It Matters Where You Go
Outward Foreign Direct Investment and Multinational Employment Growth at Home

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Abstract

How does outward foreign direct investment (FDI) affect employment growth of the multinational corporations (MNCs) in the home country? Does the impact of outward investment differ by the level of development of the destination country of the FDI? Using a difference-in-difference approach, we assess the impact of starting to invest in less-advanced countries compared with investing in more-advanced countries. To obtain suitable control groups in each case, we use the propensity score method to select national firms that ex post did not take the investment decisions that we study even though ex ante they would have been equally likely to. We find that moving to less-advanced countries decreases a company's employment growth rate especially in the short run. On the other hand, moving to more-advanced countries does not consistently affect employment growth in any significant way. Including investment decisions of established multinationals in the estimation somewhat weakens but does not overturn this conclusion.

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1 Introduction

In this paper, we focus on a question that for some time now has been at the center of heated public debates in the United States and in Asia. We study the link between a multinational corporation's (MNC) employment growth rate at home and its decision to invest in either more- or less-advanced countries. In this way, we want to investigate whether there is empirical support for the public's fears of a negative impact on employment from off-shoring to China. With a unique dataset of South Korean firms that links the South Korean parent of an MNC and its affiliates abroad at the firm level, we can explicitly differentiate the impact of foreign direct investment (FDI) by destination. Using matched sampling techniques to address self-selection and endogeneity, we compare the employment growth rate of South Korean firms that change status with those of a carefully chosen control group that don't. We compare, for example, the employment growth of new MNCs that for the first time invest in less-developed countries with national firms that continue solely to be active in South Korea. The national firms are matched to the new multinationals in such a way that both types of firms are ex ante equally likely to go into less developed countries. Similarly, we match firms that for the first time invest in more-advanced countries with national firms that do not invest abroad at all. In other words, we study the employment trajectories of multinationals with affiliates in either more- or less-advanced economies and see whether their employment growth is any different from that of firms that do not expand through foreign direct investment but that otherwise share all other forms of access to foreign markets. To compare our findings with the earlier literature, we also present results of the employment growth of new multinationals, irrespective of destinations, against a set of comparable national firms. In addition, we extend our analysis beyond first-time investments to include established multinationals and their investment decisions in either more or less-developed countries.

Since the mid-1980s, increasingly larger flows of foreign direct investment have found their way into China. China now tops the list of FDI recipients worldwide, and in recent years it has even occasionally surpassed the United States in this respect. China is also the predominant destination of FDI in East Asia. The growing FDI flows into China and their effects on domestic production have become one of the premier policy concerns in South Korea, Taiwan, Singapore, and Japan whose own firms have increasingly invested abroad. Reminiscent of the debates surrounding $NAFTA$ in the United States, the concern for countries such as South Korea is as the South Korean investment promotion agency $KOTRA$ puts it that there will be a "hollowing out of Korea's production base as a result of the rush into China."[1] Moreover, critics can point to suggestive data as in Figure 1 and 2 that show a falling share of employment in manufacturing in the 1990s as the share of trade with China as well as FDI into China increase. As if to underscore the similarity with the $NAFTA$ debate, Ross Perot's notorious 1993 phrase "A giant sucking sound" has popped up again.[2]

South Korea's case is a particularly interesting one. South Korea, like other emerging economies, is a country with a relatively young history of outward foreign direct investment. As a matter of fact, before 1980, only some 30 South Korean multinationals were active abroad, which is why assessing the impact of outward multinational activity on employment is to a large extent assessing the impact of first-time investments abroad. We thus have plenty of new multinationals that venture into either more- or into less-advanced countries since 1980. Moreover, like

[1]See Economist August 25, 2001. "Is Taiwan Hollowing Out?", Asia Times, 2002. "Taiwan hollowing out to Mainland," Friedlnet.com, 2003. "Is FDI in China Hollowing out Japan's Industry?" ,RIETI, 2002. In the words of the prime minister from Singapore, "Our biggest challenge is to secure a niche for ourselves as China swamps the world with her high quality but cheaper products... We must accelerate the upgrading of our manufacturing sector or we will be hollowed out."

[2]A few examples: "The Sucking Sound of FDI flowing into China",Asia Pacific Review, 2001. "A New Giant Sucking Sound", The Nation, 2001. "Giant Sucking Sound Rises in the East",Utne Magazine, 2003.

other countries in the region, South Korea used to predominantly invest in more-advanced countries before China opened its borders to foreign investment. This changed dramatically around 1992 when South Korea established diplomatic relations with China. Since then, China has absorbed increasingly more outward FDI from South Korea. This variation of FDI across more- and less-advanced country destinations makes it possible to investigate whether investing in China has different implications for a MNC's parent's employment growth in South Korea than investing in the United States or in Europe.

Whether the particular destination country of FDI matters for the employment in the parent company is primarily an empirical question. Economic theory offers no conclusive answer as to what should be expected. This is true for the newer literature on multinational activity that focuses on firm heterogeneity as well as for the earlier literature that hinged upon the distinction between vertical and horizontal multinationals.[3] Needless to say, the theories of the multinational corporation can be directly linked to any going labor market approach that is informed by for example the work of Hamermesh (2003). Different models and theories of the multinational imply different types of multinational operations with their own ways of affecting a multinational's domestic labor demand. Differences in operations will thus turn employment in a multinational's affiliate abroad into either a substitute for or a complement of domestic employment in the parent plant.

Horizontal multinational activity has been primarily defined through market-seeking FDI, and it has been assumed that firms with moderate increasing returns set up affiliates abroad in order to save transportation costs. Seminal here is the work by Markusen (1984) and Brainard (1997). Firms would relocate closer to the foreign consumer to produce the same goods that they produce at home. In this way, going abroad and producing in new markets would substitute for the arm's-length exports

[3]For a good discussion of the earlier literature, see Markusen and Maskus (2001) and Navaretti and Venables (2004)

that were previously sent abroad, and foreign labor would substitute for domestic labor. Consequently, jobs might get lost in this process of off-shoring. At the same time, however, moving to other markets could increase the local headquarter services that the multinational typically provides to affiliates such as R&D, management, marketing, and so on. The latter could actually lead to more employment in the long term. It should be mentioned that horizontal FDI has often been associated primarily with FDI to developed countries.

Vertical FDI, on the other hand, was defined in the earlier literature as fragmentation of production. Helpman (1984) was the first to formalize the vertical dimension of multinational activity. Instead of producing the same product at different locations, firms would break up the value chain and relocate only certain parts of their production off shore. This enabled them to produce more efficiently and to take advantage of especially low labor cost in emerging economies. It is easy to see how this vertical strategy could lessen employment in the production of intermediate goods in the parent plants of the home country. At the same time, however, nothing precluded this off-shoring strategy from being part of a long-term growth strategy. Here again, it is hard to judge a priori whether moving abroad would in the end decrease or increase employment at home, or the extent to which affiliate employment abroad would be a substitute for domestic employment.[4]

In recent years, the literature on multinational operations has moved beyond the distinction between horizontal and vertical FDI. Empirical work by Hanson, Mataloni and Slaughter (2001) together with theoretical work by, for example, Yeaple (2003) and Ekholm, Forslid and Markusen (2007) have emphasized that the integration strategies of MNCs are complex. There is likely to be both a horizontal and a vertical dimension to any multinational activity. For example, MNCs can move abroad to set up an export platform from which they service many other markets, and in so doing, they may also take advantage of lower production costs. In addi-

[4]Hanson, Mataloni and Slaughter (2005) provide empirical evidence that supports vertical FDI.

tion, the newer literature explicitly includes firm heterogeneity, which allows more- and less- productive firms to take different strategies including relocating parts of the production process or entering larger markets. In this setting, the particular firm characteristics may determine the particular strategy that a firm takes to enter foreign markets. Key papers in this literature are Helpman, Melitz and Yeaple (2004) and Antras and Helpman (2004), who initially introduced heterogeneity in what were essentially models of horizontal and vertical FDI. In the meantime, however, it has become clear that introducing heterogeneity leads to a multiplicity of strategies, see Grossman, Helpman and Szeidl (2006). This multiplicity of strategies has reinforced the notion that the theoretical literature is inconclusive as to whether moving to more- or less-advanced countries should have a detrimental effect on a multinational's employment in the home country and as to what effect will prevail in the long run. This is surely in stark contrast to the tenor of the public debate that is focused on the potential loss of jobs from MNCs going into China.

So far, the evidence on the impact of multinational activities abroad is mixed. A few studies suggest that there is no negative impact of off-shoring activities on domestic employment in the multinational. Hanson, Mataloni and Slaughter (2003), Desai, Foley and Hines (2009), Borga (2005), and Mankiw and Swagel (2006) find that U.S. multinationals actually support job growth at home. Becker and Muendler (2008) argue that FDI leads to less job losses when studying job separations for multinationals and non-multinationals in Germany. Brainard and Riker (1997), on the other hand, come to a different conclusion: They find that foreign employment may be a substitute for domestic employment. Harrison and McMillan (2006) differentiate the impact of multinational activity by whether vertical or horizontal activities are involved. Becker and Muendler (2009) allow for the impact of multinational activity to differ by location.

Our study adds to this literature in different ways. For one, ours is one of the few

studies of an emerging economy that has its multinational activity almost equally split between more- and less- advanced countries. Most existing studies examine advanced economies the majority of whose multinationals are located in other advanced economies. Also, since outward FDI is a relatively new phenomenon for emerging economies, an important part of multinational activity and its impact in emerging economies is actually about new multinationals and their first-time investments abroad.[5] In addition, we can distinguish the destination of outward investment at the firm level, and in so doing we can detect whether multinationals that venture to less advanced countries experience different impacts from those that go to more-advanced countries. This approach should avoid that the particular composition in terms of destination drives the results.[6]

Finally, our study applies difference-in-difference estimation plus propensity score matching to study multinational employment, techniques that have been widely applied in labor economics but that are only gradually finding their way in international economics. One of the first studies to apply these techniques to multinational operations were Castellani and Navaretti (2004) who studied Italian outward FDI and how it affects domestic employment and Egger and Pfaffermayr (2003) who compared the performance of multinationals and exporters.[7] Becker and Muendler (2008) is another recent application of example that focuses on job separations in Germany while comparing multinationals and national firms. The paper is also a very detailed discussion and overview of the difference-in-difference cum propensity score approach. As indicated, we exploit a feature of the firm-level data that allows

[5]Navaretti and Venables (2004) survey the empirical literature and criticize the literature for inferring the impact of multinational activity on employment from the operations of established multinationals. A recent paper by Becker and Muendler (2009) explicitly considers the intensive and extensive margin of multinational activity while assessing the impact on domestic employment.

[6]Recent work by De Loecker (2007) studies export behavior and has a similar ambition as our study, in that the impact of exports on firm performance is differentiated by the destination of exports. Much of the earlier literature on exports focuses on whether or not firms exports, without differentiating by destination.

[7]Castellani and Navaretti (2004) and Egger and Pfaffermayr (2003) do not distinguish by destination.

us to link the parent MNC with the particular destination country of its FDI. We explicitly compare the employment trajectory of the parent of the MNC that goes to more or a less-advanced countries, the treatment group, with the performance of national firms, the control group. The control group that is matched with the MNCs is selected in such a way that the national firms ex ante would have been equally likely to invest abroad as the multinationals. Obviously, the quality of the results will depend on the quality of the matches between the treatment group and the control group. We match based on a wide set of observable characteristics to minimize the possibility that any prior (pre-treatment) differences between MNCs and non-MNCs should drive the later difference in performance and we include industry and year effects. We explicitly evaluate the quality of the matches by comparing the means before and after matching and also perform other covariate balancing tests that should ensure that in our analysis the exposure to treatment is a random event. Finally, we also apply different matching methods. Our results indicate that where a multinational invests matters especially in the short run for the employment growth of the multinational's parent at home. We consistently find that a move into a country that is less advanced in terms of per capita GDP than South Korea yields a lower employment growth rate in the parent firm in South Korea compared with national firms that did not invest abroad. The longer the time horizon, however, the less significant that distinction becomes. On the other hand, we find in most cases no statistical difference between the employment growth rate of multinationals that open affiliates in more advanced countries and national firms that do not. This finding is relatively robust. When we include the employment growth rates before the investment period, we see that the employment growth rate for those MNCs that go to less-advanced countries consistently changes for the worse. When we include the subsequent investments of established multinationals, the results are somewhat weaker, but the overall conclusion does not change.

Our findings give some credibility to public concerns at least in the short run. Our results indicate that it is important to know the destination of FDI in order to be able to assess its impact. These findings are consistent with the findings of Harrison and McMillan (2006) who distinguish by vertical and horizontal multinational activities and Becker and Muendler (2009) who find different employment effects across European locations. Using data that do not differentiate by destination may mask the particular impact of investing abroad.

The rest of the article is structured as follows. First, we motivate and describe the estimation strategy that we follow. We then characterize the data that we use and turn to the construction of counterfactuals. We finally discuss the estimation results before we conclude.

2 Data and Preliminary Analysis

The data of South Korean foreign investment is obtained by the Export-Import Bank of Korea. This unbalanced dataset includes the full list of South Korean worldwide investment since 1968 when the first investment data were available. The dataset contains annual flow data across all sectors. The amount of FDI is reported in millions of dollars. To avoid any complications related the Asian financial crisis that hit South Korea hard in 1997, however, we stop the investigation in 1996. By that time, outward FDI across all sectors was still less than one percent of GDP. In Figure 3, we show two time series that illustrate the rapid increase in outward FDI. We provide the yearly total FDI flows by summing the individual investment flows from the Export-Import Bank of Korea, as well as the aggregate data reported by the Korea National Statistics Organization. It is clear that the Export-Import Bank of Korea disaggregate investment data track the aggregate data from the Korean National Statistics closely.

An important advantage of the Export-Import data (EXIM) is that it specifies

the destination of the individual flows in each year. Overall, South Korean FDI goes to 93 countries. In our analysis, we distinguish between FDI that goes to a country that is more or less advanced than South Korea. A country is classified into one or the other category if its per capita GDP is higher or lower than that of South Korea. Figure 4 shows the pattern by this classification. As can be seen, initially, more investment flows found their way to more-advanced countries. The major share of these investments ended up in the United States. However, from the early 1990s onward, there is a dramatic increase in investment also in less-advanced countries, and the outflow to less-advanced countries are continuously higher since then. An important factor in this regard is the normalization of the relations between China and South Korea in 1992, which is when both countries established diplomatic relations with each other. The cross sectional destination pattern is also reported in Table 1. In Table 2, we provide the sectoral composition of outward FDI in manufacturing. As can be seen, the electronics sector is by far the most important one for outward FDI. Automobiles, textiles, and primary metals are also significant. This industrial share is relatively stable over time.

As mentioned before, it is characteristic for South Korea and other emerging economies that outward multinational activity is relatively recent. Almost 90 percent of the 1556 multinationals in manufacturing that we count in Export-Import Bank dataset come online in the 1990s. Before 1980, only about 30 South Korean multinationals invested abroad. While the EXIM database identifies the investment flows, the dataset does not give additional information about the investors. That is why we merge the Export-Import data with a second source of firm-level information: the data provided by the Korea Information System (KIS) database of the Korea Investors Services Co., Ltd., that contains firm-level information since 1980.

The KIS is an extensive dataset that contains the balance sheets and the profits-and-loss statements of all South Korean firms that are registered as corporations

since 1980. In total the KIS database contains over 35,000 observations for 8545 firms. Like the EXIM dataset, The KIS is also an unbalanced panel dataset. The KIS database does not contain the relatively small firms that are also found in the EXIM data. However, we can identify 788 (about half) of the EXIM multinational corporations in manufacturing in the KIS dataset. Still, these multinationals are responsible for more than 80 percent of FDI in manufacturing up to 1996. Of the 788 KIS MNCs, there are 526 that have three consecutive years of data around the investment year that are needed for our difference-in-difference estimation.

Our initial focus will be on 462 of these 526 multinational firms since they are new multinationals. They invest abroad for the first time in the period we study. From the KIS dataset, we draw on a whole list of variables such as firm output (total sales), the number of employed workers, the export status (whether a firm exports or not in a given year), and whether a firm is part of a *Chaebol*, or a large South Korean conglomerate. The complete list of variables is found in Table 3, with the mean and standard deviation for the entire sample. Note that the data do not differentiate between high- and low-skilled workers. Because of this, we will not be able to address any issues that relate to the changing skill composition in the wake of a multinational's outward FDI.

Table 4 shows how the multinationals come online in our dataset, starting from 1981 onward.[8] The first line does not differentiate between multinationals that venture into more-or into less-advanced countries. The second and third line break down the number of multinationals by their destination. The table clearly illustrates the dramatic increase in multinational activity especially since the 1990s. Also, there is a significant increase in activity that targets less-developed countries, and especially China in the 1990s. Note that the numbers of multinational corporations that go to developed and developing countries are in some cases less than the total number of multinationals. The reason is that there are some multinationals that invest in both

[8]Since we need at least three consecutive years of data, we report data from 1981 to 1995.

more-and less-advanced countries. We include these multinationals when we do not differentiate by destination. [9]

With so many new multinationals coming online, our dataset is ideal for studying the impact of becoming a multinational, an element that according to Navaretti and Venables (2004) has not been studied enough in the literature that assesses the impact of multinational activity on domestic employment. To check the robustness of our results, however, we will also include the additional investments of already-established multinationals to study whether their subsequent investment decisions in more- or less-advanced countries modify any of our results. Note that these additional investments include investments from established multinationals that existed before 1980 as well as investment decisions from multinationals that came on line after 1980 but whose initial investment is not part of KIS. Combining these additional investments with the new investments we have a total 793 investment decisions for a total of 526 multinationals. Table 4b shows a breakdown over time in a similar way to Table 4a.

To get a better sense of the data especially as far as the difference between multinationals and non-multinationals goes, we run like, Bernard and Jensen (1999), De Loecker (2007), and others, the log of output (sales), employment, and output per worker on a set of sector and year dummies, as well as on a dummy that is one for the year since the firm turned a multinational (irrespective of its destination), and zero otherwise. We also differentiate by whether the multinational went to developed or less-developed countries.[10]

[9] Including the multinationals that are active in both more-and less-advanced countries does not matter for the results.

[10] Needless to say, the regression does not address any endogeneity issues, and does not limit the analysis to the period around the time when the multinational ventures abroad, which is the focus of the analysis below. Equation (1), at least when employment is on the left-hand side, could be related to a labor demand equation.

$$\ln X_{ijt} = \alpha + \beta MNC_{ijt} + \sum_t \gamma_t Year_t + \sum_j \lambda_j Sector_j + \varepsilon_{ijt} \quad (1)$$

,where X_{ijt} measures employment, output, and output per worker for firm i at time t in sector j. $Year$ and $Sector$ are respectively the year and industry effects. MNC is a dummy that is one from the year t onward in which a firm becomes a multinational irrespective of destination, a multinational heading toward a more-advanced country, or a multinational heading toward a less-advanced country. Table 5 reports the results. Multinationals, irrespective of their destination, tend to be larger in terms of employment and output and they tend to be more productive, which is in line with what the literature has found. In our dataset, all else equal, multinationals tend to have 98 percent higher sales and 84 percent higher employment and they also tend to be 13 percent more productive than South Korean national firms. Interestingly, once we separate MNCs that invest in more-advanced countries from those that invest in less-advanced countries, we see that those going to more-advanced countries are larger in size, and they are also more productive. [11]

Figure 5 provides an interesting perspective on the particular question that we investigate. We see the average log of employment trajectories for our four types of South Korean firms: South Korean national firms, MNCs irrespective of the destination of their FDI, MNCs that go to more-advanced countries, and finally the MNCs that venture into less-advanced countries.[12] Figure 5 shows the employment trajectories before and after the investment decision. The figure provides suggestive evidence that the employment of MNCs in more-advanced countries takes a very

[11]These findings are consistent with some of the stylized facts reported for Japanese MNCs by Head and Ries (2003). They provide some evidence that MNCs are larger/more productive than non-MNCs and that MNCs that go to countries with a higher per capita GDP have a tendency to be larger and more productive than those that invest in countries with a lower per capita GDP.

[12]The data are purged for firm-specific (Di) and year-specific (Dt) Effects. On the vertical axes of Figure 5 we have $e = lnL_{it} - \hat{\beta}_1 D_i - \hat{\beta}_2 D_t$. For national firms, t is the midpoint in the dataset (i.e., for a firm present between 1990 and 1994, its midpoint would be 1992).

different trajectory from that of MNCs that go into less-advanced countries.[13] The figure is instructive and suggestive of the type of concerns that surface in the public debate. Is it the case, when MNCs move to China and other less-advanced countries, that they are likely to shed employment and not increase their employment in step with South Korean firms that do not venture abroad?

At the same time, the trajectories bring to the foreground a major challenge. Figure 5 suggests questions of potential selection bias in the data. Clearly, the different types of firms have different profiles before they set up affiliates abroad. While the employment path of national firms is relatively stable, there is a steeper slope of employment over time for MNCs that invest in advanced countries; that is, their labor increases faster before the investment than that of national firms or firms that will be setting up affiliates in less-advanced countries. This gets to the question of whether indeed moving to a particular destination affects the employment trajectory of firms differently. When firms perform differently before they invest abroad, they may actually also perform differently after the investment, which is why inferring the impact of FDI on employment by glimpsing employment profiles may be misleading. Ultimately, this figure provides the reason why we need to use matching techniques to pair firms in such a way that they are virtually indistinguishable before time t, so that we can attribute any difference in post-t performance to whether a firm went abroad or not, or to a more- or a less-advanced country.

3 Estimation Strategy

As mentioned above, a central concern when studying the impact of outward FDI on the evolution of South Korea's parents' employment relates to issues of simultaneity and self-selection. Does firm employment slow down because of the investments in a

[13] We test whether $e_{t+i} - e_t, i = 1, 2, 3$ is significantly different between MNCs and Nationals. The trajectory of MNCs into LDCs is significantly different from Nationals at 1% level while it is not for MNCs into DCs.

more- or a less-advanced country, or do firms whose employment has been increasing more or less simply tend to invest in different locations and accordingly perform differently past investment? Another equally important issue relates to whether changes in firm performance that one observes are specific to multinationals or whether they are due to unobservable shocks that affect national and multinational firms alike. To address both concerns and to answer the question of how investing in either a more or a less-advanced country differs from not having done so, we take a difference-in-difference approach. We focus on employment growth after firms change their activity abroad and compare their performance with firms that do not extend their activities abroad. We will also consider the change in the growth rate before and after the time of investment for the various groups of firms. Needless to say, it will be important to find proper matches for the new multinational corporations, which is why we will specifically focus on the matching process in the next section. The matched firms should, in theory, proxy for the performance of the new multinational corporations under the alternative scenario in which they would not have changed status and would not have ventured abroad. The national firms are the counterfactuals. As indicated, after we have focused on only new MNCs that venture abroad, we will include in our dataset also the subsequent investment decisions of already-established MNCs.

For firms that change their activities or status at time t (the c-firms), we denote the first difference between their employment level after the investment as $\Delta \ln \overline{E}^{c}_{t+}$. As indicated, we will vary the length of the period that we consider. We take the difference between employment at time t and employment at time $t+1$, $t+2$, and $t+3$. Note that the calculated employment growth can represent three different cases that we study. It can stand for the employment growth rate of a new multinational that starts investing: (1) in China or some other less-advanced countries, (2) in a more-advanced country, or (3) in any direction. To properly assess the growth

rates of the first difference, we need to compare these growth rates with the growth performance of a control group of firms that do not change their activities (the n-firms) and whose employment growth is therefore not affected by the decision to invest in a particular location, i.e., $\Delta \ln \overline{E}^n_{t+}$. Once such proper controls are found, we can determine whether the double-difference estimator of equation (2) is consistent with public sentiment about FDI. Is it negative for the multinationals that extend their activities to China and for the firms that invest in less developed countries for the first time? Or, is the estimated coefficient positive or insignificant as suggested by those who minimize the impact of outward FDI?

$$\widehat{\alpha}_{DID} = \Delta \ln \overline{E}^c_{t+} - \Delta \ln \overline{E}^n_{t+} \tag{2}$$

The key issue is, of course, to find proper control groups of firms that do not change their activities. The choice of the control group is determined by the particular hypotheses, which are related to alternative FDI destinations.

To properly isolate the effect of investing in a more- or less-advanced country, Meyer (1995) suggests we construct a group of control firms that are as similar as possible to the firms that change status in terms of observables. It is for this purpose that we use the propensity score matching procedure that has been used in labor market studies. One of the advantages of propensity score matching is that it makes matching over a whole set of characteristics feasible since it summarizes all pre-treatment characteristics into one number, the propensity score (see next section). We want to match each firm that changes status and becomes a multinational with national firms that are virtually indistinguishable in terms of observable characteristics from the MNCs before they went abroad. Ex ante these matched firms are equally likely to move to a developed or less developed country, even though they eventually ended up not changing their status and staying in South Korea. In other words, what distinguishes one firm that goes abroad from one that does not going is

a random event.

Once we have the control group of firms, we can calculate the difference-in-difference estimator $\widehat{\alpha}_{DID}$. The estimator is obtained from the following regression (3) with the assumption of $E[\varepsilon^s_{it+}|d^s] = 0$.

$$\Delta \ln E^s_{it+} = \delta_0 + \widehat{\alpha}_{DID} d^s + \varepsilon^s_{it+} \tag{3}$$

The superscripts $s = n, c$ refer to the status of the firms, with n denoting those firms that do not change status and c the ones that do. d is a dummy variable that equals one in case a firm does change status, $s = c$, and zero otherwise, $s = n$. If the estimated coefficient α_{DID} is positive (negative), it implies that changing status has a positive (negative) effect on the employment growth rate.

We also extend the analysis to assess differences in the growth rates of employment before and after the investment decision. Equation (4) allows us to do so. For the new multinationals, the c-firms, and their matched national firms, the n-firms, we now consider two measures of employment growth, $\Delta \ln E^s_{it}$, depending on whether we look at employment growth before $t, t = 0$, or after $t, t = 1$.

$$\Delta \ln E^s_{it} = \gamma_0 + \gamma_1 d^s + \gamma_2 d_t + \widehat{\alpha}_{DID} d^s_t + \varepsilon^s_{it} \tag{4}$$

, where d refers to different sets of dummies.

$d^s = 1$ if $s = c$ and 0 otherwise

$d_t = 1$ if $t = 1$ and 0 otherwise

$d^s_t = 1$ if $s = c, t = 1$ and 0 otherwise.[14]

The first and second dummy variables will respectively control for any difference between firms that change status and the ones that do not and between the pre- and post-change period. For completeness, we will also run the following panel estimation

[14]By setting t equal to 1 in equation (4), one obtains equation (3).

regression (5), which pools the three groups of multinationals and all national firms together without matching.

$$\Delta \ln(E)_{it} = \alpha_i + \beta CS_{it} + \sum_t \gamma_t Year_t + \varepsilon_{it} \tag{5}$$

where the dummy variable CS_{it} equals 1 if firm i changed status since time t and equals 0 otherwise. In other words, this dummy variable captures the effect of changing status at time t. Needless to say, since common factors may drive the decision to invest and the employment growth, the coefficient on the dummy for MNCs may be biased. As indicated before, we will also perform the difference-in-difference analysis of equation (3) and (4) as we include the subsequent investment decisions for established multinationals.

4 Constructing Control Groups

Our analysis centers on firms that change status. They become an MNC irrespective of destination or they become an MNC and invest in respectively a more or a less-advanced country. We want to match each of these MNCs with comparable national firms. The national firms that we match to multinationals should be virtually indistinguishable in terms of observable characteristics from the multinationals before they went abroad. Ex ante they should be equally likely to move to a developed or a less-developed country even though they eventually ended up not changing their status and staying in South Korea. Matching methods can yield an unbiased estimate of the coefficient that captures the impact of the change in status, when the differences between any two firms are picked up by the observable characteristics before the change of status. In other words, the outcomes (investing abroad, in an emerging or in a more-advanced country) should be independent of the assignment to the class of outward-investing companies conditional on the pre-treatment covari-

ates. To construct such a control group, we rely on the propensity score method that has been used in labor market analysis, such as Heckman, Ichimura and Todd (1997).[15] The key assumption needed to perform matching based on the propensity score is that, conditional on a vector of observables, the choice of investing abroad does not depend on future performance (conditional independence assumption).

We estimate a probability model of the decision to change status for the three different cases that we investigate. Each time, the sample includes the firms that change status and national firms. The probit models are a function of observable firm-specific characteristics of the year before the change of status . The indicator variable CS is 1, if the firm changes status and zero otherwise.

$Prob(CS_{it} = 1|x_{it-1}, d_{ind}, d_t)$

Our firm-specific characteristics include output, output per worker, capital, as well as a dummy for export status and for whether a unit is part of a *Chaebol*, which are all important dimensions along which MNCs and non-MNCs often differ. We also include industry and year effects in the probit to control for any common demand or supply shocks. The aim is really to minimize the possibility that pre-treatment differences in observables (and unobservables) between our treatment and control group could explain any differences in employment growth afterwards. Because of this, we extend the number of observable characteristics that we include in the probits. The full list of firm-specific x_{it-1} variables and probit results are reported in Table 6. Similar to Becker and Muendler (2008), we use levels in our probit estimates while focusing on changes in our analysis of employment. For illustrative purposes, we also included a post-1992 dummy to highlight the impact the 1992 diplomatic relations between China and South Korea had on the likelihood that multinationals move to less-advanced countries.

We compute a firm's propensity score using the probit estimates. We predict the

[15]Becker and Muendler (2008) discusses the technique and the required conditions in detail.

probability that each firm changes status based on the conditioning variables. Next, we pair each multinational with the k-nearest neighbor national firms that have a comparable predicted probability in a common support.[16] This group of 'k-nearest neighbors' will constitute the control groups. These selected k-nearest neighbors for each multinational will be assigned equal weight $(1/k)$ in calculating DID estimates.[17] The vast majority of our matches take place between firms in the same sector, rather than across manufacturing. Only in a few cases do we match a national firm with a multinational from a different sector.[18]

The probit estimates in Table 6 are mostly in line with the expectations. The first column explains the likelihood that firms do FDI, whereas the second and third column specifically investigate the likelihood that a firm becomes a multinational by investing into a country that is more advanced or less advanced than South Korea. As one can see, across the three columns, larger firms are more likely to become multinationals or move to more or less advanced countries, and so are firms that exported before or that had a larger capital stock. Higher previous profitability also seems to matter. Conditional on size, capital stock and all other variables productivity enters negatively, which seems to be driven by MNCs that go to developing countries.

As mentioned before, the quality of our analysis hinges upon the quality of the

[16]We drop multinationals whose propensity score is higher than the maximum or less than the minimum of the control groups(national firms) as they are not in the support. This implies that some multinationals cannot be matched because they are too different from national firms. Because of this, the number of multinationals in Table 4 is not exactly the same as the number used in the estimation in Table 10 through 11.

[17]The number k can be any positive integer. Our reporting results are based on 10-nearest neighbors. The maximum p-score difference is 0.015. While maximum p-score difference becomes smaller with the smaller k, it allows less neighbors to be matched. Our estimation results are very stable irrespective of the choice of k, however. Another widely used matching technique is non-parametric kernel matching. This technique split the sample in equally spaced intervals of the propensity score and gives various weight to matched controls depending on kernel types and specified bandwidths. We also tried various kernel types and bandwidth and the estimation results are very stable. See Leuven and Sianesi (2003) for various matching techniques.

[18]To make sure that these few matches outside a sector do not drive the results, we will include sector fixed effects in the regressions (3) and (4).

matching. Therefore, we want to evaluate the quality of the matches in different ways. Table 7 reproduces a few key data of the probit model, in order to gauge the quality of the propensity scores that we infer from the probit estimates. We take the case of moving abroad irrespective of destination. The first column shows the predicted probability of investing abroad, broken down into 5 % brackets. The second column gives the actual FDI rate that is found in the dataset for the corresponding 5 % brackets. It is the rate of multinationals relative to the total number of firms (the third column divided by the fourth column). As one can see, the predicted probabilities of doing FDI in the first column tracks the actual FDI rates reasonably well, which testifies to the quality of the probit estimates.

There are different ways to check the quality of the matched data. We first compare the mean differences for our three types of firms with those of the matched control groups before t. As can be seen in Table 8, there is no statistically significant difference between the means of the characteristics of both groups of firms once we have matched the data, whereas there are statistically significant differences before the matching. This is very important for the quality of the match since we want the exposure to treatment or the change of status to random for a given propensity score, so that treatment and control groups on average should be equivalent. Table 9 reports other statistics that are often used to check the match quality. The first and second column shows the number of treated and controls, MNCs and Nationals in our study, used in the analysis. The third and fourth column shows the pseudo R2 from probit estimation, which indicates the degree to which regressors predict the treatment probability. After matching, regressors should have no explanatory power for selection into treatment. If they don't then treatment and matched control samples are said to have balanced characteristics. Our results show that this is the case. The pseudo R2 statistics drop from max 9% to less than 1%. A last measure that is sometimes used is the median absolute standardized bias before and after

matching over all regressors. They are reported in the next two columns. Though there is no formal criteria in the literature to judge the size of standardized bias, we can see that bias decreases dramatically after matching, which testifies to the quality of the matches.[19]

5 Results

Table 10 provides the difference-in-difference estimates of equation (3) for our three types of firms. As indicated, the control groups have been very carefully constructed through propensity score matching. The three different horizontal blocks of the table extend the time period for which we study the impact on employment growth after the time of investment. We go from a very short horizon of one year to somewhat longer three-year differences. The three left columns of the Table focus on new multinationals only. We look at MNCs that go to more- and to less-advanced countries. For reference to the early literature, we have also included the estimates that do not differentiate by destination. For the three columns of Table 10 on the right, we include also the subsequent investments of established multinationals. As one notices, the difference-in-difference results between the left and the right side of the table are very similar. As the first column shows, the key coefficient in our difference-in-difference estimation is not significant when we do not differentiate by destination.

The estimates in the second and third columns on the left of Table 10, however, seem to tell a somewhat different story. In these we explicitly differentiate by investment destinations; that is, by whether the destination country is more or less advanced than South Korea. The estimates are not significant for multinationals that set up affiliates in advanced countries. Within a one-, two- and even three- year time-horizon, however, we do find a significant and negative coefficient for multi-

[19]For a good discussion, see Becker and Muendler (2008).

nationals that move into less-advanced countries such as China. Compared with national firms, those firms that have decided to extend their operations in less affluent countries than South Korea grow more slowly than firms with which they are ex ante comparable but that in the end do not venture abroad. This finding, to some extent, confirms the public sentiment about job losses. Firms that venture especially into China seem to experience slower employment growth. As for the magnitude, the estimates indicate about 2 percent lower employment annual growth rate than the national firms. Note that when we include the subsequent investments, the results are comparable and slightly weaker. When we do not differentiate by destination we do obtain a negative and significant coefficient in the first year. The overall message seems the same, however, i.e. differentiation by location destination is important.

So far, we have focused on the effect on employment growth between nationals and multinationals after the time of the investments. We also include the employment growth rates before the firms became multinationals and we estimate equation (4). The results are presented in Table 11. Again, we look in the first three columns of the table at the new multinationals that have their initial investment since 1980. The last three columns again include subsequent investment of established investment, which includes the additional investments of the new multinationals in later years. The results are largely consistent with our earlier findings.[20] Comparing employment growth for one or two years before and after the decision to move to a less-advanced country, we see slower growth for MNCs moving into less-advanced countries than for firms that decide not to move abroad. Note that the estimates in the three-year window are insignificant here. It is hard to tell whether the insignificance is due to the shrinking number of observations at longer horizon. As one can see in the right-hand side of the table, a comparable result is found when we include the subsequent investments of established multinationals. We have a negative coefficient of comparable magnitude, however, that becomes insignificant at the longer

[20]Note that the variable of interest is α.

horizon. For MNCs that move to more-advanced countries, there is no such negative effect found, except for the new multinationals when we look at the one-year difference. This effect does not persist, however, when taking a slightly longer horizon. Compared to the first set of difference-in-difference estimates in Table 10 we see that the slowdown in employment growth of the MNCs going to less-advanced countries seems to be strong enough to make the negative impact on employment growth of FDI, irrespective of direction, significant.

In sum, moving to less-advanced countries has a negative impact on employment growth that is most easily detected in the short run for new multinationals. As the number of observations diminishes with the expanding time horizon, however, we cannot tell whether per se the effect diminishes because it does not persist or simply because we do not have a sufficient number of observations. When focusing on investments in more-advanced countries, no clear tendency is apparent in the data. When including subsequent investments, the results are somewhat weakened.

For reference, in Table 12, we also provide the estimates from a straightforward panel estimation regression with time dummies. We use all the observations and do not carefully match multinationals and national firms. This is based on equation (5). It turns out that our difference-in-difference estimates of Tables 10 through 11 confirm the negative impact on employment growth when a firm invests in less-advanced countries. The main difference is, as expected, that the magnitude of the employment growth difference. As before, we pick up no significant impact on employment growth when multinationals move into more-advanced countries.

6 Conclusion

We investigate the effect of outward FDI on home employment with a unique South Korean firm-level dataset. In line with the literature that investigates the impact of exporting irrespective of the particular destination, most of the existing literature

on multinationals has focused on the effect of FDI per se. In most instances, no negative impact of outward investment on employment was found, suggesting that public concerns about hollowing out of manufacturing were probably overblown. We take this analysis one step further and when we bring the particular destination country of outward investment into the analysis at the firm level. A particular feature of our data is that we can link each South Korean firm with the particular countries where it has its subsidiaries at the firm level. We categorize the destination countries into two groups, those that in terms of per capita GDP are more advanced than South Korea (mainly the United States) and those that choose as destination less-advanced nations (mainly China). In doing so, we take advantage of South Korea's position as a middle-income country that has divided its investment across more- and less-advanced nations almost evenly.

Our difference-in-difference estimates suggest that there is a short-term price to be paid in terms of employment growth when firms decide to invest in countries that are less advanced. We find this to be the case for firms that become multinationals and that set up their affiliates in countries that are less-advanced. Including subsequent investments does not alter this conclusion. On the other hand, our findings for firms that venture into more-advanced countries do not show this consistent tendency. In most instances there is no significant impact. To some extent, our findings indicate some support for the public anxiety, at least in the short term and for investments into less advanced countries. More importantly, our results strongly suggest that any assessment of the impact of multinational activity on the parents' performance should differentiate by destination. If not, there may well be a bias in the obtained results depending on the destination composition of a country's FDI. Our results are robust across different specifications and matching techniques.

References

Antras, Pol and Elhanan Helpman (2004), 'Global Sourcing', *Journal of Political Economy* **112**(3), 552–580.

Becker, Sascha O. and Marc-Andreas Muendler (2008), 'The effect of FDI on job security', *B.E. Journal of Economic Analysis & Policy: Advances* **8**(1).

Becker, Sascha O. and Marc-Andreas Muendler (2009), 'Margins of multinational labor substitution', *Mimeo* .

Bernard, Andrew B. and Bradford Jensen (1999), 'Exceptional exporter performance: cause, effect, or both?', *Journal of International Economics* **47**(1), 1–25.

Borga, Maria (2005), 'Trends in Employment at U.S. Multinational Companies: Evidence from Firm-Level Data', *Trade Forum* .

Brainard, S Lael (1997), 'An Empirical Assessment of the Proximity-Concentration Trade-off between Multinational Sales and Trade', *American Economic Review* **87**(4), 520–44.

Brainard, S. Lael and David A. Riker (1997), Are U.S. Multinationals Exporting U.S. Jobs?, NBER Working Papers 5958.

Castellani, Davide and Giorgio Barba Navaretti (2004), Investments Abroad and Performance at Home: Evidence from Italian Multinationals, CEPR Discussion Papers 4284.

De Loecker, Jan (2007), 'Do exports generate higher productivity? Evidence from Slovenia', *Journal of International Economics* **73**(1), 69–98.

Desai, Mihir, Fritz Foley and James Hines (2009), 'Domestic Effects of the Foreign Activities of U.S. Multinationals', *American Economic Journal: Economic Policy* **1**(1).

Egger, Peter and Michael Pfaffermayr (2003), The Counterfactual to Investing Abroad: An Endogenous Treatment Approach of Foreign Affiliate Activity, University of Innsbruck Working paper.

Ekholm, Karolina, Rikard Forslid and James R. Markusen (2007), 'Export-Platform Foreign Direct Investment', *Journal of the European Economic Association* **5**(4), 776–795.

Grossman, Gene M., Elhanan Helpman and Adam Szeidl (2006), 'Optimal integration strategies for the multinational firm', *Journal of International Economics* **70**(1), 216–238.

Hamermesh, Daniel S. (2003), *Labor demand*, Princeton University Press.

Hanson, Gordon H., Raymond J. Mataloni and Matthew J. Slaughter (2001), *Expansion Strategies of U.S. Multinational Firms*, In D.Rodrik and S.Collins (eds.), Brookings Trade Forum.

Hanson, Gordon H., Raymond J. Mataloni and Matthew J. Slaughter (2003), 'Expansion Abroad and the Domestic Operations of U.S. Multinational Firms', *Mimeo* .

Hanson, Gordon H., Raymond J. Mataloni and Matthew J. Slaughter (2005), 'Vertical Production Networks in Multinational Firms', *The Review of Economics and Statistics* **87**, 664–678.

Harrison, Ann E. and Margaret S. McMillan (2006), Outsourcing jobs? multinationals and us employment, NBER Working Papers 12372.

Head, Keith and John Ries (2003), 'Heterogeneity and the FDI versus export decision of Japanese manufacturers', *Journal of the Japanese and International Economies* **17**(4), 448–467.

Heckman, James J, Hidehiko Ichimura and Petra E Todd (1997), 'Matching as an Econometric Evaluation Estimator: Evidence from Evaluating a Job Training Programme', *Review of Economic Studies* **64**(4), 605–54.

Helpman, Elhanan (1984), 'A Simple Theory of International Trade with Multinational Corporations', *Journal of Political Economy* **92**(3), 451–71.

Helpman, Elhanan, Marc J. Melitz and Stephen R. Yeaple (2004), 'Export versus FDI with Heterogeneous Firms', *American Economic Review* **94**(1), 300–316.

Leuven, Edwin and Barbara Sianesi (2003), 'PSMATCH2: Stata module to perform full Mahalanobis and propensity score matching, common support graphing, and covariate imbalance testing', Statistical Software Components, Boston College Department of Economics.

Mankiw, N. Gregory and Phillip Swagel (2006), 'The politics and economics of offshore outsourcing', *Journal of Monetary Economics* **53**(5), 1027–1056.

Markusen, James R. (1984), 'Multinationals, Multi-plant Economies, and the Gains form Trade', *Journal of International Economics* **16**(3-4), 205–26.

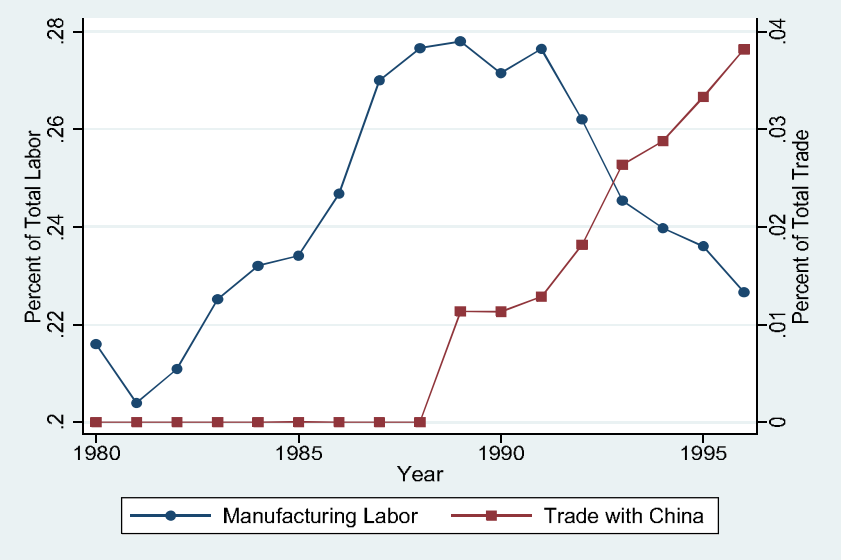
Markusen, James R. and Keith E. Maskus (2001), General-Equilibrium Approaches to the Multinational Firm: A Review of Theory and Evidence, NBER Working Papers 8334.

Meyer, B. (1995), 'Natural and Quasi-Natural Experiments in Economics', *Journal of Business and Economic Statistics,* **13**, 151–162.

Navaretti, Giorgio Barba and Anthony J. Venables (2004), *Multinational Firms in the World Economy*, Princeton University Press.

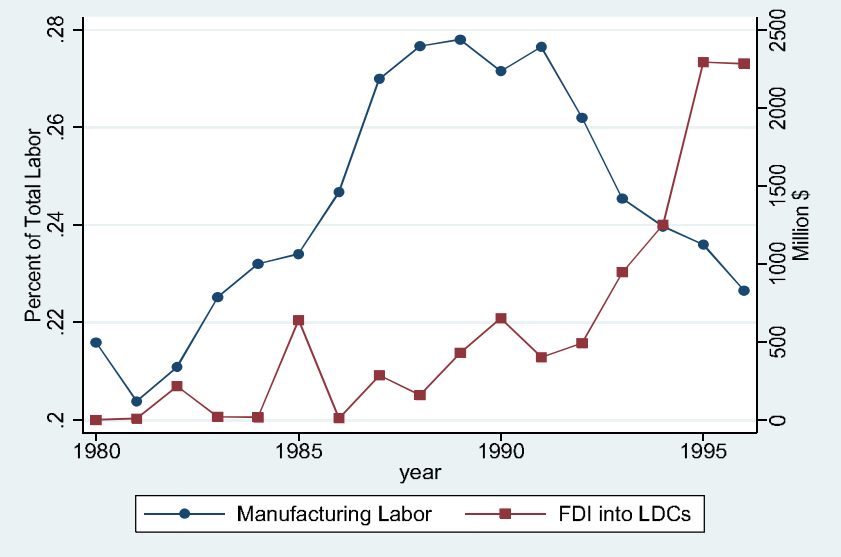
Yeaple, Stephen Ross (2003), 'The Role of Skill Endowments in the Structure of U.S. Outward Foreign Direct Investment', *The Review of Economics and Statistics* **85**(3), 726–734.

Figure 1: Share of Manufacturing Labor vs. Share of Trade with China



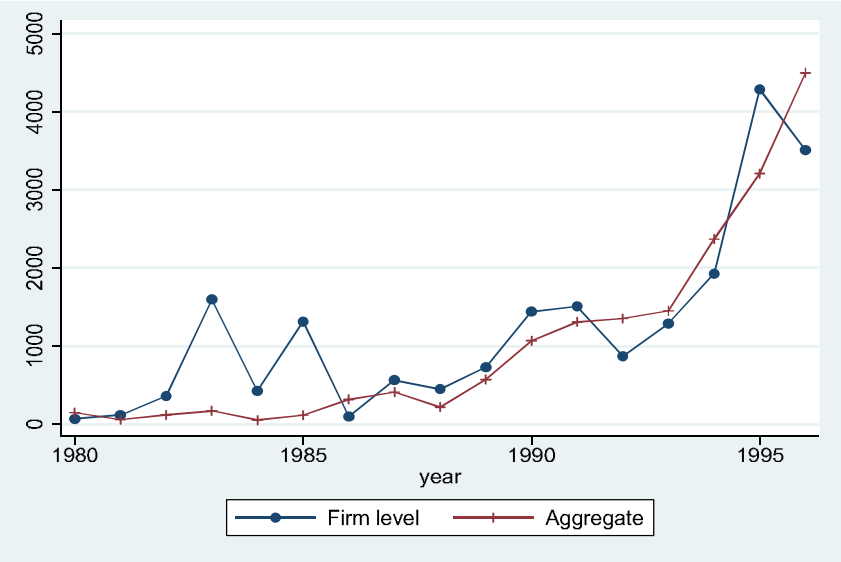
Source: National Statistics Organization
Trade is the sum of exports and imports.

Figure 2: Share of Manufacturing Labor vs. FDI into LDCs



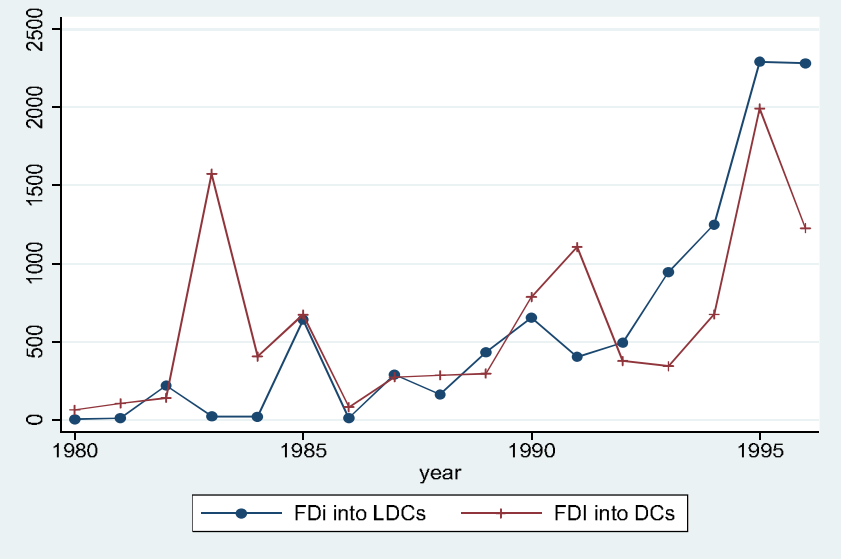
Source: Export-Import Bank of Korea and National Statistics Organization.
FDI measured in Millions of U.S. dollars;

Figure 3: Total Firm Level Data vs. Aggregate Data



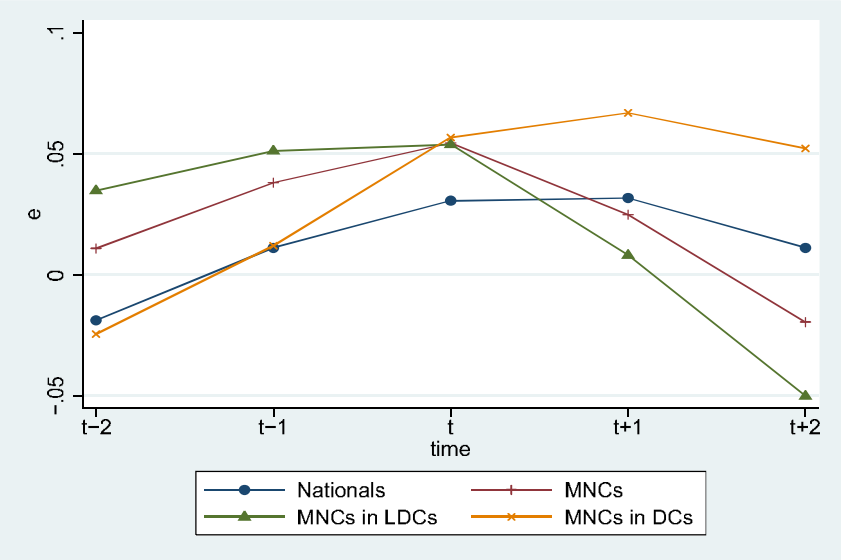
Source: Firm level data is from Export-Import Bank of Korea and aggregate data is from Korea National Statistics Organization. FDI measured in Millions of U.S. dollars.

Figure 4: Outbound FDI from South Korea



Source: Export-Import Bank of Korea. FDI measured in Millions of U.S. dollars.

Figure 5: Employment Trajectories before and after Time t:
Multinationals(MNCs) vs. Nationals



Path of average labor purged of firm and time effect ($e = lnL_{it} - \hat{\beta}_1 D_i - \hat{\beta}_2 D_t$)
$e_{t+i} - e_t$ is significantly different between MNCs into LDCs and Nationals at 1% level while MNCs into DCs is not. Source: Export-Import Bank of Korea.

Table 1: Destination Pattern of Outward FDI

	China	Other Asia	North America	Rest of World
by No. FDI firms	44.48%	12.50%	27.19%	15.83%
by FDI amount	17.34%	33.63%	21.24%	27.79%

Source: Export-Import Bank of Korea.

Table 2: Industry Composition of Outward FDI

Industry	percent
Leather, bags, and shoes	2.50%
Rubber and plastics	5.70%
Machinery	1.34%
Other vehicles	0.63%
Other manufacturing	2.23%
Timber and products	0.95%
Nonmetal products	3.94%
Computer and office products	5.06%
Textile	7.20%
Food products	3.86%
Medical and sophisticated products	1.16%
Apparel	3.85%
Automobiles	11.59%
Electrical machinery	1.80%
Electronics	33.80%
Primary metal products	7.31%
Fabricated metal products	2.36%
Printing	0.41%
Petroleum	0.04%
Pulp and paper	1.01%
Chemical	3.27%

Source: Export-Import Bank of Korea.

Table 3: Summary Statistics

	Mean	St. Dev.	Obs
ln(L)	4.85	1.38	44314
ln(Y)	18.63	1.58	45333
ln(Y/L)	18.15	0.92	44115
ln(fixed asset)	17.69	1.78	45623
ln(net profit)	11.53	6.38	45623
ln(management cost)	16.37	1.79	45623
ln(tangible asset)	17.33	1.93	45623
ln(total asset)	18.55	1.61	45623
ln(total capital)	15.79	4.68	45623
ln(total liability	18.22	1.76	45623
ln(age)	2.1	1.02	45623
Export	0.35	0.48	45623
Chaebol	0.04	0.2	45623
Post 1992	0.63	0.48	45623

Source: Export-Import Bank of Korea and KIS dataset.

Table 4: Number of Multinationals in the Dataset

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
a. New MNCs															
MNCs	4	4	6	9	12	15	20	32	46	73	123	194	250	377	462
MNCs into LDCs	0	0	0	0	1	1	1	3	10	28	60	105	147	250	319
MNCs into DCs	4	4	6	9	11	13	18	27	33	41	58	84	96	114	129
b. including additional investments of Establised MNCs															
MNCs	5	6	8	12	17	22	29	51	76	122	201	303	410	621	793
MNCs into LDCs	0	0	0	0	2	3	3	10	27	59	104	170	245	422	556
MNCs into DCs	5	6	8	12	15	20	27	44	55	76	114	151	191	243	291

Before 1980, about 30 firms invested abroad.

Table 5: Firm Characteristics Differentials

Dep. Variable	β	R-squared	Obs
1. Multinationals vs. national firms			
ln(Y)	0.984	0.2	45333
	[0.016]***		
ln(L)	0.836	0.3	44314
	[0.013]***		
ln(Y/L)	0.129	0.21	44115
	[0.009]***		
2. Multinationals to LDCs vs. national firms			
ln(Y)	0.716	0.16	41357
	[0.018]***		
ln(L)	0.626	0.27	40355
	[0.014]***		
ln(Y/L)	0.069	0.2	40161
	[0.011]***		
3. Multinationals to DCs vs. national firms			
ln(Y)	1.447	0.21	36911
	[0.026]***		
ln(L)	1.206	0.31	35948
	[0.021]***		
ln(Y/L)	0.227	0.2	35760
	[0.015]***		

Regression results of
$\ln X_{ijt} = \alpha + \beta MNC_{ijt} + \sum_t \gamma_t Year_t + \sum_j \lambda_j Sector_j + \varepsilon_{ijt}$.
i, j, and t denote firm, industry, and year, respectively. MNC_{ijt} is dummy variable whether i is a MNC. * significant at 10%. ** significant at 5%. *** significant at 1%.

Table 6: Probit

	MNCs	MNCs into LDCs	MNCs into DCs
ln(Y)	0.265	0.317	0.035
	[0.052]***	[0.057]***	[0.095]
ln(Y/L)	-0.209	-0.27	0.012
	[0.038]***	[0.043]***	[0.064]
ln(fixed asset)	-0.019	-0.009	0.039
	[0.092]	[0.098]	[0.166]
ln(net profit)	0.006	0.008	0.001
	[0.004]*	[0.004]*	[0.006]
ln(management cost)	0.004	-0.08	0.246
	[0.035]	[0.039]**	[0.065]***
ln(tangible asset)	0.037	0.011	0
	[0.063]	[0.067]	[0.114]
ln(total asset)	-0.151	-0.182	-0.079
	[0.107]	[0.121]	[0.186]
ln(total capital)	0.021	0.014	0.046
	[0.007]***	[0.007]**	[0.019]**
ln(total liability)	0.051	0.064	0.007
	[0.071]	[0.080]	[0.116]
ln(age)	-0.004	0.04	-0.074
	[0.028]	[0.033]	[0.047]
Export	0.233	0.211	0.238
	[0.046]***	[0.052]***	[0.082]***
Chaebol	-0.072	-0.148	-0.138
	[0.101]	[0.140]	[0.141]
Post 1992	-0.047	4.595	-0.98
	[0.244]	[0.713]***	[0.279]***
Year effect	yes	yes	yes
Industry effect	yes	yes	yes
Observations	24703	21956	24167
Pseudo-R2	0.1	0.09	0.13

* significant at 10%. ** significant at 5%. *** significant at 1%.

Table 7: Features of the Probit

predicted prob. of FDI	FDI rate	No. of MNCs	Total No. of obs
.00-.05	0.016	321	19824
.05-.10	0.056	98	1733
.10-.15	0.088	26	296
>.15	0.170	17	100

Table 8: Mean Difference between MNCs and Nationals before Time t: Comparing Matched and Unmatched Data

	unmatched			matched		
	MNCs	National	significance	MNCs	National	significance
1. MNCs vs. nationals						
ln(Y)	19.574	18.852	yes	19.574	19.532	no
ln(Y/L)	18.114	18.017	yes	18.114	18.127	no
ln(fixed asset)	18.668	18.004	yes	18.668	18.624	no
ln(net profit)	13.241	11.900	yes	13.241	13.220	no
ln(management cost)	17.289	16.629	yes	17.289	17.266	no
ln(tangible asset)	18.328	17.693	yes	18.328	18.286	no
ln(total asset)	19.476	18.825	yes	19.476	19.429	no
ln(total capital)	17.461	16.183	yes	17.461	17.453	no
ln(total liability)	19.143	18.496	yes	19.143	19.106	no
ln(age)	2.504	2.246	yes	2.504	2.503	no
Export	0.655	0.378	yes	0.655	0.651	no
Chaebol	0.051	0.048	no	0.051	0.048	no
Post 1992	0.580	0.430	yes	0.580	0.600	no
2. MNCs into LDCs vs. nationals						
ln(Y)	19.325	18.847	yes	19.325	19.330	no
ln(Y/L)	18.098	18.069	no	18.098	18.086	no
ln(fixed asset)	18.406	18.028	yes	18.406	18.428	no
ln(net profit)	12.849	11.844	yes	12.849	12.837	no
ln(management cost)	17.020	16.631	yes	17.020	17.040	no
ln(tangible asset)	18.065	17.710	yes	18.065	18.075	no
ln(total asset)	19.218	18.837	yes	19.218	19.227	no
ln(total capital)	16.988	16.158	yes	16.988	17.008	no
ln(total liability)	18.899	18.510	yes	18.899	18.904	no
ln(age)	2.457	2.231	yes	2.457	2.456	no
Export	0.630	0.399	yes	0.630	0.624	no
Chaebol	0.031	0.044	no	0.031	0.031	no
Post 1992	0.670	0.483	yes	0.670	0.680	no
3. MNCs into DCs vs. nationals						
ln(Y)	20.037	18.850	yes	20.003	19.990	no
ln(Y/L)	18.152	18.016	yes	18.148	18.181	no
ln(fixed asset)	19.151	18.001	yes	19.114	19.108	no
ln(net profit)	13.890	11.910	yes	13.849	13.737	no
ln(management cost)	17.814	16.629	yes	17.782	17.771	no
ln(tangible asset)	18.808	17.690	yes	18.771	18.747	no
ln(total asset)	19.963	18.822	yes	19.927	19.916	no
ln(total capital)	18.392	16.198	yes	18.355	18.341	no
ln(total liability)	19.604	18.492	yes	19.568	19.569	no
ln(age)	2.580	2.244	yes	2.570	2.578	no
Export	0.689	0.379	yes	0.687	0.693	no
Chaebol	0.093	0.049	yes	0.093	0.091	no
Post 1992	0.348	0.430	yes	0.351	0.376	no

Units: L is in number of workers. Y is in Korean currency(W). Significance is at 10% level.

Table 9: Covariate Balancing, Before and After Matching

	No. of Treated	No. of controls	Probit R2 before	Probit R2 after	Median bias before	Median bias after
MNCs vs. Nationals	462	3763	0.067	0.001	43.855	1.781
MNCs into LDCs vs. Nationals	319	2641	0.055	0.001	28.440	0.711
MNCs into DCs vs. Nationals	128	1180	0.092	0.002	65.472	0.913

Table 10: Employment Growth post-FDI, difference-indifference Estimates of Equation (3)

	new MNCs only			incl. established MNCs		
	MNCs	MNCs into LDCs	MNCs into DCs	MNCs	MNCs into LDCs	MNCs into DCs
1. One-year diff.						
α	-0.015	-0.022	0.001	-0.02	-0.018	-0.007
	[0.010]	[0.012]*	[0.018]	[0.008]**	[0.009]**	[0.011]
Industry effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
No. MNCs	462	319	128	781	553	281
2. Two-year diff.						
α	-0.017	-0.047	0.036	-0.018	-0.028	-0.005
	[0.018]	[0.021]**	[0.033]	[0.015]	[0.017]*	[0.022]
Industry effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
No. MNCs	357	234	109	583	397	226
3. Three-year diff.						
α	-0.016	-0.063	0.072	-0.026	-0.051	-0.001
	[0.028]	[0.035]*	[0.048]	[0.024]	[0.028]*	[0.033]
Industry effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
No. MNCs	241	140	93	381	229	178

* significant at 10%. ** significant at 5%. *** significant at 1%.

Table 11: Employment Growth pre- and post-FDI, difference-in-difference Estimates of Equation (4)

	new MNCs only			incl. established MNCs		
	MNCs	MNCs into LDCs	MNCs into DCs	MNCs	MNCs into LDCs	MNCs into DCs
1. One-year diff.						
$\gamma 1$	0.04	0.038	0.052	0.022	0.019	0.019
	[0.010]***	[0.012]***	[0.018]***	[0.008]***	[0.009]**	[0.012]
$\gamma 2$	-0.006	-0.007	0.001	-0.001	-0.01	-0.001
	[0.005]	[0.006]	[0.010]	[0.006]	[0.006]	[0.008]
α	-0.055	-0.059	-0.05	-0.043	-0.039	-0.028
	[0.013]***	[0.016]***	[0.025]**	[0.011]***	[0.013]***	[0.016]*
Industry effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
No. MNCs	462	319	128	781	553	281
2. Two-year diff.						
$\gamma 1$	0.057	0.033	0.076	0.012	0.007	0.035
	[0.016]***	[0.020]	[0.025]***	[0.013]	[0.016]	[0.019]*
$\gamma 2$	-0.024	-0.037	-0.03	-0.033	-0.047	-0.018
	[0.012]**	[0.016]**	[0.018]*	[0.012]***	[0.015]***	[0.014]
α	-0.076	-0.08	-0.039	-0.033	-0.037	-0.042
	[0.023]***	[0.029]***	[0.039]	[0.019]*	[0.023]	[0.028]
Industry effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
No. MNCs	357	234	109	583	397	226
3. Three-year diff.						
$\gamma 1$	0.042	0.011	0.069	-0.002	-0.025	0.003
	[0.028]	[0.035]	[0.044]	[0.022]	[0.027]	[0.030]
$\gamma 2$	-0.069	-0.09	-0.077	-0.048	-0.045	-0.074
	[0.023]***	[0.042]**	[0.030]**	[0.020]**	[0.028]	[0.025]***
α	-0.059	-0.074	-0.002	-0.025	-0.03	-0.003
	[0.038]	[0.049]	[0.060]	[0.031]	[0.038]	[0.042]
Industry effect	yes	yes	yes	yes	yes	yes
Year effect	yes	yes	yes	yes	yes	yes
No. MNCs	241	140	93	381	229	178

* significant at 10%. ** significant at 5%. *** significant at 1%.

Table 12: Panel estimation

	FDI	FDI into LDCs	FDI into DCs
β	-0.041	-0.047	-0.017
	[0.013]***	[0.014]***	[0.032]
Fixed effect	yes	yes	yes
Year effect	yes	yes	yes
R-squared	0.08	0.08	0.08
Obs	29193	27985	25221

Regression results of $\Delta \ln(L)_{it} = \alpha_i + \beta CS_{it} + \sum_t \gamma_t Year_t + \varepsilon_{it}$. i and t denote firm and year, respectively. CS_{it}=1 if a firm i starts investing from t. * significant at 10%. ** significant at 5%. *** significant at 1%.