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THE IMPACT OF OUTWARD
FOREIGN DIRECT INVESTMENT ON
MULTINATIONALS' EMPLOYMENT
AT HOME**

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Joonhyung Lee

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ABSTRACT

Does Where You Go Matter? The Impact of Outward Foreign Direct Investment on Multinationals' Employment at Home

How does outward foreign direct investment (FDI) affect employment growth of the multinationals (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, of investing in more advanced countries, and of changing the direction of one's investment from more to less advanced nations. To obtain suitable control groups in each case, we use the propensity score method to select national firms that ex post did not make investment decisions even though ex ante they would have been equally likely to each multinational. We find that moving to less advanced countries (as an initial foreign investment or as a redirection of previous investment) decreases a company's employment growth rate. On the other hand, moving to more advanced countries does not affect employment growth in any significant way.

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1. Introduction

In this paper we study a question that has been at the center of heated public debates for some time. We investigate the causal link between a multinational's (MNC) employment growth rate at home and the multinational's decision to send its foreign direct investment (FDI) to either more or less advanced countries. With a unique data set of South Korean firms that links, at the firm level, the MNC's parent and its affiliates abroad, we can explicitly differentiate the impact of FDI by destination. To address issues of self-selection and endogeneity, we compare the employment growth rate of firms that change status with that of a carefully chosen control group. For example, we compare employment growth of established MNCs that, for the first time, invest in less developed countries with those that continue solely to be active in advanced countries. Ex ante, however, the latter MNCs are equally likely to shift destination and move to less advanced countries. Similarly, we also match firms that, for the first time, invest respectively in more or in less advanced countries with comparable firms that do not invest abroad at all.

Since the mid 1980s increasingly larger flows of foreign direct investment have found their way to China.[1] China now tops the list of FDI recipients worldwide and in recent years it has even occasionally surpassed the US in this respect. China is 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 that have increasingly allowed their own firms to invest abroad. Reminiscent of the debates surrounding NAFTA in the US, 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

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[1] See UN (2002)

of the rush into China".[2] As if it underscores the similarity with the NAFTA debate, Ross Perot's notorious 1993 phrase -"A giant sucking sound" - has popped up again.[3]

South Korea, like other countries in the region, 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 the lion share of South Korea's outward FDI to less advanced nations. From this perspective, the question that we study, to a large extent, amounts to investigating whether investing in China has in any way different implications for MNC's parent firm's employment in South Korea than investing in the other region such as the US or in Europe.

Whether the particular destination country of FDI matters for employment at home is primarily an empirical question. The theory of the multinational has emphasized two types of FDI: horizontal and vertical FDI.[4] While there is likely to be a horizontal and vertical dimension to any FDI activity, the public debate suggests and the empirical literature confirms that multinational activities with the North are more likely of the horizontal type and those with the South of the vertical kind.[5] Still, the theory does not conclusively differentiate the impact of FDI on employment by type.[6] For both, one could argue that short-term losses are likely. For the horizontal firms, these can be related to how multinational activity is defined, i.e. as a substitute for exports. To save transportation costs and with moderate plant-specific increasing returns to scale, MNCs

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[2] 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."

[3] 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.

[4] For a good discussion of the literature, see Markusen and Maskus (2001) and Markusen (2002). Brainard (1997) and Markusen (1984) have emphasized the horizontal dimension of FDI. Helpman (1984) was the first to formalize the vertical dimension of multinational activity as firms relocate to take advantage of factor price differences. Helplman, Melitz and Yeaple (2003) and Antras and Helpman (2004) present the theoretical counterparts for respectively horizontal and vertical MNCs and explicitly take firm heterogeneity into account.

[5] Hanson, Mattaloni and Slaughter (2004) and Debaere (2004) provide evidence that there is a vertical dimension to MNC activity and that MNCs take advantage of factor price differences in the way they organize themselves.

decide to produce in the foreign market the goods they used to produce domestically and export. FDI activity in this way may depress domestic production. As for the vertical dimension of multinational activity, multinationals can break up the production process ("fragment production") and relocate entire stages of production to low-wage countries to produce more cost effectively. In this way multinational activity may reduce domestic employment at the parent plant. However, and this is true for both types of FDI, in a growing market, foreign affiliates may increase demand for the parts/services produced in the country of origin. In sum, in both cases there is the possibility of negative short-term effects in which foreign activities may substitute for domestic employment and the possibility for potentially positive long-term effects that may prove complementary to domestic production. Therefore, any empirical study will have to be careful about the timing of investment and its effect.

The question how the particular destination of FDI affects employment in the MNC at home has so far not been answered satisfactorily. In part, this is due to the lack of data that match a firm in a home country with the destinations of its affiliates.[7] In spite of this, the tenor of the existing research has been that concerns about the negative impact of multinational activity have been overstated.[8] Amiti and Wei (2004), Barba Navaretti and Castellani (2004), Braconier and Ekholm (2002) and Brainard and Riker (1997a, 1997b) are a few examples of studies that all investigate multinational employment in the home country. However, these studies all have a somewhat different focus from ours for one or two reasons. First, most firm-level FDI studies that assess the impact of FDI on employment or output focus only on the binary decision of whether a firm opens up an affiliate abroad or not, irrespective of its destination.[9] Moreover, note that outward FDI studies tend to be for developed countries whose affiliates are overwhelmingly in other developed countries. Therefore, these studies may not give a sense of whether there is any ground for the fear of "hollowing out" from outward activities in the "South".

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[6] One could argue that because of prevalent use of the Dixit Stiglitz model (and the high degree of symmetry implied) the existing models are perhaps not particularly well fit to analyze the implications of FDI on firm size.

[7] See Lipsey (2001)

[8] For a survey of the relevant literature, see Barba Navaretti and Venables (2004)

Secondly, when studies do have data on the destination of multinationals, they mostly either work with aggregate data on regions or sectors or they only focus on the substitution of employment between affiliates. This poses a problem if one wants to gauge the exact impact of FDI on multinational activity, rather than assess whether multinationals are different from national firms or whether sectoral FDI correlates with firm employment. Like Barba Navaretti and Castellani (2004), we will instead assess the impact of FDI by comparing MNC employment growth with what would have happened if the MNC in question had not made the particular investment decision that they did; different from them, however, we will differentiate investment decisions by the destination of the FDI flows.

What is thus needed are proper counterfactuals to compare with the employment growth of multinationals before and after they invest in more or in less advanced countries. In other words, one needs to construct hypothetical performance trajectories for comparable firms that ultimately do not make the same investment decisions. Once these control groups exist, a difference-in-difference analysis can then show whether indeed investing in a more or less advanced country affects employment growth or not. As Meyer (1995) emphasizes, a judicious choice of control groups is key. We address this concern in two ways.

We construct different comparison groups and investigate whether the results are consistent across control groups. In particular, to assess the impact of investing in less advanced countries, we, on the one hand, focus on the performance of established multinationals that had been investing in more advanced countries and that shift their destination to China or other less advanced nations. We take the multinationals that did not "go South" as control group for this case, yet remained investing in more advanced nations. On the other hand, we isolate firms that become multinationals by investing abroad for the first time. We distinguish these new multinationals by their destination and, for each case, compare them with regular firms that did not invest abroad. Finally, to contrast and compare our findings with previous studies that only consider the binary

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[9] Note that the same is true for the extensive literature that relates a firm's performance to its (changing) export status. See Clerides, Lach and Tybout (1998) and Bernard and Jensen (1999) and references in Tybout (2001).

decision to invest/or not, we also match multinationals as they start investing, irrespective of destination, with regular domestic firms.

A second way in which we are careful about the control groups is by following Meyer (1995)'s suggestion that one should try to make sure that the "untreated" comparison group is very similar to the "treatment group", in our case, the investing firms that change status. To achieve this goal, we apply the propensity score method that has been used in labor market studies such as Heckman et al. (1997). This procedure is warranted since there is striking firm heterogeneity that is most pronounced for firms moving in opposite directions. The idea is to match the firms that change status (i.e. the new MNC to more or less developed nations, the MNCs that change direction) with firms that ex ante were equally likely to make these decisions, yet in the end did not. To our knowledge, Barba Navaretti and Castellani (2004) is the only study so far that has applied this matching methodology combined with a difference-in-difference approach to multinationals.

Our results indicate that where a firm invests matters for the employment growth of the multinational at home. We find consistently that a Southward move depresses the growth of a firm's employment. This finding is most pronounced for multinationals that had been investing abroad and that start investing in China and other less advanced countries; they grow less than they would have, had they kept investing only in the advanced countries. Similarly, by matching firms that become multinationals by investing in less advanced countries for the first time with comparable national firms that do not invest, we find that multinationals tend to grow less than if they had not invested. On the other hand, we find that the employment growth of firms that, for the first time, invest in more advanced countries is not significantly different from peer firms that do not.

While our approach does not tell whether indeed there is more of a vertical dimension in the multinational activity in China and other developing countries, our estimates give some credibility to the public sentiment that there may be some negative impact on employment growth when firms (irrespective of whether they were multinationals before or not) move into the South. Moreover, our findings may cast a light on the existing results in the empirical literature that have emphasized the non-

neutral or even positive impact on employment of investing abroad. These studies are mostly for developed countries that tend to predominantly direct their investment towards other developed countries. Our findings suggest that these firms, in the absence of any differentiation by destination country, may be driving the conclusion.

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, turn to the construction of counterfactuals, and finally discuss the estimation results before we conclude.

2. Estimation Strategy

As mentioned above, a central concern when studying the impact of outward FDI on the evolution of South Korea's parent's employment relates to simultaneity and self-selection. Does observing differences in firm performance imply that firms have made different decisions in the past or do firms with unequal performance simply make different decisions? In other words, in our case, does firm employment growth slow down because of the investments in a more or a less advanced country, or do firms whose employment grows faster or slower simply tend to invest in different locations? Another equally important issue relates to whether changes in firm performance that one observes are specific to multinationals or whether they are rather due to unobservable shocks that affect national and multinational firms alike. To address both concerns and to answer the question 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 the one hand, on employment growth before and after firms change their status. At the same time, we want to find proper counterfactuals to compare with the employment of these firms that switch status.

We denote as follows the first difference between the growth rate of employment of firms that change their status (the *c*-firms) before (at time *t-1*) and after (at time *t+1*) the change of status, $\Delta \ln \overline{E}_{t,t+1}^{c} - \Delta \ln \overline{E}_{t,t-1}^{c}$. This difference can mean four things corresponding to our four cases. First, it can stand for the employment growth rate of multinationals before and after they change the direction of their investment and move to

less developed countries. Second and third, the difference can also refer to firms' employment growth rate before and after they become multinationals and direct their first investment respectively to a more or a less advanced country. And, finally, as indicated in the introduction, in order to compare our results with those in the previous literature, we will also consider firms' employment growth before and after they become multinationals (irrespective of the destination of the investment).

To properly assess the changing growth rates of the first difference, we need to compare them with the growth performance of a control group of firms that do not change status (the n-firms) and whose employment growth is therefore not affected by the decision to invest in a particular location, i.e. $\Delta \ln \overline{E}^n_{t,t+1} - \Delta \ln \overline{E}^n_{t,t-1}$. Once such proper controls are found, we can determine whether the double-difference estimator $\hat{\alpha}_{DID}$ of equation (1) is consistent with the expectations of the public. Is it negative for the multinationals that move to China and for the firms that invest in less developed countries for the first time? Or, is the estimated coefficient positive as suggested by those who minimize the impact of outward FDI.

$$\hat{\alpha}_{DID} = (\Delta \ln \overline{E}^c_{t,t+1} - \Delta \ln \overline{E}^c_{t,t-1}) - (\Delta \ln \overline{E}^n_{t,t+1} - \Delta \ln \overline{E}^n_{t,t-1}) \tag{1}$$

The key issue is, of course, to find proper control groups of firms that do not change their status. The A and B panels of Figure I should help determine these. The figures are based, on the one hand, on the hypotheses of the differential impact on employment for alternative FDI destinations. On the other hand, they relate to stylized facts about multinationals. Panel A is the familiar graph from Clerides, Lach, Tybout (1998) and Barba Navaretti and Castellani (2004) who respectively focus on the binary decision to export or not and to invest or not, irrespective of destination considerations. Panel A presents the hypothetical average performance trajectories of three groups of firms. Two of them do not change status and consistently differ in their average performance. The trajectory of the firms that do change status, the new exporters or the new investors (referred to as switchers, SW in panel A), then moves from the initially inferior non-exporters or non-investors to the superior performance of the exporters or established MNCs. Note that the performance of this third group is allowed to differ somewhat from that of both other groups. In order to measure the impact of exporting or

investing in light of what would have happened if firms did not start exporting or investing, it is key to compare the performance of firms that change status with the dotted line, which is the performance of a firm from a control group. The control group consists of the set of firms that did not export or invest abroad (the nationals), yet these firms (ex ante) are so similar to the firms that change status that they could have started to export or invest themselves.

As we want to also relate our results to the existing literature, we use panel A for the analysis of the impact of multinationals' investment decisions on their employment growth rates, irrespective of destination. We will, however, also tailor panel A to the destination question and consider firms that start investing in the more advanced countries. We, in addition, consider an alternative scenario in panel B that is of interest for the question whether moving to less advanced countries adversely affects employment. Panel B is almost the mirror image of A: The firms that change status see their superior performance worsen as they invest in the South. In our case, these firms are either the MNCs that previously invested in the North and that now turn to the South (as marked in Panel B), or regular firms that target less advanced countries for their first destination. Here again, note that the firms that change status can differ from the average of the group of firms that they leave. In our case, the control groups will thus either be MNCs that were equally likely to move their investment to less advanced countries (China) but that did not (as marked in panel B), and national firms that end up not moving to China, even though ex ante they were equally likely to. As the firms move South, we expect the employment growth rate to drop.

Note that the four scenarios that we choose are informed not just by the public debate. They also relate to stylized facts that suggest differences in performance across groups. It has been well-documented (primarily for developed countries that tend to invest mostly in other developed countries) that multinationals tend to be larger in terms of employment and output, and that they are also more productive, more profitable and more capital-intensive than regular firms. The first two columns of Table 3 A that presents the sample averages of the variables of interest for multinationals vs. national firms confirm this. Tables 3B, 3C and 3D reveal other facts about multinationals, once they are differentiated by destination. We find that multinationals that move to more

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advanced countries (3C) tend to be far superior to national firms in every respect: higher profits, more productive, more capital intensive and larger in size. On the other hand, first-time investors in less advanced countries are virtually indistinguishable from national firms (3B) on average. Interestingly enough, multinationals that redirect their investment to less advanced countries tend to have stronger indicators than the ones that stay in the advanced countries.[10]

Unfortunately, the hypothetical trajectories that should yield $\Delta \ln \overline{E}_{t,t+1}^{n} - \Delta \ln \overline{E}_{t,t-1}^{n}$ are not directly observable. Moreover, simply comparing the firms that change status with either MNCs in the North or national firms would not be appropriate since, as our stylized facts indicate, both types of firms may be very different from the potential switchers. If we want to isolate the effect of investing in a more or less advanced country, we need to construct, as Meyer (1995) suggests, counterfactuals that are as similar as possible to the firms that change status. It is for this purpose that we use the propensity score matching procedure.

We want to match each firm that changes status with a firm that is similar. This firm is ex ante equally likely to change the direction of its investment or to invest respectively in a more advanced or a less advanced country, yet it eventually ends up not changing its status. We therefore estimate a probit model of the decision to change status for the four different cases that we investigate, based on observable firm characteristics in the period before the investment decision is made.

Based on the probit estimates, it is then possible to compute the probability that each firm changes its status (propensity score) and then to pair each firm that does change its status with its nearest neighbor (with the closest propensity score) that does not. This group of 'nearest neighbors' will constitute the counterfactuals. They are the closest approximation to the dotted line in Figure 1 with very similar ex-ante probabilities of changing their status.[11]

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[10] These findings are consistent with some of the stylized facts reported for Japanese MNCs by Head and Ries (2004). They provide some evidence that (1) MNCs are larger/more productive than non-MNCs (2) 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.

[11] 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).

Once we have the counterfactuals, we can calculate the difference-in-difference estimator $\hat{\alpha}_{DID}$. The estimator is obtained from the following regression (2) that has the added benefit of controlling for unobserved heterogeneity that might not have been eliminated by matching and that might affect the firm's performance after its investment, see Meyer (1995). An important identifying assumption is that $\hat{\alpha}_{DID}$ is zero if a firm does not change its status, or $E[\varepsilon_{it}^s \mid d_t^s] = 0$.

$$\Delta \ln E_{it}^s = \gamma_0 + \gamma_1 d_t + \gamma_2 d^s + \alpha_{DID} d_t^s + x'\lambda + \varepsilon_{it}^s, \qquad (2)$$

where the covariates x control for other sources of heterogeneity and d refers to different sets of dummies. 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; the subscripts $t = 0, 1$ refer to the period before and after the change of status. To summarize, the dummies take on the following values:

$$d_t \begin{cases} = 1 \ if \ t = 1 \\ = 0 \ Otherwise \end{cases}$$

$$d^s \begin{cases} = 1 \ if \ s = c \\ = 0 \ Otherwise \end{cases}$$

$$d_t^s \begin{cases} = 1 \ if \ t = 1 \ and \ s = c \\ = 0 \ Otherwise \end{cases}$$

The coefficient of interest is the third one, α_{DID}. If it is positive (negative), it implies that changing status has a positive (negative) effect on the employment growth rate. The first and second dummy variables will respectively control for any difference between the pre- and post-change period and between firms that change status and the ones that do not. For completeness, we will also report the standard matching estimator (α_{SM}) that is obtained by setting t = 1 in regression (3). In other words, in this case we focus on the differences in employment growth in the period after the investment decision.

$$\Delta \ln E_{it}^s = \delta_0 + \alpha_{SM} d^s + x'\delta + \upsilon_{it}^s \qquad (3)$$

3. Data Description

The firm-level data used in this paper are taken from the *KIS Financial Analysis System 2000* and *KIS Stock Market Analysis Tool 2000* database of the Korea Investors Services Co., Ltd. The data contains the balance sheets and the profit and loss statements of all South Korean firms that are listed on the Korea Stock Exchange.[12] The data is available in annual series from 1980 to 1999. We select the firms in manufacturing between 1980 and 1996, before the South Korean financial crisis in 1997. In all years manufacturing is the largest industry on the Korea Stock Exchange. In 1996, 71.8 percent of all firms listed on Korea Stock Exchange are manufacturing firms. The dataset includes 235 firms in 1980 and 604 firms in 1996.

The dataset provides information on a firm's outputs (sales and exports) and inputs (i.e. total number of workers, capital stock and intermediate inputs). The firms are classified by the 2-digit Korean Standard Industrial Classification (KSIC) codes that are closely related to 2-digit Standard Industrial Classification (SIC) codes used in the US.[13] To deflate the value of total output (defined as total firm sales), industry-specific domestic producer price indices were obtained from the Bank of Korea's *Price Statistics Summary* for various years at the two-digit industry level. The measure of capital input is the book value of fixed assets. The dataset provides assets in four categories: buildings and structures, machinery and equipment, vehicles, and other assets. The Bank of Korea's *Economic Statistics Yearbook* provides the implicit price deflator for three asset categories, buildings and structures, machinery and equipment and vehicles. We weight these price indexes by the average reported value shares of these categories in the Bank of Korea survey to obtain an annual capital deflator. To deflate material expenditures, we use the raw materials price index for the manufacturing sector from the Bank of Korea's *Price Statistics Summary* also for various years.

The KIS database itself does not contain information on firm FDI flows. We therefore merge the KIS data with data from the Export-Import Bank of Korea. The Export-Import Bank of Korea publishes sectoral (3-digit KSIC) data on outward FDI in the *Overseas Direct Investment Statistics Yearbook*. These data are publicly available

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[12] To list on the Korea Stock Exchange, firms have to satisfy several criteria from the Korea Stock Exchange's *Rules and Regulations*. The advantage of these criteria is that they make the pool of firms more comparable which, for the purpose of finding proper matches, is an advantage.

[13] See appendix I

from 1980 to 2000. We, however, have obtained the unpublished firm-level data from the Export-Import Bank of Korea. These data not only specify per firm its level of outward investment, but, critical for our analysis, the host country of a multinational's subsidiaries is also listed. As time goes by, the fraction of firms that consists of multinational corporations increases in the dataset. In 1980 there are only 28 firms that invest abroad, by 1990, however, we have 237 firms setting up subsidiaries abroad and at the end of the period we have some 391 multinationals. Note that we call a firm a multinational from the moment it sends its first investment abroad.

At the end of the sample period, in 1996, South Korea's FDI flows to 93 host countries. We list these countries in Appendix II. We group them into more developed countries, DCs, and less developed countries, LCDs, based on their per capita GDP. For each year, a country is classified into either category if its per capita GDP is higher or lower than that of South Korea. As Figure 2 shows, there is steady increase in firms that start investing abroad - South Korea officially started to gradually liberalize its outward FDI from 1980 onwards. Initially, most of the new multinationals seek as destination a more advanced country - the lion share of these multinationals set up affiliates in the US. However, from the late 1980s onwards there is a dramatic increase in firms that invest in less advanced countries as they become multinationals. An important factor in this regard is the normalization of the relations between China and South Korea - In 1992 South Korea and China establish diplomatic relations. As Figure 3 illustrates, around that same period, multinationals that were already investing in more advanced countries change the destination of their investments abroad and also open affiliates into less advanced countries. Note that the movement from multinationals active in less advanced countries into more advanced ones is less pronounced, and too limited for a formal analysis.

Table 1 summarizes the movements of the South Korean firms. The first row reports for each year the total number of firms, which is the sum of the multinationals (in the second row) and the national firms that do not invest abroad (in the eighth row). For each year we report the number of new multinationals in row three and break it down according to whether their initial destination is a more or a less advanced country in the next two rows. We denote the firms that change status SW, from switchers. For example, of the total of 35 switchers in 1990, 18 have a more advanced country as their first

destination and 17 a less advanced country. The reported numbers here are the ones used for Figure 2. The next two rows focus on the multinationals that change direction, i.e. those that were investing in a more advanced country and move to a less advanced country and vice versa. Figure 3 visualizes these multinationals that switch direction.

For the econometric analysis we end up using 452 firms. There are two reasons for the attrition of the sample. One, we can only include firms that have a complete list of variables, i.e. number of workers, capital, output, intermediates, and profits – a fair number of multinationals do not report all. Second, we drop firms with abnormal values (excessively low/high variables compared to the other variables in some years). Accordingly, the number of firms that change status and the number of national firms decreases as well. The first two columns of the Tables 3 A through D report the sample averages for the different subsets of our sample that are relevant for our analysis: multinationals vs. non-multinationals, firms that move into less advanced countries and those that go to more advanced nations, and multinationals that change direction and move to less advanced countries vs. those that stay in more advanced countries.

4. Constructing Counterfactuals

Our analysis centers around firms that change status – be it firms that become a MNC irrespective of destination, that become a MNC respectively in the more or in the less advanced country, or MNCs that were active in more advanced countries and start opening affiliates in less advanced countries. We want to match each of these firms with a comparable firm that could have, yet in fact has not, made an investment decision, in order to determine whether the investment decisions do matter for employment growth.

For our before-and-after exercise, we need for each firm that changes status a four-year window. If, say, a firm starts investing in a less advanced country in 1990, we use its employment figures for 1988 and 1989 to construct the growth rate before, and the 1990 and 1991 numbers for the growth rate after. We move this four-year window through our data set.[14] Each time, we consider the firm that switches status together with respectively national firms (that do not invest abroad in a four-year window or before), or

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[14] Obviously, firms that change status in the first or last two years of the data set cannot be included in the analysis.

with a multinational active in a more advanced country (that does not invest in a less developed country in a four-year window or before).

To find counterfactuals, we run four probit regressions to derive the probability of investing per se/investing in a less advanced country/investing in a more advanced country and switching the destination of one's investment. Each time, the sample includes the firms that change status and national firms (for the first three cases) or multinationals that are active in advanced countries (for the last). The probit is a function of observable firm-specific characteristics of the year before the switch as well as industry dummies and year dummies. The indicator variable SW is 1 if the firm switches or changes status and zero otherwise.

Prob ($SW_{it} = 1 \mid X_{it-1}$, industry dummies, year dummies),

Our firm-specific X_{it-1} - variables include labor, output, profit per labor, capital per labor, a dummy for export experience, and a dummy for whether the firm belongs to one of South Korea's big business conglomerates that are called Chaebol or not.

The first column of Table 2 reports the estimation results. In panel A we first consider the decision to become a multinational, irrespective of the particular destination. Consistent with the average firm characteristics referred to in the previous section, firms that become multinationals tend to be larger in size. We also find that they are more profitable. Also, a good predictor for future investments abroad is whether the firm exported in the past and whether it belongs to a Chaebol – Chaebol tend to be larger in size, more capital intensive and more profitable. In Panel B and C, we compare regular firms with respectively firms that become multinationals in a more and a less advanced country. Telling is that in comparison with multinationals that move into more advanced countries, profitability and size seem to be less of a factor for firms that move into less advanced countries. This is at least consistent with the view that if moving into developing countries is about relocating a production line rather than breaking into a competitive market, it probably does not require higher profitability and bigger size, which seem to be a factor when moving to more advanced countries. The last panel then considers the decision to move into less advanced countries among multinationals that invest in advanced countries. Only prior export performance seems to matter, which suggests that matching comparable firms will be more of a concern for more

heterogeneous groups (say multinationals and nationals) rather than comparing among multinationals. Based on the probit regressions, we match each firm that changes its status with a firm with a similar propensity score that does not change its status.[15]

To check the matched data we run a probit regression only on the pairs of matched data and find as we expected that none of the variables are any longer significant. We report these probit regressions in the second column of Table 2. In Table 3, we show how the sample averages for the firms that change their status and those for the counterfactual matches have become more similar.

The next section presents the estimation results for the various subsamples that we study.

5. Results

The estimation results for the regressions (2) and (3) are reported in Table 4, panels A through D. Each time, we report in the first column the standard matching estimator that only compares the post investment employment growth rate of the firm that invests with that of the counterfactual. In the second column, we then list the difference-in-difference estimator that evaluates the post investment employment growth rates in light of those from the pre-investment period. Also, we include as an additional control the difference in logarithm of output levels to control for those instances where there still was a difference in the means of the matched and unmatched series. (We refer to this case as the conditional difference.)

As a benchmark, we first focus on the results that are familiar from the literature and that do not differentiate by destination. As one can see, for both the DID and the SM estimates, the coefficient of interest is negative but insignificant. This result implies that investing abroad per se does not affect the parent firms' growth rate of employment. This conclusion is in line with the findings of Barba Navaretti and Castellini (2003) who investigate Italian multinationals and also with the results of other previous studies that mostly could not find any significant negative effect. As indicated in the introduction,

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[15] Some switching firms do not have any sufficient close neighbor and get dropped from the matched sample.

this result seems to underscore the conclusion that there are no evident worries about hollowing out. Note that the dummy variable that control for common characteristics of multinationals (vs. nationals) are insignificant. This suggests that the matching was fairly effective.

The following panels of Table 4, however, seem to tell a different story. In these, we explicitly differentiate by investment decisions, i.e. by whether the destination country is more or less advanced than South Korea. Table B reports the effect of firms becoming multinationals in less advanced countries - the control group consists of national firms. With the standard matching estimator, investing in LDCs has a negative effect on the home employment growth rate. However, the coefficient is not significant. When one controls for differences in growth rates before the investment decision, as with the DID estimator, we do find a significant coefficient on the dummy of interest. In other words, this suggests that the growth rate of employment of a MNC's parent firm is less than what it would have been had it not become a MNC that invests in less developed countries. This result gives some support to concerns about negative employment effects of investments in less advanced countries, which in most cases is China.

Table D then reinforces the results obtained in Table B. Here we look at multinationals only. We compare the firms that shift their investment from more to less advanced countries with the matched multinationals that do not. In this instance the coefficient of interest for both the standard matching and the difference-in-difference estimator is significant and negative. This implies again that the employment growth rate for multinationals that decide to go to China is less than what it would have been had they decided to keep their investments in more advanced countries.

Table C then shows the estimates for firms that invest abroad for the first time and that do so in more advanced countries. The control group here again consists of national firms that do not invest during the four-year window or before. The estimates obtained are consistent with those of Table A for investment per se. The coefficients for both specifications are insignificant. They imply that investing in more advanced countries does not make any significant difference. The results from Table A and C are interesting in light of the existing literature that mostly does not differentiate by destination at the firm level. Since the destination countries of FDI flows from most developed countries

are overwhelmingly other developed countries, our results confirm that these do not affect in a significant way employment growth of the parent firms. This, however, does not preclude the possibility that the multinationals from more advanced countries that do move into less advanced countries pay a price in term of domestic employment.[16]

6. Conclusion

We investigate the effect of outward FDI on home employment with a unique data set of Korean firm-level data. In line with the literature that investigates the impact of exporting irrespective of the particular destination, the existing literature on multinationals has focused on the effect of FDI per se. In most instances no significant negative impact of outward investment on employment was found, suggesting that concerns about hollowing out were probably overdrawn. We take this analysis one step further and we bring the particular destination country of outward investment into the analysis. A particular feature of our data is that we, at the firm level, can link each South Korean firm with the particular countries where it has its subsidiaries. We categorize the destination countries into two groups, those that in terms of per capita GDP are more advanced than South Korea (mainly the US) 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 in addition has divided its investment across more and less advanced nations almost evenly.

Our difference-in-difference estimates together with our standard matching estimates suggest that there is a 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 two groups of firms that differ quite significantly from one another. Both the employment growth rate for established multinationals that start investing in less developed countries even though they used to concentrate their investment in more advanced nations and the employment growth rate for firms that invest for the first time in these countries slows down after they have moved to the South. On the other hand, our findings for firms that

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[16] We also do the same work on the employment level change, not growth rate change. The results are qualitatively the same.

for the first time invest in more advanced countries show no significant impact on employment at all.

Our estimates thus indicate that the destination of firms' foreign direct investment does matter. Or more specifically, if firms invest in less advanced countries, there may be a negative impact compared to when they had not invested there. Even though our findings do not specify the specific channel through which employment is affected, they do give some credibility to concerns that have surfaced in the public debate about outsourcing to less developed countries and its impact on employment at home. At the same time, our findings cast a light on the existing literature that has found no negative (and sometimes even a positive) impact of investing abroad. This conclusion that is obtained mostly for studies with firms from developed countries may well be driven by the destination of the FDI that for developed countries is overwhelmingly the developed world.

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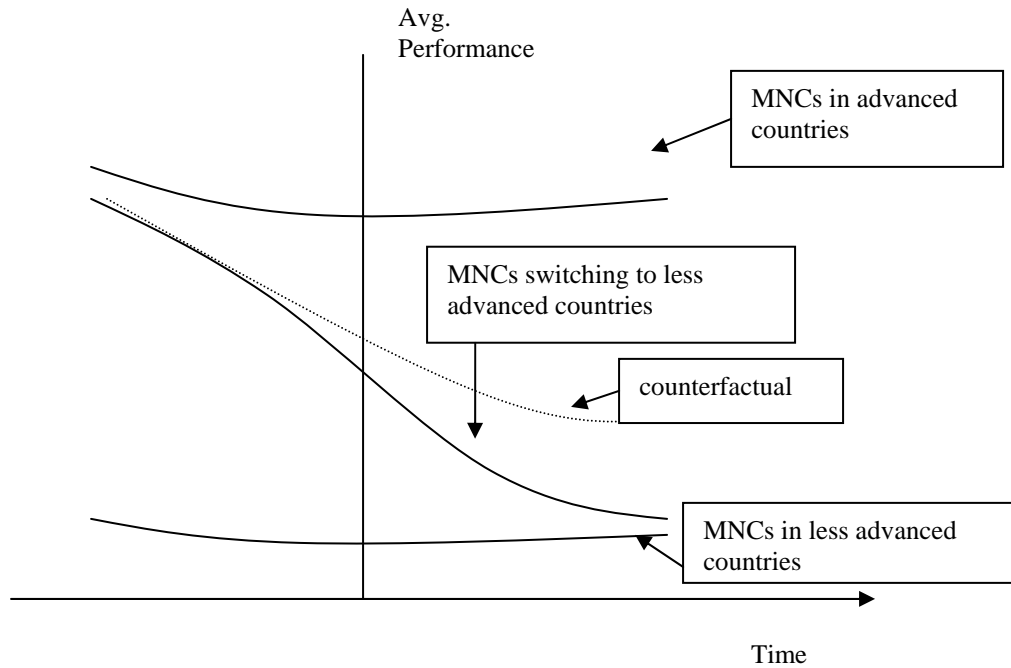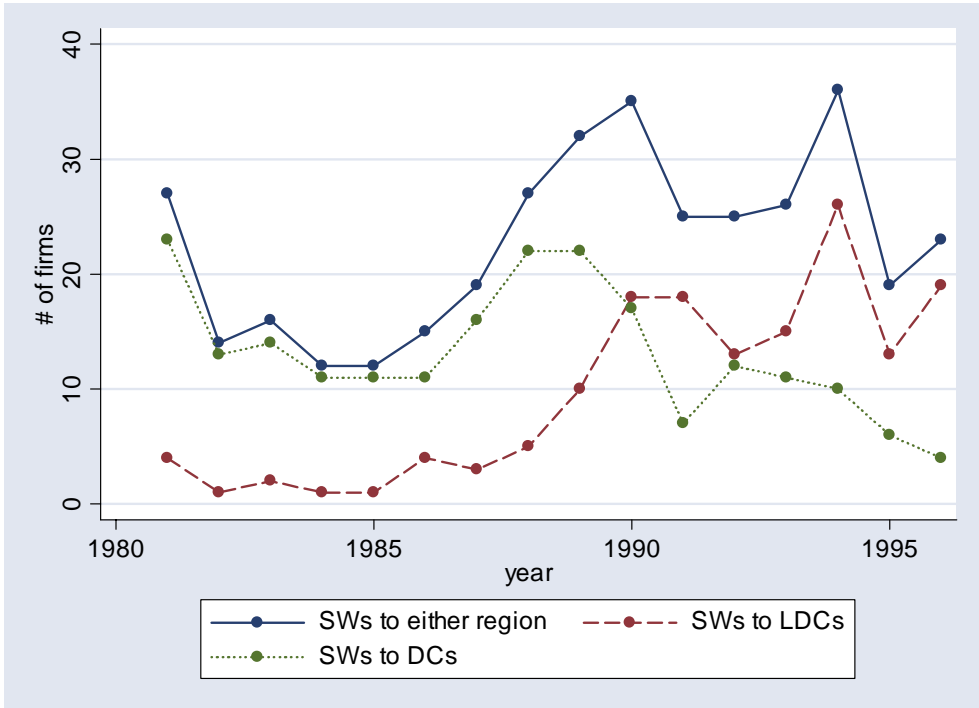
Figure 1. Performance Trajectories

Panel A
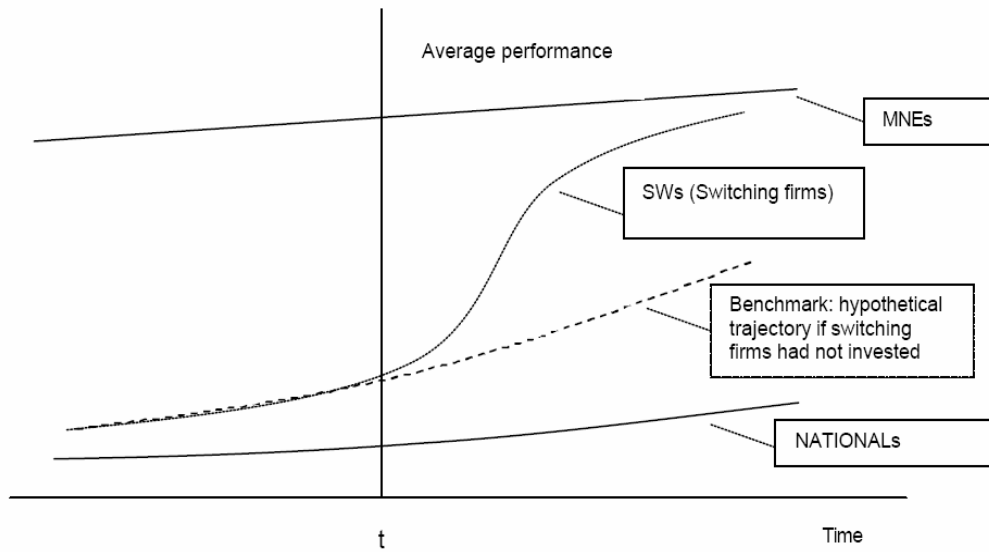
from Navaretti and Castellini (2003)

Panel B

Figure 2. New Multinationals (SW) from South Korea investing in more (DCs) or less developed countries (LDCs)

Figure 3. Multinationals from South Korea switching investment destination (SW)
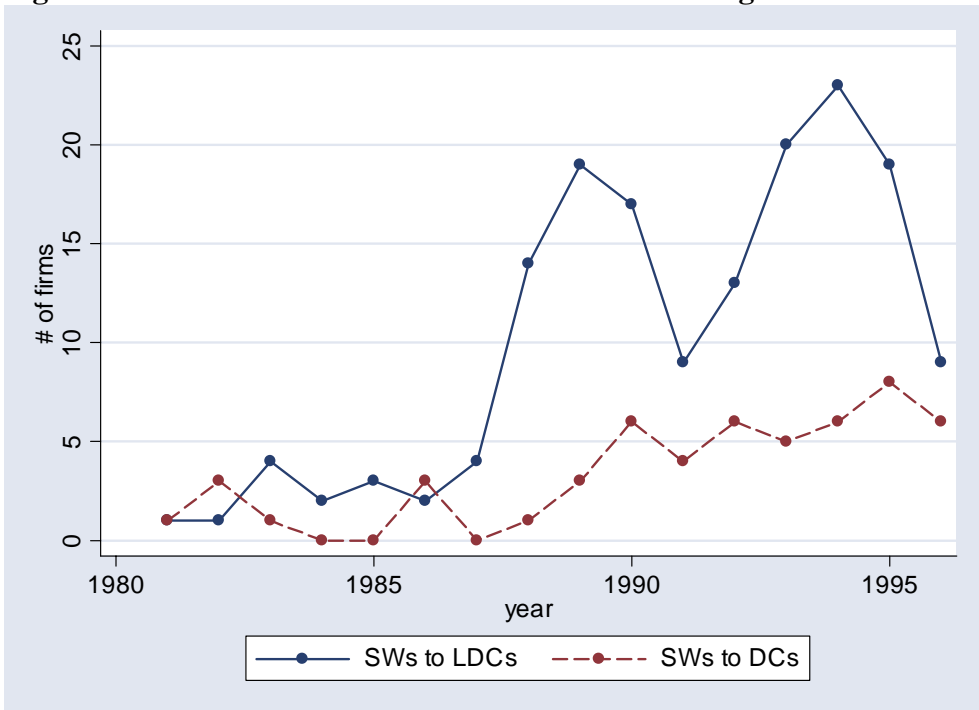
Table 1. The number of firms in the data set

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total Firms	235	241	411	481	512	540	560	577	585	588	594	600	601	603	604	604
MNCs	28	55	69	85	97	109	124	143	170	202	237	262	287	313	349	368
New MNCs by investing in either region*	N.A	27	14	16	12	12	15	19	27	32	35	25	25	26	36	19
New MNCs by investing in LDCs**	N.A	4	1	2	1	1	3	3	4	9	18	17	12	14	25	12
New MNCs by investing in DCs***	N.A	23	13	14	11	11	10	16	22	21	17	7	12	9	8	5
Destination change from DCs to LDCs#	N.A	1	1	4	2	3	2	4	14	19	17	9	13	20	23	19
Destination change from LDCs to DCs##	N.A	1	3	1	0	0	3	0	1	3	6	4	6	5	6	8
Nationals	207	186	342	396	415	431	436	434	415	386	357	338	314	290	255	236

* Difference between the number of MNCs in two years, E.g in 1990l 35 firms (237-202) become MNCs.
** Firms that become multinationals by investing in LDCs for the first time.
*** Firms that become multinationals by investing in DCs for the first time.
SWs to either region is not necessarily summation of SWs to LDCs and SWs to DCs because there are some firms that start investing in both regions at the same time.
The firms among MNCs that switches the investment destination from DCs to LDCs.
The firms among MNCs that switches the investment destination from LDCs to DCs.

Table 1-1. The number of firms in the sample we use

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total Firms	156	160	286	343	367	392	411	427	434	436	442	448	449	451	452	452
MNCs	9	22	28	39	45	56	63	77	93	110	128	147	161	178	201	213
New MNCs by investing in either region	N.A	13	6	11	6	11	7	14	16	17	18	19	14	17	23	12
New MNCs by investing in LDCs	N.A	1	0	1	0	1	0	2	1	4	13	13	6	7	14	7
New MNCs by investing in DCs	N.A	12	5	4	5	8	5	12	13	13	5	5	6	8	6	4
Destination change from DCs to LDCs	N.A	1	0	1	2	0	2	5	12	8	4	9	10	11	10	5
Nationals	**147**	**138**	**258**	**304**	**322**	**336**	**348**	**350**	**341**	**326**	**314**	**301**	**288**	**273**	**251**	**239**

Table 2.   Constructing the Counterfactuals

Prob ($SW_{it} = 1 \mid X_{it-1}$, industry dummies, year dummies)

A. Probability of becoming a MNC (irrespective of destination)

Variable	Unmatched		Matched	
	Coefficient	Std. Error	Coefficient	Std. Error
Labor	.0002**	0.000101	0.00027	0.00021
Output	3E-10	2E-10	-1.19E-09	9.05E-10
Profit per labor	.000003***	0.000001	-5.08E-08	3.68E-06
Capital per Labor	-4.E-08	0.0000001	-1.83E-07	7.29E-07
Export Experience	.36***	0.09	-0.19	0.23
Chaebol	.96***	0.2	-0.16	0.59
Industry dummies	Yes		Yes	
Year dummies	Yes		Yes	
obs.	3391		300	
Pseudo R^2	0.12		0.05	

*, **, and *** is significant at 10, 5, 1 % level

B. Probability of becoming a MNC that goes to less developed countries, LDCs

Variable	Unmatched		Matched	
	Coefficient	Std. Error	Coefficient	Std. Error
Labor	.00017	.00015	.00013	.00037
Output	-1.06E-10	5.22E-10	8.52E-10	1.75E-09
Profit per labor	.0000030	.0000027	.0000025	.0000092
Capital per Labor	-3.94E-07	5.68E-7	-1.35E-07	1.06E-06
Export Experience	.32**	.13	-.601	.394
Chaebol	.85***	.29	-.250	.133
Industry dummies	Yes		Yes	
Year dummies	Yes		Yes	
Obs.	3283		126	
Pseudo R^2	.17		.07	

C. Probability of becoming a MNC that goes to more advanced counties, DCs

Variable	Unmatched Coefficient	Std. Error	Matched Coefficient	Std. Error
Labor	.00019*	.00012	.00032	.00024
Output	4.52E-10	3.09E-10	-1.76E-09	1.25E-09
Profit per labor	.0000026*	.0000014	1.70E-06	4.74E-06
Capital per Labor	-2.79E-08	1.01E-07	7.54E-07	1.34E-06
Export Experience	.398***	.129	.177	.348
Chaebol	1.117***	.240	-.590	.830
Industry dummies	Yes		Yes	
Year dummies	Yes		Yes	
Obs.	3313		156	
Pseudo R^2	.15		.10	

D. Probability that MNCs change their investment destination from DCs to LDCs

Variable	Unmatched Coefficient	Std. Error	Matched Coefficient	Std. Error
Labor	0.00003	0.00005	0.0001	0.0002
Output	6E-12	1.6E-10	2E-11	7.4E-10
Profit per labor	0.000002	0.000002	-0.000003	5.9E-06
Capital per Labor	8.63E-08	0.0000003	-0.000003	0.000002
Export Experience	.61***	0.23	-0.5	0.5
Industry dummies	Yes		Yes	
Year dummies	Yes		Yes	
Obs.	452		106	
Pseudo R^2	0.2		0.05	

*, **, and *** is significant at 10, 5, 1 % level

Table 3. Sample Means for Unmatched and Matched Data

A. New MNCs (SW, irrespective of destination) vs. Nationals

	Unmatched		Matched	
	SWs	Nationals	SWs	Nationals(counterfactuals)
Nr of firms	179	3212	150	150
Labor	602	304	408	419
Output	18,400,000	7,560,000	9,880,000	11,100,000
Capital	14,600,000	2,990,000	3,460,000	4,620,000
Material input	6,600,000	4,000,000	4,610,000	5,640,000
Output per labor	365,860	286,707	322,999	318,621
Profit per labor	24,737	12,493	15,244	15,631
Capital per labor	177,812	95,464	97,654	102,994

B. New MNC in LDCs (SW) vs. Nationals

	Unmatched		Matched	
	SWs	Nationals	SWs	Nationals(counterfactuals)
Nr of firms	71	3212	63	63
Labor	455	304	497	463
Output	9,910,000	7,560,000	11,300,000	9,810,000
Capital	3,100,000	2,990,000	3,500,000	3,510,000
Material input	4,350,000	4,000,000	4,670,000	4,690,000
Output per labor	318,193	286,707	343,616	317,280
Profit per labor	13,030	12,493	16,059	13,740
Capital per labor	84,756	95,464	90,397	106,102

C. New MNCs in DCs (SW) vs. Nationals

	Unmatched		Matched	
	SWs	Nationals	SWs	Nationals(counterfactuals)
Nr of firms	101	3212	78	78
Labor	732	304	366	415
Output	24,800,000	7,560,000	9,930,000	12,900,000
Capital	23,600,000	2,990,000	3,750,000	5,800,000
Material input	8,400,000	4,000,000	5,090,000	6,810,000
Output per labor	393,400	286,707	324,931	323,342
Profit per labor	31,240	12,493	16,037	16,973
Capital per labor	250,603	95,464	106,419	102,470

D. Established MNCs switching to LDCs (SW) vs. MNCs staying in DCs

| | Unmatched | | Matched | |
	SWs	MNCs	SWs	MNCs(counterfactuals)
Nr of firms	75	377	53	53
Labor	1668	1301	1082	994
Output	54,700,000	39,100,000	25,400,000	25,300,000
Capital	29,900,000	57,800,000	9,600,000	18,500,000
Material input	23,300,000	16,300,000	10,500,000	12,300,000
Output per labor	723,699	296,087	291,674	298,884
Profit per labor	47,086	12,122	11,336	13,139
Capital per labor	415,862	145,254	96,112	125,060

Table 4. Difference-in-Difference (DID) and Standard Matching (SM) Estimates

$$\Delta \ln E_{it}^s = \gamma_0 + \gamma_1 d_t + \gamma_2 d^s + \alpha_{DID} d_t^s + x'\lambda + \varepsilon_{it}^s \qquad (2)$$

$$\Delta \ln E_{it}^s = \delta_0 + \alpha_{SM} d^s + x'\delta + \upsilon_{it}^s \qquad (3)$$

A. For firms that become MNCs (irrespective or destination)

Dependent variable	SM method		DID method	
	Unconditional difference	Conditional difference	Unconditional difference	Conditional difference
Dummy on time (γ_1)			.034** (.017)	.028* (.016)
Dummy on SWs (γ_2)			.019 (.021)	.015 (.019)
Dummy on SWs' post investment (α)	-.011 (.018)	-.004 (.016)	-.026 (.026)	-.017 (.023)
R-squared	.09	.29	.08	.23
Year dummy	Yes		Yes	
Industry dummy	Yes		Yes	
Obs.	300		600	

*, **, and *** is significance at 10, 5, and 1% level.
Number in parenthesis is bootstrapped standard error with repetition 1000.

B. For firms that become MNCs in less developed countries, LDCs

Dependent variable	SM method		DID method	
	Unconditional difference	Conditional difference	Unconditional difference	Conditional difference
Dummy on time (γ_1)			.014 (.026)	.012 (.026)
Dummy on SWs (γ_2)			.036 (.031)	.039 (.028)
Dummy on SWs' post investment (α)	-.032 (.028)	-.020 (.027)	-.069* (.036)	-.062* (.036)
R^2	.16	.30	.14	.21
Year dummy	Yes		Yes	
Industry dummy	Yes		Yes	
Obs.	126		252	

C. For firms that become MNCs in developed countries, DCs

Dependent variable	SM method		DID method	
	Unconditional difference	Conditional difference	Unconditional difference	Conditional difference
Dummy on time (γ_1)			.036 (.025)	.026 (.022)
Dummy on SWs (γ_2)			.009 (.031)	.005 (.026)
Dummy on SWs' post investment (α)	-.0005 (.026)	.010 (.023)	-.0008 (.031)	.012 (.029)
R^2	.18	.38	.11	.30
Year dummy	Yes		Yes	
Industry dummy	Yes		Yes	
Obs.	156		312	

D. For established MNCs that move from DCs into LDCs

Dependent variable	SM method		DID method	
	Unconditional difference	Conditional Difference	Unconditional Difference	Conditional difference
Dummy on time (γ_1)			-.009 (.033)	.029 (.030)
Dummy on SWs (γ_2)			.040 (.033)	.036 (.024)
Dummy on SWs' post investment (α)	-.048* (.027)	-.050* (.029)	-.082** (.040)	-.080** (.033)
R^2	.19	.30	.19	.46
Year dummy	Yes		Yes	
Industry dummy	Yes		Yes	
Obs.	106		212	

*, **, and *** is significance at 10, 5, and 1% level.
Number in parenthesis is bootstrapped standard error with repetition 1000.

Appendix 1. Industry Index

1	Food and beverage
2	Textile and apparel
3	Leather and footwear
4	Wood and furniture
5	Paper and printing
6	Petroleum and Chemicals
7	Non-metallic minerals
8	Basic metals
9	Fabricated metals
10	Machinery and equipment
11	Electronics and telecommunication equipment
12	Transportation vehicles
13	other manufacturing

2. Host Countries

1	Algeria	36	Hong Kong	71	Slovak Republic
2	Argentina	37	Hungary	72	Solomon Islands
3	Australia	38	India	73	South Africa
4	Austria	39	Indonesia	74	Spain
5	Bahamas	40	Iran, Islamic Rep.	75	Sri Lanka
6	Bahrain	41	Ireland	76	Sudan
7	Bangladesh	42	Italy	77	Sweden
8	Banuat	43	Jamaica	78	Switzerland
9	Belgium	44	Japan	79	Syrian Arab Republic
10	Bermuda	45	Kazakhstan	80	Taiwan
11	Brazil	46	Laos	81	Tajikistan
12	Brunei	47	Macao, China	82	Thailand
13	Bulgaria	48	Malaysia	83	Turkey
14	Cambodia	49	Mexico	84	Ukraine
15	Cameroon	50	Mongolia	85	United Arab Emirates
16	Canada	51	Morissus	86	United Kingdom
17	Cayman Islands	52	Morocco	87	United States
18	Chile	53	Myanmar	88	Uruguay
19	China	54	Netherlands	89	Uzbekistan
20	Colombia	55	New Zealand	90	Venezuela, RB
21	Costa Rica	56	Nicaragua	91	Vietnam
22	Czech Republic	57	Nigeria	92	Virgin Islands
23	Dominican Republic	58	North Mariana Rep	93	Yemen, Rep.
24	Ecuador	59	Pakistan		
25	Egypt, Arab Rep.	60	Panama		
26	El Salvador	61	Papua New Guinea		
27	Fiji	62	Peru		
28	Finland	63	Philippines		
29	France	64	Poland		
30	Gabon	65	Portugal		
31	Germany	66	Puerto Rico		
32	Guam	67	Romania		
33	Guatemala	68	Russian Federation		
34	Guinea	69	Saudi Arabia		
35	Honduras	70	Singapore		