y_{1i} and Y_{0i} are the outcomes in the case of treatment and no treatment, respectively.

Given equation (3.24), the following two hypotheses should be satisfied to derive (3.25).

Lemma 1: Balancing of pre-treatment variables given in the propensity score.

If $p(X)$ is the propensity score, then

$$D \perp X \mid p(X)$$

Lemma 2: Unconfoundedness given the propensity score.

Suppose that assignment to treatment is unconfounded, i.e.,

$$Y_1, Y_0 \perp D \mid X$$

Then assignment to treatment is uncounfounded given the propensity score,i.e,

$$Y_1, Y_0 \perp D \mid p(X)$$

If the Balancing Hypotheses of Lemma 1 is satisfied, for a given propensity score, receiving treatment is random and hence treated and control groups should be statistically identical.

The estimation of the propensity score is implemented in Stata 10 using the

program pscore.ado defined in the Becker and Ichino (2002). This program estimates the propensity score and tests Balancing Hypothesis. The first step is to estimate a logit regression for firms, where the dependent variable FDI indicates if a firms received any FDI inflows (=1) or not (=0). For the different levels of FDI the propensity scores estimations are repeated. Employment, employment square, capital intensity (K/L), ratio of non-production workers, total factor productivity, real investments are taken as the explanatory variables. These are the observable characteristics of plants that will affect receiving FDI. To avoid endogeneity, all explanatory variables are lagged one year. A logit regression is conducted to identify whether these variables are statistically significant or not. Note that, we find all explanatory variables to be statistically significant implying that these are all the significant observable plant characteristics that affect the probability of foreign acquisition.

These logit estimates are used to generate a propensity score (pscore) for each firm. All combinations of sectors and years where no foreign acquisition occurred are dropped to increase the reliability of the model. Moreover, observations outside the common support are excluded. This is done by adding a dummy variable named comsup to the data set to identify the observations in the common support. The balancing hypothesis test is performed by using the procedure suggested by Becker and Ichino (2002). The balancing hypothesis is satisfied for each year and and each sector implying that the approach is confidentially able to group together relatively identical plants.[14]

After estimating propensity scores firms that received FDI (treated group) and those that did not (control group) are matched using the propensity score (pscore). The variable pscore gives the probability that the firms will receive FDI given the pre-characteristics included in logit regression.

In the application of propensity score matching, one-to-one nearest neighbor

[14]To make sure that we are matching identical plants, the balancing hypothesis test is conducted for each sector and year. When the balancing hypothesis test is not satisfied then a different matching procedure is used, such that for some years or sectors the real investment or capital intensity are excluded from the estimation of propensity scores.

matching is adopted with replacement. A caliper setting of 0.2 is also adopted where the caliper ensures all the available treated firms are used. In addition, the requirement that the matched plant observations come from the same sector and year is imposed.[15]

3.3.2.2 Difference-in-Differences The last step[16] involves comparing employment of the matched firms. This comparison is named as the Average Treatment Effect on the Treated (ATT) and calculated as follows:

$$\begin{aligned} ATT &= \frac{1}{n}\sum_{1}^{n}\left(Employment_{yearA}^{treated} - Employment_{yearA}^{control}\right) - \\ &\quad \frac{1}{n}\sum_{1}^{n}\left(Employment_{yearB}^{treated} - Employment_{yearB}^{control}\right) \end{aligned}$$

where year A denotes either the acquisition year or the following years and year B denotes the pre-acquisition year where $yearA > yearB$.

The advantage of combining propensity score matching approach with difference-in-differences is to observe the divergence in the paths of performance between the treated plants and the matched control plants that had similar characteristics in the pre-acquisition year (Arnold and Javorcik, 2005). The benefits of combining these two approaches is also well accepted by recent studies which argue that the standard matching estimators are unsatisfactory, but in combination with difference in differences approach the matching analysis improves "...the quality of non-experimental evaluation results significantly" (Blundell and Costa Dias, 2000, pp. 438). Furthermore with the difference-in-differences approach we are able to eliminate unobserved fixed effect differences in employment between acquired plants and non acquired plants, whereas the standard matching estimators fail to eliminate (Smith and Todd, 2005).

[15] The matching procedure is implemented in Stata 10 using a modified version of the procedure described in psmatch2.ado suggested by Leuven and Sianesi (2001).

[16] Carried out using the Stata implementation matchcat by Arnold and Javorcik (2009).

CHAPTER 4

EMPIRICAL RESULTS

In this section the effects of FDI inflows on plant employment are examined for different levels of FDI inflows. The results are reported from Table-8 through Table-25.

4.1 Main Results

The primary results give the average difference in employment in the matched pairs, net of the average initial difference before the acquisition. We look at the employment effects of foreign ownerships at different levels. The 10, 25, 50, 75, 100 percent foreign ownership effects are examined, respectively. This captures the possible difference in results due to the extent of control by the foreign owners.

As can be seen in Table-8, between the year prior to the acquisition and the acquisition year the divergence between the treatment and the control group is significant in terms of employment. As it can be seen in Table-8, between the year prior to the acquisition and the acquisition year, a foreign acquisition leads to an additional 13.5 percentage employment increase in the plants that have foreign ownerships. Moreover, this effect grows in the following year and reaches 22.9 percentage. By the end of the third year, foreign acquired firms enjoy an employment advantage, which is equivalent to 21.2 percentage, over the control group. In this and in all subsequent analyses, the firms that have never received any FDI inflows are taken as the control group.

In our data the number of state-owned firms that have been affiliated by foreign owners are relatively so small than the domestically owned firms and the number of state-owned firms that have never received FDI inflows have predominant share among the state-owned firms. In order to make sure that the results are not driven by any facts that are caused by the structure of the data, in the second analysis state-owned firms are excluded and we focus on the effects of foreign acquisitions between the private establishments and foreign affiliated firms.

Although the results vary in number, the positive effect is still observed. The difference-in-differences results presented in Table-9 indicate that a foreign acquisition leads to an additional 12.7 employment in the acquired plants compared to statistically similar plants remaining in domestic hands. By the end of the second year, the gap between the acquired and the private domestic firms widens to 21.6 percentage. The positive effects also persist by the end of the third year by 19 percentage.

For both two cases, the divergence between the acquired plants and the control plants is positive. The final step in the analysis involves bootstrapping the ATT results[1] to check if the results are statistically different from zero. This gives an indication of whether receiving FDI confers significant increases in employment when compared to firms that do not receive it. The confidence intervals are reported based on the bias-corrected confidence intervals.

According to bias-corrected confidence intervals, the results are statistically significant at the one percent level in the acquisition year and the following two years.

As Table-10 presents, the positive effects of FDI inflows on plant employment is still observed when plants with 25 percent or more foreign ownership are considered as foreign affiliated. However, the effects get smaller. As it can be seen in Table-10, by the end of the acquisition year a foreign acquisition only leads to an additional 2.8 percentage employment increase in the plants that have foreign ownerships. By

[1]The ATT results are bootstrapped for 50 times for all of the analysis.

the end of the third year, foreign ownership leads to 7.9 percentage increase in the treated plants. The analysis that excludes state-owned firms is also carried out for the level of 25 percent foreign ownership. The results are almost the same as what we have observed in the whole data set. Between the year prior to the acquisition and the acquisition year, a foreign acquisition increases plant employment only by 2.9 percentage and this effect becomes 7.5 percentage by the end of the third year. In this analysis there are 128 matched plants. The observed effects are all statistically significant at the one percent level according to the bias- corrected confidence intervals.

When we only consider the plants that have 50 percent or more foreign ownership as foreign affiliated, as evident in Table-11, employment effects of FDI inflows into manufacturing sector is still positive, however the observed effects are smaller than the effects obtained in the case of firms with 10 percent or more are considered as foreign affiliated. For both including state-owned enterprises and excluding those from the sample, the same qualitative results are observed. In the case when state-owned firms are included, foreign acquired firms lead to 5.6 percentage increase in employment in the acquisition year and gets to 12.6 percentage by the end of the third year and in the case when state-owned firms are excluded, FDI inflows have a slightly greater positive impact on plant employment. By the end of the acquisition year, a foreign acquisition increases plant employment only by 6.9 percentage and this effect becomes 15.6 percentage by the end of the third year. All the results are statistically significant at the one percent level but note that this analysis restricts the number of matches to 98 plants.

The analysis that considers only the plants that receive 75 percent or more foreign ownership as foreign affiliated reduces the number of matched plants to 63 plants. The analysis suggests that between the year prior to the acquisition and the acquisition year the divergence between the treatment and the control group is positive but smaller than obtained earlier. As it can be seen in Table-12, between the year prior to the acquisition and the acquisition year, a foreign acquisition

leads to an additional 6.9 percentage employment increase in the plants that have foreign ownerships. However, this effect does not grow in the following years and stands at 5 percentage. As Table-12 presents, for 75 percent acquisition level the results do not differ much between the whole data set and when state-owned firms are excluded from the data set. All results are statistically significant at the one percent significance level.

Finally, the analysis is conducted for the plants with 100 percent foreign ownership at the acquisition year. Although the positive effects are not observed until the end of the second year, by the end of the third year, foreign acquired firms enjoy an employment advantage, which is equivalent to 15.1 percentage (see Table-13), over the control group. The observed negative effects for the acquisition year and following year are very small. However, unlike other cases, in this case the effects differ when state-owned firms are excluded in the data set. While foreign firms only lead to a 2.6 percentage decrease at the acquisition year for the whole data set, the negative effect increases to 11 percentage when state-owned firms are dropped from the data. The effects are almost the same by the end of the second year for both cases, but by the end of the third year foreign ownership leads to an 9.4 percentage, which is less than 15.1 percentage when we only focus on private establishments.

In the literature Arnold and Javorcik (2005) studied the plant performance of Indonesian manufacturing firms by employing the method of difference-in-differences combined with propensity score matching. For the employment analysis they also observe the positive effects of FDI inflows when 10 percent is chosen as a threshold level to become foreign acquired. However, this thesis shows that the employment effects can differ due to different levels of FDI inflows. Hence, in this thesis not only do we replicate the study of Arnold and Javorcik (2005), but we also provide evidence that the employment effects differ for different levels of FDI inflows.

4.2 Robustness Checks

4.2.1 Extending the Time Horizon

In this section the time horizon is extended by two more years to ensure that the employment increase due to FDI is not a temporary phenomenon. For the first case the difference-in-differences results presented in Table-14 indicate that the employment increase experienced by the foreign affiliated firms continue in the third and fourth year. By the end of the fourth year the employment gap between foreign affiliated firms and local firms increases to 24.1 percentage and this difference gets larger at the end of the fifth year being 27 percentage. These results are significant at the one percent level considering the 99% bias corrected confidence intervals. Note that, as the time horizon is extended the number of observations from matching decreases.

In the analysis which state-owned firms are excluded from the sample the results indicate that the additional employment experienced by the foreign acquired firms also continue in the following two years. By the end of the fourth year the employment gap between the foreign acquired firms and local firms widens to 20.5 and the difference is 22.3 percentage at the end of the fifth year. These results are also significant at the one percent level considering the 99 percent bias corrected confidence intervals. Note that, as the time horizon is extended the size of the sample is limited (see Table-14).

As Table-15 presents, the positive effects of FDI inflows on plant employment persists when plants with 25 percent or more foreign ownership are considered as foreign affiliated. As can be seen in Table-15, by the end of the fourth year a foreign acquisition leads to an additional 10.7 percentage employment increase in the plants that have foreign ownerships. By the end of the fifth year, foreign ownership leads to 16.3 percentage increase in the treated plants. The analysis that excludes state-owned firms is also carried out for the level of 25 percent foreign ownership and the results do not differ in magnitude. By the end of the fourth

year and fifth year foreign acquired firms enjoy an employment advantage by 10.2 and 14.6 percentage over the control group, respectively.

The analysis that considers only the plants that receive 50 percent or more foreign ownership as foreign affiliated shows that when the time horizon is extended to four years the results that is obtained by the end of the third year do not change qualitatively. By the end of the fourth year, foreign ownership leads to a 11.2 percentage employment increase in the domestic firms. However, when the time horizon is extended to five years the employment effects are almost insignificant by the end of the fifth year (see Table-16). As Table-16 presents when we only focus on the private establishments, by the end of the fourth year foreign acquisition leads to a 9 percentage employment increase in the domestic firms where this effect again gets insignificant (1 percentage point) by the end of the fifth year as observed in the preceding analysis. Although the observed effects are all statistically significant at the one percent level according to the bias-corrected confidence intervals, the effects are not economically significant by the end of the fifth year.

In the case of the plants that have 75 percent or more foreign ownership, as evident in Table-17, the causal effect of foreign ownership on domestic firms is negative by the end of the fourth and the fifth years. For the case where we include all the firms, these negative effects are -4.8 and -8.2 percentage, respectively. For the case where we only focus on private establishments by the end of the fourth and fifth years the negative effects are -3.5 and -4.3 percentage. However, one should consider that this analysis restricts the number of matched plants to 51 and 34 where these numbers are relatively small when compared to the other. Furthermore, it should also be noted that in our data there are not many firms that are acquired by 75 percent or more there are not many firms that are acquired by 75 percent and survive up to five years.

For the plants with 100 percent foreign ownership at the acquisition year, by the end of the fourth year the employment increase experienced by the foreign affiliated firms is 17.7 percentage and this increase is 11.2 percentage when only

private establishments are considered in the matching process. However, by the end of the fifth year the positive employment effects are replaced by negative effects, by -1 and -8 percentage; respectively. Again, the results should be read carefully, since the number of matched plants decreases to 17 and 10 plants (see Table-18). This small number of matches gives a signal that in the data we do not have enough number of firms that are acquired by 100 percent.

4.2.2 Removing the restriction on matching within sectors

In order to make sure that restricting the control observations to come from the same sector and year does not distort the results, the results are also obtained without imposing this constraint and are presented in Table-19. As evident from Table-19, for both including state-owned enterprises and excluding those from the sample, the same qualitative results are obtained with this modification. In the case when state-owned firms are included, foreign acquired firms lead to a 12.6 percentage increase in employment in the acquisition year and this increase also persists by the end of the third year. Besides, when state-owned firms are excluded foreign acquired firms also enjoy an employment advantage over the control group equivalent to 8 percentage by the end of the third year. Although the same qualitative results are observed, allowing out-of-sector matching produces somewhat smaller effects for the acquisition year and the following year when compared to the restriction imposed case.

As Table-20 presents, the positive effects of FDI inflows on plant employment is still observed when plants with 25 percent or more foreign ownership are considered as foreign affiliated in the non-restriction case. By the end of the third year, foreign ownership leads to 10.8 percentage increase in the treated plants. The analysis that excludes state-owned firms is also carried out for the level of 25 percent foreign ownership and it is observed that foreign acquisition leads to a 11.6 percentage employment increase in the domestic firms. Although we observe insignificant but negative effects in two years, as Table-21 presents, by the end of the third

year the employment gap between foreign acquired and domestic firms is almost 7 percentage for both cases when state-owned firms are included and excluded when the 50 percent level of FDI inflows are taken as a threshold level to become acquired. For 75 percent level of FDI inflows, by the end of the third year foreign acquired firms lead to 6.4 percentage increase for both cases where this effect is slightly larger than the effect that we have observed in the restriction imposed case (see Table-22). For the plants with 100 percent foreign ownership at the acquisition year, although the observed effects are negative around three percentage for two years time period, by the end of the third year employment increase experienced by the foreign affiliated firms is 14.9 percentage and this increase is 16 percentage when only private establishments are considered in the matching process (see Table-23).

4.2.3 Evidence on Output and Total Factor Productivity

If our findings of increased employment are due to FDI, we would also expect to see the positive effects of FDI inflows on output and total factor productivity. In the analysis, the real output in the logarithmic form is used. Total factor productivity is calculated based on the methodology described in Levinsohn and Petrin (2003). As illustrated in Table-24 and Table-25, foreign ownership leads to an increase in output and production in the manufacturing industry. Although the effects are small in the acquisition year, foreign acquired firms have higher production by the end of the third year by 21 percentage when both state-owned firms included and excluded cases. In addition, foreign acquisition also leads to approximately 10 percentage increase in the productivity by the end of the second year for both state-owned firms included and excluded cases. All of the observed effects are statistically significant at the one percent significance level throughout the period considered.

CHAPTER 5

CONCLUSION

This study investigates the relationship between FDI inflows and employment at the plant level in Turkey. The literature on the employment effects shows that identifying the correlation and the causal relationship between foreign ownership and plants' employment is not straightforward and the results are prone to change by different methodologies. The aim of this study is to search for the employment effects of FDI inflows by using the strategy of difference-in-differences combined with propensity score matching.

To identify the correlation and the causality, a firm-level unbalanced panel data from the Turkish manufacturing industry covering the period of 1990-2001 is used. First, one of the explanatory variables that would affect the probability of receiving FDI, the firm-level TFP, is estimated at the level of 3-digit sectors by using Levinsohn-Petrin (2003) methodology. Then the propensity score of each firm is calculated for each sector and year, followed by imposing the within year and sector restriction difference-in-differences approach combined with propensity score matching. At first, the analysis includes the acquisition year and the following two years. Then I extend the time period to five years to make sure that the effects of FDI inflows are not temporary. Moreover, to ensure that the results are not driven by the restriction imposed, the analysis is also conducted without matching within sector/year restriction. Finally the productivity and output effects of FDI inflows are also examined. All of these estimation procedures are conducted for both the whole data and for a data set where the state-owned firms excluded.

The baseline results suggest that between the year prior to the acquisition and the acquisition year, a foreign acquisition leads to an additional 13.5 percentage points employment increase in the plants that have foreign ownerships and by the end of the third year, foreign acquired firms enjoy an employment advantage, which is equivalent to 21.2 percentage points, over the control group. For the state-owned firms excluded case, although the results vary in number, the positive effects is still observed. The difference-in-differences results show that a foreign acquisition leads to an additional 12.7 employment in the acquired plants where this additional employment effects can not be shared by statistically similar plants remaining in domestic hands. The positive effects also persist by the end of the third year by 19 percentage points.

As mentioned above, the results are robust when we extend the time horizon. The results for the whole data suggest that by the end of the fourth year the employment gap between foreign affiliated firms and local firms increases to 24.1 percentage points and this difference gets larger at the end of the fifth year being 27 percentage points. Also, the results are robust to the case where we only focus on private establishments, where we find by the end of the fourth year the employment gap between the foreign acquired firms and local firms widens to 20.5 and the difference is 22.3 percentage points at the end of the fifth year.

Although the numbers are smaller than what we have observed with the restriction imposed case, the results for without restriction also suggest significant and positive employment effects of FDI. For the whole data, foreign acquired firms lead to 12.6 percentage points increase in the acquisition year and this increase also persists by the end of the third year. Besides, foreign acquired firms also enjoy an employment advantage over the control group equivalent to 8 percentage points by the end of the third year. And the positive effects of FDI inflows for both output and productivity are observed.

Unlike the other studies that have been issued for the employment effects of FDI for Turkey, this study finds significant and positive effects of foreign acquisitions

on plant employment by using the standard definition of FDI. Furthermore, not only do I examine the employment effects of FDI inflows by using the standard definition of FDI as is done in the literature, but I also look into the possible differentiale effects of different levels of FDI and identify these effects at the 10, 25, 50, 75 and 100 percent levels of foreign ownership, respectively. I find that as the dominance of foreign firms in the acquired firm increases the employment effects of FDI inflows begins to decrease, explain this result by the fact that the increase in FDI managerial control makes the restructuring process more active and this limits the employment improvement in the acquired firms, as expected.

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APPENDIX

FIGURES AND TABLES

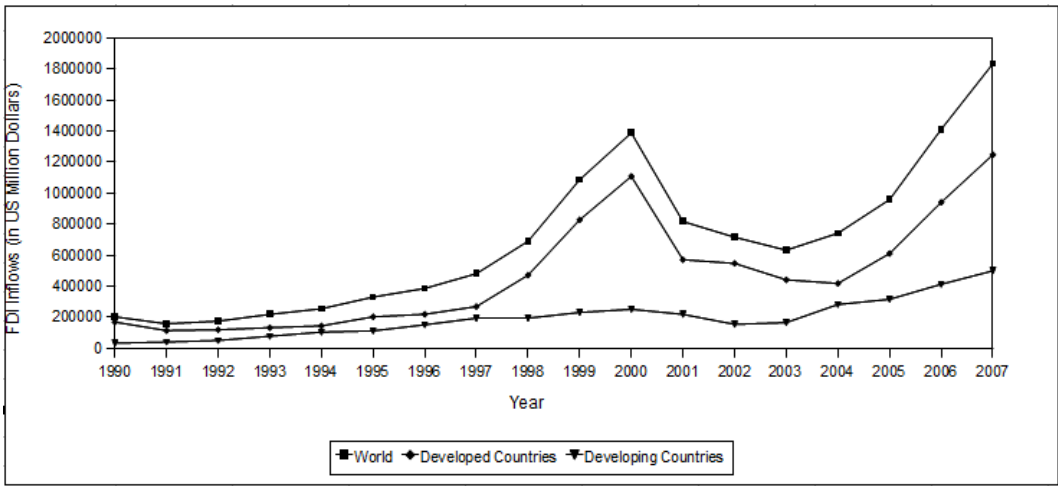

Figure 1: World FDI Inflows

Source: United Nations Conference on Trade and Development (UNCTAD), World Investment Report

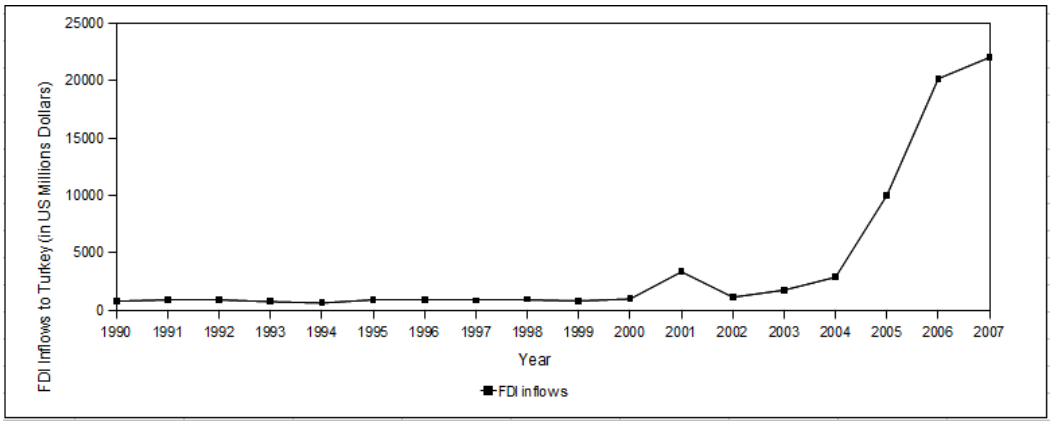

Figure 2: FDI Inflows to Turkey, 1990-2007

Source: United Nations Conference on Trade and Development (UNCTAD), World Investment Report

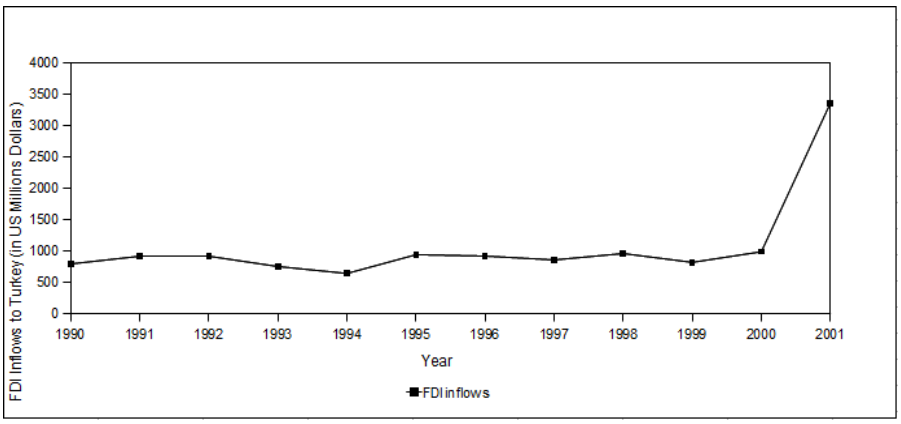

Figure 3: FDI Inflows to Turkey, 1990-2001

Source: United Nations Conference on Trade and Development (UNCTAD), World Investment Report

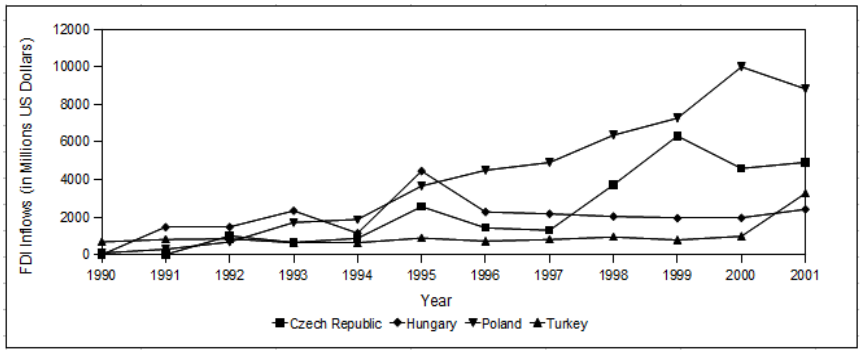

Figure 4: Comparison of FDI inflows

Source: United Nations Conference on Trade and Development (UNCTAD), World Investment Report

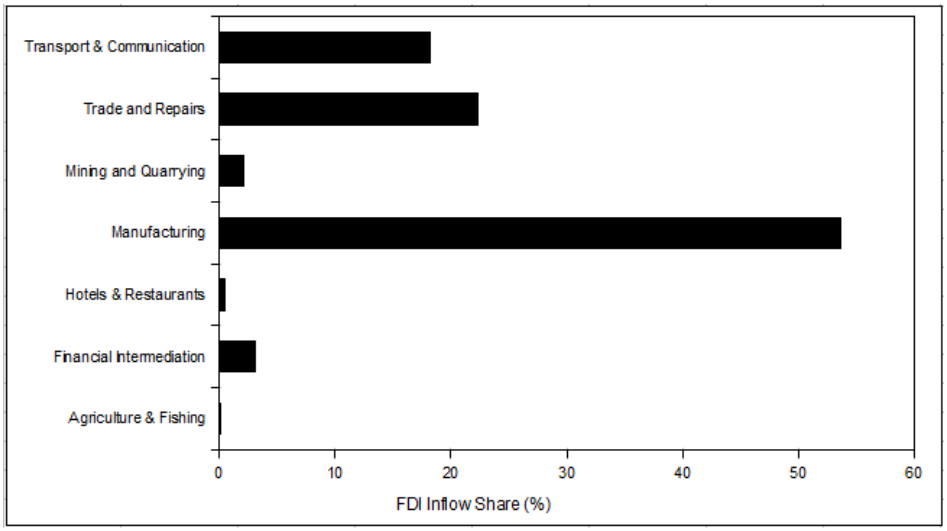

Figure 5: Shares of Industries, 1990-2001

Source: OECD

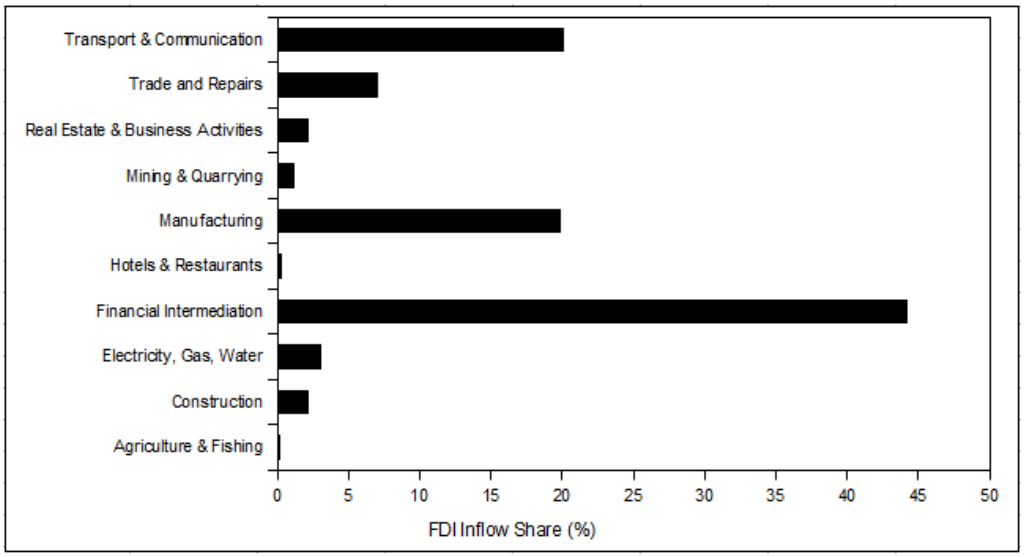

Figure 6: Shares of Industries, 2001-2007

Source : OECD

Table 1: Descriptive Statistics by Year

Years	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Number of plants	5201	5073	5665	6653	6606	6889	7089	7506	8076	7690	7669	7756
Number of FA plants	206	205	220	259	268	280	279	305	340	356	356	379
Percent of FA plants	3.9	4.0	3.9	3.9	4.0	4.0	3.9	4.0	4.2	4.6	4.6	4.9

Source : TurkStat.

Notes : Plants with 10 percent or more foreign ownership are considered as foreign affiliated (FA) plants.

Table 2: Descriptive Statistics by Sector

Sector	All Plants-Years	FA Plants-Years	% of FA Plants
311	8313	328	4
312	3189	150	4.7
313	973	47	4.8
321	14723	240	1.6
322	11344	268	2.4
323	1026	2	0.19
324	929	6	0.7
331	1660	16	0.96
332	1174	11	0.93
341	1501	81	5.4
351	877	105	12
352	2476	369	14.9
355	1254	64	5.1
356	3040	144	4.7
361	477	9	1.9
362	655	24	3.7
369	6346	190	3
372	1073	32	2.9
381	6450	216	3.34
382	5214	230	4.4
383	3675	372	10.12
384	3771	374	9.9
390	983	43	4.3

Source: TurkStat.

Notes : Plants with 10 percent or more foreign ownership shares are defined as foreign affiliated (FA) plants.

Table 3: Descriptive Statistics-Number of Firms with Different Levels of FDI

Year	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
1990	206	186	171	151	107	86	80	70	60	35
1991	205	186	174	156	112	88	78	66	56	32
1992	220	196	285	169	119	90	82	76	64	41
1993	259	234	219	196	144	116	107	94	80	52
1994	268	244	226	203	151	125	117	102	91	57
1995	280	261	240	216	162	136	122	105	95	63
1996	279	258	240	223	166	134	118	102	91	61
1997	305	282	256	235	162	132	119	98	91	51
1998	340	313	283	264	179	150	134	116	105	60
1999	356	330	302	277	196	161	147	127	116	82
2000	356	335	306	281	209	183	169	149	135	94
2001	379	358	332	301	230	203	190	168	149	114

Source : TurkStat.

Table 4: Summary Statistics by Year

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
All Plants												
Avg. Emp.	186	176	158	138	134	133	139	143	140	137	140	133
Avg. Output	32.4	35.2	36.3	36.1	33.4	36.5	36.0	40.1	38.2	38.8	41.9	40.2
Avg. K/L	195.7	149.0	160.7	193.1	173.9	177.4	175.8	151.6	149.1	161.4	150.1	159.2
Avg. TFP	6.2	6.2	6.4	6.4	6.3	6.4	6.4	6.5	6.5	6.5	6.5	6.5
FA Plants												
Avg. Emp.	430	436	425	383	352	341	340	343	347	330	346	333
Avg. Output	133.7	153.9	178.1	201.8	160.8	188.5	182.2	195.0	188.2	186.3	217.1	203.1
Avg. K/L	201.7	184.1	170.9	175.8	202.7	199.0	218.3	221.5	213.5	237.6	244.6	268.8
Avg. TFP	6.6	6.7	6.9	7.03	6.9	7.05	6.9	6.9	6.9	6.8	6.9	6.9
Local Plants												
Avg. Emp.	172	162	146	130	123	124	128	133	130	127	128	122
Avg. Output	27.3	29.2	30.0	28.8	27.4	29.3	29.0	32.3	31.1	31.3	32.7	31.2
Avg. K/L	194.2	147.1	160.1	193.9	172.2	176.1	173.4	147.6	145.3	156.1	143.8	152.3
Avg. TFP	6.2	6.2	6.3	6.4	6.3	6.4	6.4	6.5	6.5	6.5	6.5	6.5

Source : TURKSTAT
Notes : Plants with 10 percent or more foreign ownership are considered as foreign affiliated (FA) plants. Output and capital/labor is in billion 1990 TL. TFP is calculated by Levinsohn-Petrin (2003) procedure.

Table 5: Summary Statistics by Sector

Sector	Avg. Emp	Avg. K/L	Avg. Output	Avg. TFP
311	176	169.1	32.0	4.8
312	86	126.6	23.7	5.0
313	156	196.0	58.0	4.5
321	192	178.9	28.7	5.0
322	105	78.9	13.2	8.5
323	69	76.9	17.0	7.9
324	102	47.7	9.5	3.8
331	88	82.2	16.7	6.6
332	101	67.4	11.8	5.6
341	172	139.5	36.5	5.1
351	353	267.7	132.2	6.8
352	154	225.4	54.3	6.5
355	128	83.8	27.1	3.3
356	83	178.6	24.4	5.9
361	318	215.7	67.7	4.6
362	241	189.9	66.8	5.2
369	87	171.2	17.2	3.5
372	164	145.9	49.7	6.2
381	90	214.9	21.3	6.9
382	118	116.5	26.2	5.0
383	165	158.7	79.0	6.9
384	243	108.2	67.7	5.3
390	83	179.9	96.5	4.7

Source: TurkStat.
Notes : Plants with 10 percent or more foreign ownership are considered as foreign affiliated (FA) plants. Output and capital/labor is in billion 1990 TL. TFP is calculated by Levinsohn-Petrin (2003) procedure.

Table 6: OLS Estimates of Production Function (1990-2001), Dependent Variable: Value Added

Sector	Labor***	S.E.	Capital	S.E	No of Obs.
311 Food	1.06	0.03	0.18***	0.01	4650
312 Food Miscellaneous	0.99	0.05	0.12***	0.03	1379
313 Beverages	1.51	0.13	0.13***	0.06	639
321 Textiles	1.01	0.02	0.16***	0.01	9329
322 Wearing Appeal	0.94	0.04	0.09***	0.02	5161
323 Leather Products	1.01	0.09	0.13***	0.04	637
324 Footwear	1.17	0.11	0.06	0.05	359
331 Wood Products	1.17	0.79	0.15***	0.03	1022
332 Furniture	1.34	0.09	0.08***	0.04	563
341 Paper	0.82	0.12	0.26***	0.06	835
351 Industrial Chemicals	0.71	0.12	0.26***	0.07	554
352 Other Chemicals	1.00	0.07	0.27***	0.04	1552
355 Rubber Products	1.05	0.09	0.28***	0.03	877
356 Plastics	1.10	0.05	0.19***	0.02	2410
361 Seramics	1.17	0.14	0.23***	0.06	337
362 Glass	1.07	0.09	0.24***	0.04	470
369 Non-metal Minerals	1.29	0.05	0.27***	0.02	4212
372 Non-ferrous Metals	1.11	0.07	0.14***	0.03	853
381 Fabricated Metals	1.02	0.03	0.20***	0.02	4625
382 Non-electrical Mach.	1.12	0.04	0.12***	0.01	3622
383 Electrical Machinery	1.10	0.04	0.20***	0.02	2768
384 Transport Equipment	1.08	0.04	0.17***	0.02	2787
390 Other Manufacturing Prod.	1.23	0.13	0.17***	0.04	569

Notes : S.E. denotes standard errors. ***, ** and * indicate the statistical significance at the 1, 5 and 10% levels, respectively. Statistical significance indicators apply to all sectors if it is next to the variable name.

Table 7: Levinsohn-Petrin Estimates of Production Function (1990-2001), Dependent Variable: Value Added

Sector	Labor***	S.E.	Capital	S.E	No of Obs.
311 Food	0.78	0.03	0.27***	0.06	4649
312 Food Miscellaneous	0.74	0.05	0.15	0.11	1379
313 Beverages	0.89	0.15	0.28***	0.13	639
321 Textiles	0.62	0.02	0.26***	0.04	9325
322 Wearing Appeal	0.49	0.05	0.03	0.07	5158
323 Leather Products	0.39	0.05	0.20	0.10	637
324 Footwear	0.65	0.12	-0.06	0.24	359
331 Wood Products	0.47	0.06	0.26**	0.11	1022
332 Furniture	0.99	0.15	-0.10	0.20	563
341 Paper	0.45	0.15	0.16	0.14	835
351 Industrial Chemicals	0.46	0.18	0.31	0.30	553
352 Other Chemicals	0.60	0.07	0.25***	0.11	1551
355 Rubber Products	0.58	0.08	0.48***	0.14	877
356 Plastics	0.62	0.05	0.30***	0.07	2410
361 Seramics	0.59	0.13	0.20	0.15	336
362 Glass	0.81	0.05	0.26**	0.10	470
369 Non-metal Minerals	0.84	0.03	0.34***	0.07	4123
372 Non-ferrous Metals	0.81	0.07	0.11	0.11	853
381 Fabricated Metals	0.46	0.06	0.17***	0.05	4623
382 Non-electrical Mach.	0.73	0.02	0.30***	0.06	3622
383 Electrical Machinery	0.56	0.05	0.27***	0.07	2768
384 Transport Equipment	0.72	0.05	0.11***	0.07	2787
390 Other Manufacturing Prod.	0.90	0.13	0.25***	0.24	569

Notes : S.E. denotes standard errors. ***, ** and * indicate the statistical significance at the 1, 5 and 10% levels, respectively. Statistical significance indicators apply to all sectors if it is next to the variable name.

Table 8: Matching Results for Employment-10 percent

Effect of Foreign Acquisition	Log Employment
Acquisition year	0.135***
	(0.068)
Following year	0.229***
	(0.078)
Two years later	0.212***
	(0.083)
n	118

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

n= number of matched acquisitions

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 9: Matching Results-Stateowned Firms are excluded-10 percent

Effect of Foreign Acquisition	Log Employment
Acquisition year	0.127***
	(0.069)
Following year	0.216***
	(0.078)
Two years later	0.190***
	(0.084)
n	118

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

n= number of matched acquisitions

Table 10: Matching Results for Employment-FDI level 25 percent

	Whole data	Stateowned firms are excluded
Effect of Foreign Acquisition	Log Employment	Log Employment
Acquisition year	0.028***	0.029***
	(0.059)	(0.046)
One year later	0.07***	0.072***
	(0.087)	(0.073)
Two years later	0.079***	0.075***
	(0.086)	(0.062)
n	128	128

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 11: Matching Results for Employment-FDI level 50 percent

	Whole data	Stateowned firms are excluded
Effect of Foreign Acquisition	Log Employment	Log Employment
Acquisition year	0.056***	0.069***
	(0.056)	(0.055)
One year later	0.118***	0.152***
	(0.061)	(0.075)
Two years later	0.126***	0.156***
	(0.093)	(0.101)
n	98	98

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 12: Matching Results for Employment-FDI level 75 percent

	Whole data	Stateowned firms are excluded
Effect of Foreign Acquisition	Log Employment	Log Employment
Acquisition year	0.069***	0.073***
	(0.067)	(0.054)
One year later	-0.001***	0.009***
	(0.073)	(0.084)
Two years later	0.051***	0.056***
	(0.104)	(0.07)
n	63	63

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 13: Matching Results for Employment-FDI level 100 percent

	Whole data	Stateowned firms are excluded
Effect of Foreign Acquisition	Log Employment	Log Employment
Acquisition year	-0.026***	-0.11***
	(0.079)	(0.101)
One year later	-0.032***	-0.039***
	(0.118)	(0.107)
Two years later	0.151***	0.094***
	(0.187)	(0.163)
n	22	22

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 14: Matching Results-Longer Horizon-10 percent

	Whole data		Stateowned firms are excluded	
Effect of Foreign Acquisition	Log Employment	Log Employment	Log Employment	Log Employment
Acquisition year	0.180***	0.187***	0.176***	0.184***
	(0.068)	(0.115)	(0.109)	(0.116)
One year later	0.266***	0.310***	0.254***	0.304***
	(0.077)	(0.090)	(0.071)	(0.125)
Two years later	0.264***	0.329***	0.236***	0.311***
	(0.118)	(0.104)	(0.11)	(0.108)
Three years later	0.241***	0.270***	0.205***	0.231***
	(0.107)	(0.121)	(0.101)	(0.097)
Four years later		0.270***		0.223***
		(0.136)		(0.133)
n	96	70	96	70

n= number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 15: Matching Results for Employment-Time Horizon Extended-FDI level 25 percent

	Whole data		Stateowned firms are excluded	
Effect of Foreign Acquisition	Log Employment	Log Employment	Log Employment	Log Employment
Acquisition year	0.047***	0.0892***	0.05***	0.09***
	(0.069)	(0.071)	(0.058)	(0.104)
One year later	0.104***	0.159***	0.111***	0.163***
	(0.076)	(0.104)	(0.077)	(0.098)
Two years later	0.110***	0.18***	0.106***	0.176***
	(0.093)	(0.131)	(0.065)	(0.143)
Three years later	0.107***	0.193***	0.102***	0.179***
	(0.11)	(0.114)	(0.08)	(0.125)
Four years later		0.163***		0.146***
		(0.161)		(0.132)
n	105	71	105	71

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 16: Matching Results for Employment-Time Horizon Extended-FDI level 50 percent

	Whole data		Stateowned firms are excluded	
Effect of Foreign Acquisition	Log Employment	Log Employment	Log Employment	Log Employment
Acquisition year	0.075***	0.0005***	0.053***	0.013***
	(0.081)	(0.121)	(0.083)	(0.105)
One year later	0.132***	0.046***	0.121***	0.079***
	(0.087)	(0.109)	(0.105)	(0.101)
Two years later	0.07***	0.057***	0.051***	0.079***
	(0.093)	(0.120)	(0.149)	(0.162)
Three years later	0.112***	0.075***	0.09***	0.088***
	(0.098)	(0.123)	(0.096)	(0.162)
Four years later		-0.011***		0.01***
		(0.133)		(0.082)
n	80	55	80	55

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 17: Matching Results for Employment-Time Horizon Extended-FDI level 75 percent

	Whole data		Stateowned firms are excluded	
Effect of Foreign Acquisition	Log Employment	Log Employment	Log Employment	Log Employment
Acquisition year	0.042***	0.043***	0.047***	0.049***
	(0.075)	(0.093)	(0.05)	(0.076)
One year later	-0.011***	0.046***	0.002***	0.073***
	(0.077)	(0.088)	(0.091)	(0.101)
Two years later	0.005***	0.01***	0.016***	0.037***
	(0.103)	(0.104)	(0.118)	(0.112)
Three years later	-0.048***	-0.161***	-0.035***	-0.125***
	(0.119)	(0.128)	(0.088)	(0.14)
Four years later		-0.082***		-0.043***
		(0.165)		(0.129)
n	51	34	51	34

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 18: Matching Results for Employment-Time Horizon Extended-FDI level 100 percent

	Whole data		Stateowned firms are excluded	
Effect of Foreign Acquisition	Log Employment	Log Employment	Log Employment	Log Employment
Acquisition year	-0.001***	0.011***	-0.1***	-0.15***
	(0.108)	(0.147)	(0.135)	(0.17)
One year later	0.028***	-0.032***	-0.004***	-0.053***
	(0.16)	(0.117)	(0.129)	(0.103)
Two years later	0.246***	0.127***	0.175***	0.09***
	(0.205)	(0.257)	(0.244)	(0.327)
Three years later	0.177***	0.058***	0.112***	-0.014***
	(0.213)	(0.319)	(0.243)	(0.269)
Four years later		-0.016***		-0.08***
		(0.191)		(0.179)
n	17	10	17	10

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 19: Matching Results for Employment, not restricted within sector/year-10 percent

	Whole data	Stateowned firms are excluded
Effect of Foreign Acquisition	Log Employment	Log Employment
Acquisition year	0.126***	0.093***
	(0.063)	(0.079)
Following year	0.152***	0.111***
	(0.072)	(0.065)
Two years later	0.125***	0.08***
	(0.084)	(0.074)
n	124	124

n= number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 20: Matching Results for Employment-Without Restriction-FDI level 25 percent

	Whole data	Stateowned firms are excluded
Effect of Foreign Acquisition	Log Employment	Log Employment
Acquisition year	0.064***	0.063***
	(0.062)	(0.058)
One year later	0.073***	0.077***
	(0.072)	(0.085)
Two years later	0.108***	0.116***
	(0.079)	(0.066)
n	137	137

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 21: Matching Results for Employment-Without Restriction-FDI level 50 percent

	Whole data	Stateowned firms are excluded
Effect of Foreign Acquisition	Log Employment	Log Employment
Acquisition year	-0.037***	-0.031***
	(0.045)	(0.049)
One year later	-0.025***	-0.022***
	(0.053)	(0.053)
Two years later	0.072***	0.076***
	(0.103)	(0.076)
n	103	103

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 22: Matching Results for Employment-Without Restriction-FDI level 75 percent

	Whole data	Stateowned firms are excluded
Effect of Foreign Acquisition	Log Employment	Log Employment
Acquisition year	0.046***	0.05***
	(0.048)	(0.051)
One year later	0.003***	0.002***
	(0.08)	(0.077)
Two years later	0.064***	0.064***
	(0.074)	(0.097)
n	69	69

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 23: Matching Results for Employment-Without Restriction-FDI level 100 percent

	Whole data	Stateowned firms are excluded
Effect of Foreign Acquisition	Log Employment	Log Employment
Acquisition year	0.069***	0.074***
	(0.09)	(0.093)
One year later	-0.03***	-0.002***
	(0.188)	(0.153)
Two years later	0.149***	0.16***
	(0.201)	(0.22)
n	22	22

n=number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 24: Matching Results for Output

	Whole data	Stateowned firms are excluded
Effect of Foreign Acquisition	Log Output	Log Output
Acquisition year	0.04***	0.033***
	(0.063)	(0.061)
One year later	0.174***	0.162***
	(0.09)	(0.107)
Two years later	0.21***	0.211***
	(0.107)	(0.075)
n	118	118

n= number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.

Table 25: Matching Results for TFP

	Whole data	Stateowned firms are excluded
Effect of Foreign Acquisition	Log TFP	Log TFP
Acquisition year	0.029***	0.016***
	(0.061)	(0.053)
One year later	0.116***	0.105***
	(0.074)	(0.064)
Two years later	0.089***	0.095***
	(0.065)	(0.064)
n	142	142

n= number of matched acquisitions

Average Treatment Effect on the Treated (ATT), bootstrapped standard errors in parentheses.

***,**,* indicate statistical significance at the 1, 5 and 10% level, respectively.